C2 by Design

**A Handbook for Putting
Command and Control Agility Theory
Into Practice**

Version 1.0

August 2014

CCRP

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Preface

The Department of Defense Command and Control Research Program (CCRP), once housed at the National Defense University and sponsored by the Assistant Secretary of Defense for Networks and Information Integration, has since 2012 been sponsored by the Under Secretary of Defense for Acquisition, Technology, and Logistics; and since 2013 has been housed at the Institute for Defense Analyses in Alexandria, Virginia.

The CCRP is focused on advancing the state of both the art and the practice of command and control (C2). It pursues a broad program of research and analysis in C2 theory, doctrine, applications, systems, the implications of emerging technology, and C2 experimentation. It also develops new concepts for C2 in joint, combined, and coalition operations in the context of both traditional and non-traditional missions.

One such new concept is "Command and Control Agility." Based on years of research and analysis by the CCRP, the central point of the concept—and of this handbook—is that a unique and tailored C2 approach can and should be associated with every operational approach derived as a product of operational design, and that a significant change in circumstances can and probably should necessitate a change to the C2 approach. The concept is consistent with and puts into practice the joint command and control fundamentals of Joint Publication 1, Doctrine for the Armed Forces of the United States (25 March 2013).

Military history provides ample evidence of military commanders achieving success by changing their approach to C2. Admiral Nelson's victory at Trafalgar, for example, depended upon a new operational approach that could not have been implemented without a corresponding change to the C2 methods then in use in the Royal Navy. Rather than insisting on their rigid obedience to signal flags hoisted by his flagship, Nelson delegated substantial authority to his subordinate ship captains, in the process conveying his commander's intent clearly and concisely:

> In case signals can neither be seen or perfectly understood, no captain can do very wrong if he places his ship alongside that of the enemy.[1]

History also provides instances where sticking with an inappropriate C2 approach may have helped bring about an operational failure. Although other factors contributed, the German Army leadership's continued reliance on a C2 approach that had proven successful

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[1] Lord Nelson to his captains, prior to the Battle of Trafalgar, 21 October 1805. Royal Museums Greenwich website, "Quotations, Vice-Admiral Horatio, Lord Nelson." http://www.rmg.co.uk/explore/sea-and-ships/in-depth/nelson-a-z/quotations Accessed 28 July 2014.

in the past may have helped French-British forces escape defeat at the Battle of Frontiers in 1914. The selected C2 approach was based on an assumed level of shared awareness across German forces—an assumption that proved to be invalid as the battle unfolded.[2]

What Admiral Nelson did—and the German high command did not do—was to manifest agility. Agility refers to the capability to operate successfully in the face of changes to the mission or circumstances.[3] *C2 Agility* refers to selecting an approach to command and control that is appropriate to the nature of the mission, the force and its capabilities, and the prevailing circumstances; and making appropriate adjustments when these factors change. Given the growing complexity and dynamism of military operations, C2 Agility is, and will surely remain, an important element of the business of command.

The aim of this booklet is to help commanders and their plans and operations staffs become successful practitioners of C2 Agility. By thinking about and "test driving" the concepts presented here, they should come to appreciate 1) the central role C2 plays in planning and executing operations; 2) the need to consider the C2 approach as a key operational variable; 3) the differences between and among various C2 approaches and how they best align with different sets of conditions; 4) how to assess whether a change in C2 approach is needed; and 5) how to switch to a more effective approach.

The ultimate aim of this CCRP effort is to move C2 Agility from theory to concept to practice; and to see it recognized as a "best practice," incorporated into the joint operation planning process and codified in joint doctrine.[4]

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[2]   These and other examples are presented in greater detail in Appendix A.

[3]   The terms adaptability and agility are often used interchangeably. This booklet uses the C2 research community's preferred term, *agility*, which adds the qualities of ease and timeliness to adaptability's capacity for adjusting in response to changed conditions.

[4]   The Deployable Training Division of the Joint Staff's Directorate for Joint Force Development (J-7) collects and compare practices among the different headquarters, draws out and refines "insights" and "best practices," publishes them on the Joint Electronic Library website, and shares them across the operational, training, lessons learned, doctrine, and joint development communities. See the current collection at http://www.dtic.mil/doctrine/fp/focus_papers.htm (accessed 28 July 2014)

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1. Introduction: C2 Agility Theory

This handbook provides a basis for establishing an initial command-and-control (C2) approach and assessing C2 in practice. It is intended to help commanders and staffs see the need for and make dynamic adjustments to the C2 approach, thereby enabling better, more informed decisions. The concept presented here is intended to complement and supplement, not supplant, joint doctrine regarding command and control. The handbook is envisioned as a practical companion to Joint Publication (Joint Pub) 5-0, *Joint Operation Planning*.

Today's US military forces are expected to cope with challenges ranging from a peer competitor in a traditional combat scenario to asymmetric insurgent groups using hit-and-run and terrorist tactics; to cyber-attacks, either stand-alone or in combination with kinetic attacks; to humanitarian operations, disaster relief, and homeland security. These challenges require an assured capability to conduct the full range of military operations with a variety of partners, in a variety of operating environments, and under a variety of circumstances. Such operations will normally be joint, and will often include inter-agency partners, allies, and other military forces. Complicating matters further, non-governmental organizations and other actors may be dealing with the same challenge in their own ways, independent from the United States and its coalition partners. Complex environmental factors, opposition from a skillful enemy, presence of other hostile groups (perhaps fighting each other), or simply the weather and geography can further compound operational challenges.

This operational complexity has been widely recognized by the senior leadership of the Department of Defense (DoD), and there have been repeated calls to increase the agility of US forces. Our forces in Operation Iraqi Freedom (OIF) and Enduring Freedom (OEF) successfully exhibited many agile behaviors, including innovative approaches to C2. However, these manifestations of agility were largely ad hoc and idiosyncratic. They were not based on empirically informed theory or experimental findings, nor were they validated rigorously in the field or (in many cases) even featured prominently among lessons learned. Consequently they have not yet been thoroughly incorporated into

doctrine, education, and training.[5] Neither recent innovative experience nor high-level exhortations have yet produced the desired degree of force agility in general, or C2 Agility in particular.

One major barrier to agility is institutional inertia. For many years the organizational structures and processes for most US forces were based primarily on requirements designed for major combat operations against a conventional threat, with everything else considered a "lesser included case." This was also true of generating forces, including the institutional underpinnings such as schools and training establishments. Major adaptations were forced upon the armed forces to meet the requirements of OEF and OIF, and now, after more than a decade of rotational deployments to the same theaters, often to the same locations, the Cold War paradigm has been replaced. US forces have grown accustomed to conducting counterinsurgency and counter-terrorism operations, supported by extensive intelligence, surveillance, and reconnaissance and robust, mature communications. A different set of missions, for example combat operations against a conventionally armed enemy or humanitarian relief operations in a semi-hostile environment (see Somalia vignette in Appendix A) would require "out of the box" thinking and many changes to what have become the established ways of doing business.

Agility can apply to many dimensions of a military organization, including the organization itself (reorganizing when the situation demands), its equipment, its training, and its basic operational functions (C2, intelligence, fires, movement and maneuver, protection, and sustainment).[6] But the most important dimension by far is leadership. Without agile leaders who can recognize when things are not going as planned, challenge their own preconceptions, change their own behaviors, and shape those of their subordinates, it will be impossible to increase the agility of organizations or forces. Individual leaders and the organizations to which they belong must be primed for learning and prepared to adapt their C2 approach to the mission and the environment at hand, not those they remember or are most comfortable with.

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[5] This is not to say there have not been concerted efforts to improve C2 within and among the Services. An example is the first use of a Joint Force Air Component Command in Operation Desert Storm, and the subsequent evolution of the Air Operations Center (AOC). By 2005, the Pacific AOC was the locus for Air Force participation in Operation Unified Assistance (tsunami relief operations in Southeast Asia) and just months later conducted exercises involving a major theater conflict.

[6] Joint Pub 3-0, Joint Operations, 11 August 2011, Chapter III

Fortunately, with OIF and OEF as catalysts, the US Armed Forces have recognized that leadership is paramount and have embraced operational design as an iterative method for taking on complex and dynamic problems.[7] Operational design implies the need to tailor one's approach and behaviors to the problem at hand; therefore, no one-size-fits-all approach exists for either operations or joint functions like C2. Commanders need to understand whether a particular C2 approach is appropriate and how to transition smoothly from one C2 approach to another.

The basic concept of *mission command* is thoroughly consistent with operational design and the development of an operational approach. Joint doctrine defines mission command simply as "the conduct of military operations through decentralized execution based upon mission-type orders." In his 2012 Mission Command White Paper, the Chairman of the Joint Chiefs of Staff embraced this doctrine and emphasized its applicability to the future operational environment. While the preferred C2 approach is decentralized, with subordinate leaders given freedom to develop their situations and exploit opportunities, consistent with the commander's intent, there is need to continually reassess and make changes as necessary to achieve the over-arching purpose. Therefore, "Mission Command is not a mechanical process…instead it is a continual cognitive effort to understand, to adapt, and to direct the achievement of intent."[8]

Operational design, the concept of an operational approach, and mission command all address the imperative of adapting to changing circumstances and operational demands. Collectively, these inter-related concepts provide a sound context for first developing, and then altering as required, an appropriate C2 approach for a specific mission and set of circumstances. However, these concepts do not deal explicitly with how this should be done. C2 Agility Theory provides a basic methodology for this critical step.

For more than 30 years, C2 Agility Theory in the military context has been studied largely as an academic discipline. In the process, it has produced a solid foundation for practical C2 approaches in real-world operational situations. With both missions and environments expected to vary dynamically in future operations, C2 Agility Theory provides the essential methodology for identifying a C2 approach that best matches the chosen operational approach.

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[7]   Joint Pub 5-0, Joint Operations Planning, 11 August 2011, Chapter III

[8]   Mission Command White Paper, 3 April 2012, page 4.

The variables associated with C2 can be expressed in a variety of ways. C2 Agility Theory holds that approaches to C2 differ in three fundamental ways:

1) how decision rights are allocated;
2) how entities interact with one another; and
3) how information is distributed.

These three variables form the key dimensions of what C2 Agility Theory calls the C2 Approach Space, and serve to characterize a given approach (Figure 1). The C2 Approach Space can be visualized as a cube, within which each C2 Approach occupies its own region—from highly centralized, stove-piped hierarchies to loosely-coupled networks.

Missions differ with respect to their complexity and dynamics. No single C2 Approach works well for all missions and circumstances. The most appropriate approach will be a function of the mission and the prevailing circumstances.

Figure 1.   C2 Approach Space

Figure 2.   Endeavor Space
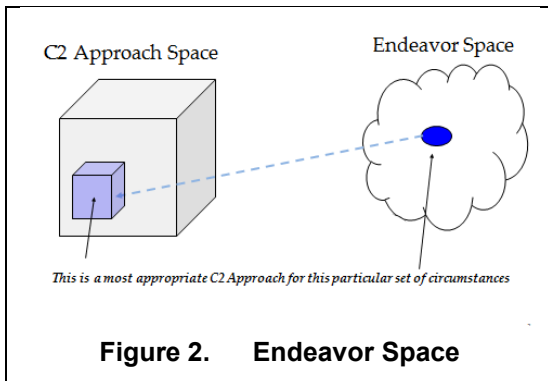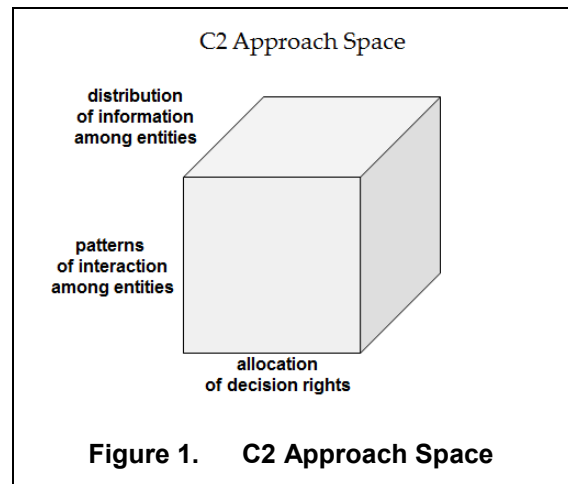
One can also visualize an "Endeavor Space," with internal regions corresponding to different types of missions and circumstances (Figure 2). For each region in the Endeavor Space, there are both effective and ineffective C2 approaches. If, over time, entities performing a mission need to operate in all, or even a substantial part of, the Endeavor Space, they may need to employ more than one C2 approach to be effective. That is, they will need the ability to move around the C2 Approach Space in response to changing missions and circumstances.

This ability to move around the C2 Approach Space—to consciously and purposefully alter how decision rights are allocated, how entities interact, and how information is distributed—is called C2 Agility. C2 Agility involves:

- recognizing the significance of a change in circumstances that can impact the appropriateness of one's C2 approach;

- understanding which C2 approach(es) are more appropriate for the mission and new circumstances; and

- being able to transition to a new, more appropriate C2 approach (Figure 3).

In summary, operational design, operational approach, mission command, and C2 Agility are mutually reinforcing concepts. In combination, they provide sound guidance on how to develop an initial C2 approach tailored to the mission, including the forces/capabilities available and the circumstances. The concepts also allow the commander to alter a chosen C2 approach, replacing it with one that is more appropriate to changes in one or more of these factors. Being able to manifest such C2 Agility will maximize the prospects of success in future operations. Chapters 2 and 3 build upon these concepts.
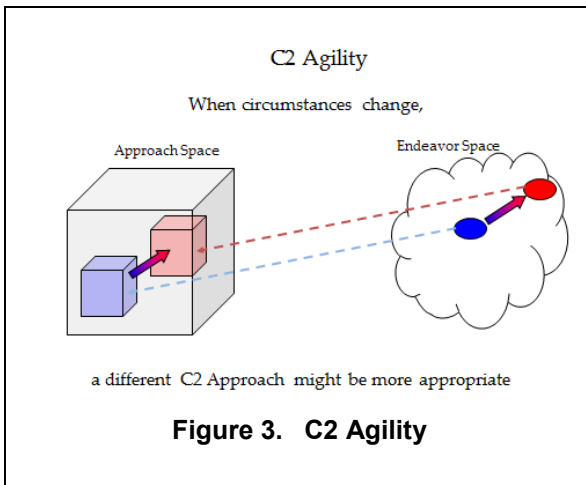
Figure 3. C2 Agility

2. Joint Operation Planning: How to Select and Establish an Initial C2 Approach

Joint Pub 5-0 defines the procedures and steps that together make up the joint operation planning process, which uses elements of operational design to produce an operational approach tailored to prevailing circumstances. It is our belief that a C2 approach, similarly tailored to existing circumstances, can and should be an explicit part of the commander's guidance, in parallel with the operational approach, but not a mirror image of the operational approach. Current doctrine describes how to fashion an operational approach, but not how to determine or instantiate an appropriate C2 approach or evaluate its execution. In this chapter we describe how to select and establish an initial C2 approach, and in chapter 3 we discuss how to assess its effectiveness and make adjustments to fit changed or changing circumstances.

Developing an appropriate C2 approach requires an understanding of operational design, selecting an operational approach, and developing the commander's planning guidance.

A. Operational Design, Operational Approach, and the Commander's Planning Guidance

1. Purposes for Design and an Operational Approach

Joint Pub 5-0 lists three purposes for the development of an operational approach and discusses how the planning team uses elements of operational design to inform its development and facilitate detailed planning. First, the operational approach provides the foundation for the commander's planning guidance to the staff and other partners. Second, the operational approach provides the model for execution of the campaign or operation, as well as for development of operational assessments. Finally, developing an operational approach enables a better understanding of the operational environment and of the problem.[9]

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[9]   Joint Pub 5-0, page III-13.

2. Developing an Operational Approach

The operational approach is "the commander's description of the broad actions the force must take to achieve the desired military end state."[10]

The first step in developing an operational approach is to understand the strategic direction—the strategic goals to be achieved and the strategic end state—the broad expression of the conditions that should exist at the conclusion of a campaign or operation.[11] Understanding *why* a particular mission or task is being undertaken is fundamental to understanding the strategic direction. Based on the strategic guidance, the commander will determine the military end state and objectives, which together answer the question, *Where do we want to go?*

Developing an operational approach requires an understanding of the operational environment. The commander must be able to describe both the current state of the environment and how it should look when operations conclude.[12] The description of the current operational environment provides context for and answers the question, *Where are we?*

The most critical step in operational design is defining the problem to be solved. Modern operations often confront uncertain, complex, and dynamic operational environments and problems. The problem statement identifies the areas for action that will transform existing conditions in the operational environment toward the desired end state.[13] This step formulates the problem statement and answers the question, *What prevents us from going where we want to go?*

In the next step, planners describe the operational approach as a formulation of how to address the problem. The operational approach should describe the operational objectives that will enable achievement of the key conditions of the desired end state. Objectives are established, desired conditions are formulated, and lines of operation (LOOs) and lines of effort (LOEs) are developed.[14] Objectives and desired conditions are then arranged onto these lines, and key tasks are generated for the accomplishment of

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[10]   Joint Pub 5-0, page III-5.

[11]   Joint Pub 5-0, Figure III-2 and page III-7.

[12]   Joint Pub 5-0, Figure III-2 and pages III-8 thru III-11.

[13]   Joint Pub 5-0, Figure III-2 and pages III-12 thru III-13.

[14]   A LOO defines the orientation of the force in relation to the enemy and connects actions on nodes or decisive points related in time and space to an objective. An LOE links multiple tasks and missions to focus efforts toward establishing strategic and operational conditions. Joint Pub 5-0, page xxii.

each objective. The resulting framework informs what must be accomplished and generally how those accomplishments array over time in order to ameliorate the problem. This step begins to answer the question, *What should we be doing?*

3.   Developing the Commander's Planning Guidance

Commander's planning guidance may vary according to the commander's personal preferences, but generally will include some combination of graphics and narrative that convey the commander's current understanding of the environment; a narrative problem statement to convey the commander's understanding of the problem; and a narrative describing objectives, decisive points (geographic places, specific events, critical factors or functions that, when acted upon, will allow the commander to gain a marked advantage over the adversary or will contribute materially to achieving success), and potential LOOs and LOEs that together describe the operational approach. In addition to these elements, the commander's planning guidance generally includes the commander's intent. There is no specified format, but a generally accepted construct for commander's intent includes the following:

- The <u>purpose</u>: explains why the forthcoming military action is to be taken, particularly with respect to the mission of the next higher command. When the purpose is well understood, subordinate commanders confronted with unanticipated situations can act decisively, in keeping with the commander's intent.

- The <u>end state</u>: describes the strategic end state and the higher commander's military end state, and describes how reaching the specified end-state conditions will support higher headquarters' guidance.

- The <u>operational risk</u>: Defines aspects of the operation where the commander is willing to accept risk, as well as areas where risk is not acceptable.[15]

Joint Pub 5-0 states that operational objectives, method, and effects guidance may also be included in the commander's intent, but neither Joint Pub 5-0 nor the DoD Dictionary of Military and Associated Terms (Joint Pub 1-02) defines the term method. Joint Pub 5-0 comes closest, describing a Course of Action (COA) as "a potential way (solution, method) to accomplish the assigned mission, and goes on to say that:

> Since the *operational approach* contains the joint force commander's broad approach to solve the problem at hand, each COA will expand this concept with

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[15]   Joint Pub 5-0, page III-17.

the additional details that will describe **who** will take the action, **what type** of military action will occur, **when** the action will begin, **where** the action will occur, **why** the action is required, and **how** the action will occur (method of employment of forces).[16]

As previously noted, the concept described in this handbook is based on the belief that communicating a C2 approach can and should be an explicit part of the commander's planning guidance, paralleling the operational approach. However, we do not believe the "method of employment of C2" can or should even attempt to parallel the method of employment of forces as expressed in a COA. In this handbook, therefore, the "C2 method" to be included as part of the commander's intent is envisioned as the practical result of broad guidance, telling the staff, subordinate commanders, and mission partners who is to be in charge of what, in collaboration with whom, to accomplish specific tasks or objectives. This broad guidance could take the form of commander's initial C2 approach guidance (discussed further in Section E 2 within this Chapter). In practice, the C2 method should include two specific elements that are critical to fleshing out a C2 approach: first, the linkages (both internal and external) that describe the organization of the endeavor and the network architecture needed to enable the operational approach; and second, the C2 activities that collectively comprise the commander's intent with respect to C2.[17] Taken together, the commander's initial C2 approach guidance and the response thereto by the staff, subordinate commanders, and mission partners comprise the "C2 method" —which we define as the instantiation of the C2 approach through specific C2 activities as they apply to the dimensions of all the linkages.

B. Linking C2 Agility Theory to Joint Doctrine and Operational Application

1. C2 Agility Theory Applied

Having described the doctrinal start point for planning a joint military operation, we turn now to the C2 approach, an outgrowth of C2 Theory. The central point of this handbook is that a unique and tailored C2 approach can and should be associated with

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[16]   Joint Pub 5-0, pages xxvi-xxvii. Italics and boldface in the original.

[17]   In this handbook, the term "C2 activities" includes what Marine Corps Doctrinal Publication 6, *Command and Control* (1996) calls *activities* that include planning, coordination, and analysis, among others (page 126); what Joint Pub 3-0 refers to as *tasks,* including (but not limited to) 12 specific tasks (page III-2); and what other sources refer to as C2 *functions*. By C2 activities, we mean the full range of processes, tasks, and actions that may be taken to carry out the C2 function.

every operational approach. This requires application of the C2 Agility theory to the specifics of the operation. The theory does not dictate what to do; rather, it is a guide for thinking about and understanding the critical C2 variables that can be adjusted to the prevailing circumstances. The circumstances are not theoretical; rather, they are practical. In a military operation, the specifics related to C2 cannot be determined until the commander's intent is made clear. Similarly, the instantiation of an appropriate C2 approach requires details of the circumstances that in turn define the needed linkages and the delineation of or adjustments to C2 activities. These are incorporated into a specific C2 approach. The C2 approach then provides the mechanism (i.e., network architecture) by which information, knowledge and understanding can be shared, context can be co-created, and decisions can be made to enable the operational approach.

2. C2 Terminology Mapped to Doctrinal Terminology

Figure 4 below shows terminology associated with joint planning, as found in Joint Pub 5-0, and related terms used in this paper. Specifically, where joint doctrine discusses the development of an Operational Approach; this handbook suggests the development of a corresponding C2 Approach; and where joint doctrine lists operational "method" as an element that may be included as part of the Commander's Planning Guidance, this handbook suggests that in similar fashion, a C2 "method" can and should be articulated to describe the way commanders and staffs are expected to implement the C2 approach. These relationships are further explored in the paragraphs that follow.
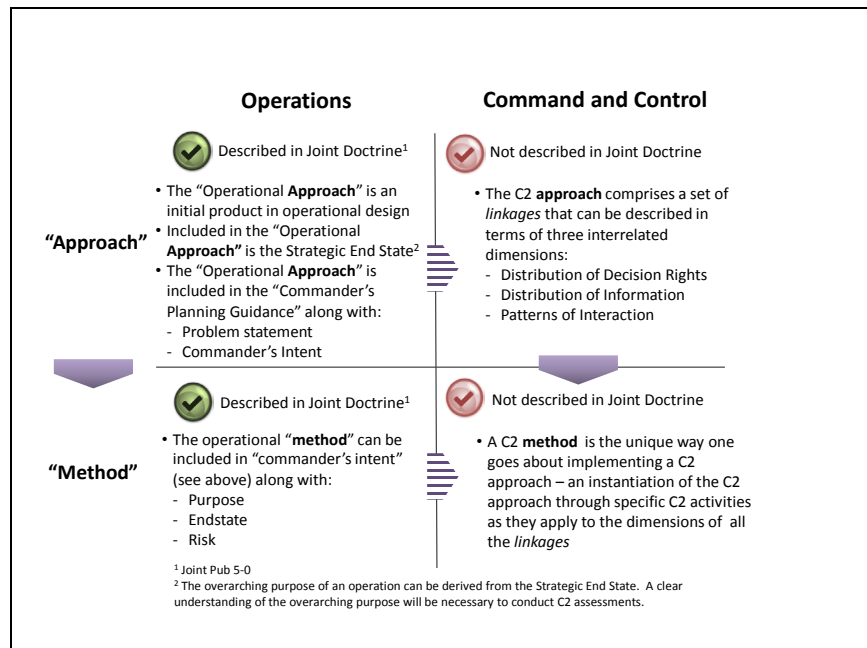
Figure 4.   C2 Terms Mapped to Doctrinal Terms

C. Relationship between the Operational Approach and C2 Approach

Lines of effort assist in visualizing and organizing operational activities by topic in a temporal sequence, while further aligning those activities to specific objectives, desired conditions, and, ultimately, the desired end state. Together, this collective framework constitutes the operational approach. Within the operational approach, the lines of effort serve as the bases for various operational methods that are further described within the Commander's Intent and included in the Commander's Planning Guidance. However, Joint Pub 5-0 does not describe a corresponding *C2 approach* that enables the operational activities along the lines of effort. As depicted in Figure 5 below, the C2 approach can be visualized as wrapping around the operational approach, linking current conditions to the desired conditions of the end state through the provision of informational means that foster suitable, timely decisions and permit both the advancement and integration of the lines of effort.
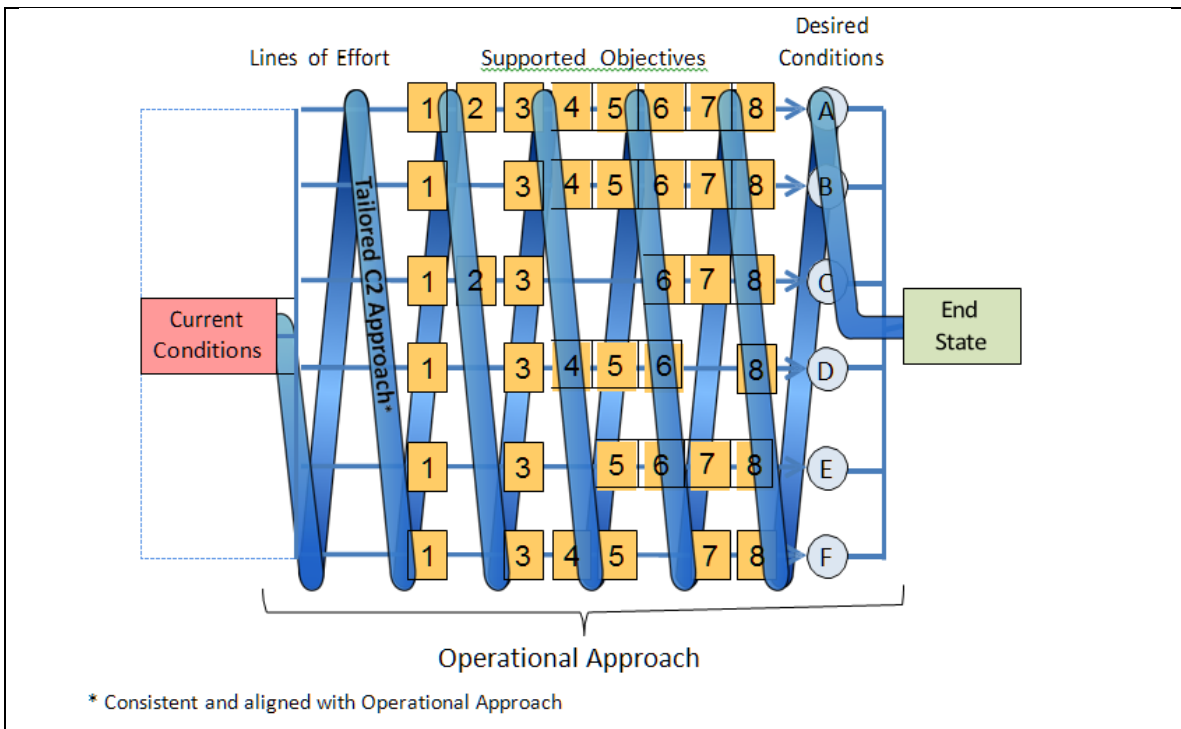
Source: Adapted from Joint Pub 5-0, Figure III-8, page III-15.

Figure 5.   C2 Approach Wrapping Around the Operational Approach

D. Elements of a C2 Approach

1. Goal of the C2 Function and C2 Approach

The goal of the joint C2 function is to provide the ability to make decisions and execute those decisions more rapidly and effectively than the adversary.[18] Inherent to achieving this goal is the creation of a common understanding of the environment (a "common operating picture") to the extent practicable by sharing information and collaborating on its development and exploitation. Explicitly defining an appropriate C2 approach enables the commander to posture all C2 activities to make and execute sound, timely decisions.

As noted in Chapter 1, the C2 approach can be represented as three inter-related dimensions: (1) the distribution of information among *entities*; (2) the patterns of interaction among entities; and (3) the distribution of decision rights to *the collective*.[19] What is actually happening on each of these dimensions determines the corresponding position along each, and together they determine a position within the three-dimensional C2 approach space, resulting in a specific C2 approach.

In practice, every military organization has a C2 approach that is driven by procedures, rules, and standard operating procedures that—wittingly or unwittingly— defines a default location on each dimension for each entity with respect to its relationships with other entities within the parent organization as well as external entities. This is the organization's overall C2 approach.[20] While not all entities within a collective need to practice the same C2 approach for the collective to be effective, the various C2 approaches practiced should be mutually supportive among entities and echelons and appropriate to the circumstances within which each must operate.

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[18] Joint Pub 3-0, Joint Operations, 11 August 2011, page III-3.

[19] *Entity* is a term used to describe a wide range of actors consisting of individuals or purposed groupings of individuals within a larger organization or grouping of organizations, referred to as *the collective,* with a common and concurrent task or mission.

[20] At one extreme it is theoretically possible to interact with no one, share no information with anyone else, and centralize all decision rights unto a single person. It is also possible in theory to move to the opposite extreme, where all entities are permitted to interact with everyone else, all information is shared with everyone, and anyone can make a decision on behalf of the entire collective. It is difficult to imagine circumstances in which an approach at either extreme would be effective.

2. Relationship between the Circumstances and the C2 Approach

The circumstances (the endeavor space) can be considered as consisting of:

- The Operational Environment

- The Mission or Task: Broadly related to the problem to be solved at the operational level but can be much more specific, depending on the organization's role in fulfillment of the operational approach

- The Organization: The collection of all those entities (actors) necessary to effectively ameliorate the problem, structured appropriately. This usually includes entities outside the direct control of the US military structure. The C2 approach must recognize independent entities and describe how to influence or coerce them to cooperate toward achieving the end state.

Operational design creates a hypothesis on how to bridge the gap between the current circumstances and the end state, which forms the basis for development of the operational approach. A significant change in circumstances usually suggests a change in operational approach, which could as easily necessitate a change in the C2 approach. Joint Pub 5-0 addresses operational design and approach but not the C2 approach. For this it is less important to know exactly what to do, than it is to know 1) the variables (C2 approach space dimensions) that can be used to change the C2 approach, and 2) the kinds of changes to each vector that are needed to adjust the C2 approach (e.g., more or less delegation of authority, increase or decrease sharing of information). These should be apparent for each C2 linkage. If the C2 approach remains unchanged after a significant change in circumstances, a loss in operational effectiveness is likely to result, placing the achievement of operational objectives and the desired end state at greater risk. Thus, a significant change in circumstances should trigger an assessment and, if appropriate, changes to the C2 approach.

3. Linkages

The C2 linkages are all the actual connections among entities in a specific operation. Many of these would exist prior to the operation but normally there will be new linkages both internal (subordinate) and external (lateral or upward, including host nation, allies and coalition partners, and international organizations). These can be military or non-military but in each case the modalities that govern the linkage must be confirmed, adjusted, or created to match the existing circumstances and enable the operational approach.

4.   C2 Activities

While it is possible to visualize and characterize a C2 approach, it can be difficult to recognize the approach actually in use at a particular moment without relating it to the corresponding *C2 activities*. These activities comprise what commanders and staffs are actually doing to exercise C2, which could be the default approach the organization habitually uses, the C2 approach developed and used for a prior operation, or an approach that develops in the absence of guidance, with entities each "doing their own thing."

The C2 activities become the means by which the C2 approach is executed, just as operational activities are the means by which an operational approach is carried out. Accordingly, an entity's C2 approach can either enable or restrict its C2 activities, whether intentionally through design or otherwise.[21] Currently, there is no doctrinal list of C2 activities. However, an exemplar list of C2 activities is provided in Table 1. It shows a mix of entities, processes, procedures, and products organized within the various tasks that together comprise the joint C2 function.[22]

Table 1.   Joint C2 Tasks and Exemplar C2 Activities

Joint C2 Tasks and Exemplar C2 Activities
Establish, organize, and operate a joint force headquarters:
• Operational Design
Command subordinate forces:
• Decision Authorities Matrix
Prepare and, when required, modify plans, orders, and guidance:
• Mission Analysis
• Orders Process
• Plans Synchronization Boards
• Transition Mapping Workgroup
• Joint Planning Groups (deliberate, crisis action, and adaptive planning processes)
Prioritize and allocate resources:
• Synchronization Workgroup
• Critical Path Synchronization Meeting

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[21]   For an example of how changes in C2 activities could have a significant impact on operational effectiveness see: Modeling C2 Agility to Meet the Demands of a Distributed Force, Paper presented at 18th ICCRTS, by Jenny McFarland, Dan McConnell, Harvey Reed, John Kane, 26 April 2013: found at: http://www.dodccrp.org/events/18th_iccrts_2013/post_conference/papers/014.pdf.

[22]   Joint Pub 3-0, page III-2.

- Various Utilization Boards
- Intelligence Collection/Synchronization Workgroup
- Medical Workgroup
- Logistics Coordination Workgroup
- Aviation Deep Operations Working Group
- Joint Transportation Board
- Cyber-Electromagnetic Activities Working Group

Manage risk:
- Risk Assessment Workgroup
- Develop Commander's Critical Information Requirements
- Force Protection Working Group

Communicate and maintain the status of information:
- Battle Update Briefings
- Commander's Update Assessment
- Commander's Azimuth Check
- Chief of Operations Synchronization Huddle
- Staff Update Briefing
- Shift Change Turnover Briefing
- Information and Knowledge Management Workgroup
- Information Operations Workgroup

Assess progress toward accomplishing tasks, creating conditions, and achieving objectives:
- Assessment Boards
- Decision Support Matrix

Coordinate and control the employment of joint lethal and non-lethal capabilities:
- Deliberate and Dynamic Targeting Processes
- Targeting Workgroups
- Targeting Boards

Coordinate, synchronize, and, when appropriate, integrate joint operations with the operations and activities of inter-organizational partners:
- Operate various centers and cells
- Civil-Military Workgroup
- Manage Visitors' Bureau
- Strategic Communications Workgroup

E.   Determining an Appropriate C2 Approach

1.   Aligning C2 Activities to Decisional Needs

An appropriate C2 approach can be determined after assessing the circumstances, the linkages (organization), and required C2 activities. During planning, once the C2 approach is chosen or described, commanders and staffs should determine how to conduct C2 activities, given the existing or anticipated circumstances. In this way the C2 activities serve as organizing mechanisms to co-create the needed context and enable a shared understanding.

Ideally, commanders and staffs establish C2 activities to address various informational and decision-making needs associated with the C2 approach. These needs include ensuring the appropriate distribution of information in order to provide a shared understanding constructive to the purpose. Passively awaiting the arrival of needed information is neither an effective nor an efficient use of available time. Instead C2 activities can serve to focus commander and staff efforts in a disciplined, structured manner in order to collectively raise the level of shared understanding. These C2 activities, shaped by the appropriate C2 approach, should support an efficient and effective decision-making process.

During planning and as each operation unfolds, every participant or organization that has a role in the construction or delivery of one or more informational products within a C2 activity (e.g. reports, slides, charts, graphic overlays) should examine whether their product (format and content) actually enhances the decision making process. Conveying information unrelated to current or future decisions may not be helpful and can waste valuable time and cognitive energy of both staff and commander. Conversely, omitting or de-emphasizing information critically important to a decision can derail an otherwise effective operation. All participants should continuously assess the contribution of the products generated by their respective C2 activities in support of effective decision-making.

2.   Initial C2 Approach Guidance

Simply put, command and control can be considered the means by which a commander recognizes what needs to be done - and sees to it that appropriate actions are taken.[23] The C2 approach, then, becomes the way in which the activities associated with

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[23]   Marine Corps Doctrinal Publication 6, *Command and Control,* 4 October 1996, page 37.

C2 are performed. As discussed previously, there are many approaches to C2. Therefore, the commander should consider the C2 approach options available in the context of the mission and circumstances, and, having selected an appropriate approach to C2, provide C2 approach guidance to ensure that the appropriate linkages are established and the necessary adjustments to C2 activities are made. At the same time, the commander should convey that the current C2 approach may not be appropriate to the current or anticipated circumstances and may need to change. Guidance should also include the commander's understanding of the overarching purpose for the ongoing or pending military operation; and considering this purpose, the commander should describe the scope and breadth of the organizations and other entities whose actions must be harmonized to achieve that purpose.

Others in leadership positions should also consider how they are conforming to/supporting the implementation of the selected C2 approach. For example, each LOO and LOE within an operational approach may spawn its own planning effort, and within that effort a C2 approach is needed. As mentioned before, there are many approaches to C2. The lead planner for each LOO and LOE should provide C2 approach guidance (consistent with the commander's initial C2 approach guidance) to the planning team to ensure that planning activities include all appropriate organizations charged with achieving objectives along that LOO or LOE. Later, during plan execution, the operational lead for each LOO and LOE should provide C2 approach guidance to the operational units that are aligned to it. In fact, every organization that has members reporting to and working together to inform a leader charged with making decisions or providing decisional recommendations needs to develop a C2 approach and assess its effectiveness as operations go forward (see Appendix B for more examples of the abundance, nesting, and aggregation of C2 approaches in practice).

3. Fleshing Out the C2 Approach

Some of the questions that could point to a more proactive and appropriate C2 approach are listed below, followed by the related C2 approach space dimensions in italics. Taken together, these questions can help identify a C2 approach that aligns C2 activities and supporting products to the needs of the commander and others to whom decision authority is delegated.

- What are we seeking to understand, how does this understanding relate to current or planned operations (relevant yet missing aspects of the circumstances and supported decisions), and how is it related to decision making?

- What then are the informational needs? *Distribution of information.*

- Who might have the needed information or where do we expect to find it? *Patterns of interaction and Distribution of information.*

- What relationships exist with those that have or are expected to have the needed information? *Patterns of interaction.*

- Do new relationships need to be established in order to gain the needed information? *Patterns of interaction.*

- What types of information will need to be exchanged and how exactly will the exchange be accomplished? *Distribution of information.*

- Do we have release authority to share this information in the manner expected? Do other entities have the authority to share with us? *Decision rights.*

- Are communications established and tested to ensure information can be shared in the manner expected? *Distribution of information.*

- How will this new information be compiled and presented to meet the informational and decisional needs? *Distribution of information.*

- How will this information support decisions necessary to enable current or future operations? *Decision rights.*

Figure 6 below, from Joint Pub 5-0, illustrates how various entities (depicted as nodes within each instrument of power) may be interconnected. These nodes, many outside the military's direct sphere of influence, may have the information we seek. It is important to note that the operational approach identifies entities with whom the commander and the staff must interact. There are two kinds of entities: (1) those with whom a connection already exists (an existing linkage), and (2) those with whom no relationship exists. In the first case, the staff must determine whether the existing linkage is sufficient; in the second, the appropriate linkage must be determined.

In one sense, decisions are the most important products of the C2 function [enabled by C2 activities associated with a C2 approach], because they guide the force toward objectives and mission accomplishment. Commanders and staffs require not only information to make these decisions, but also the knowledge and understanding that results in the wisdom essential to sound decision making.[24]

A shared understanding of the situation is also a critical information-sharing product.

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[24] Joint Pub 3-0, page III-11 (bracketed text added).
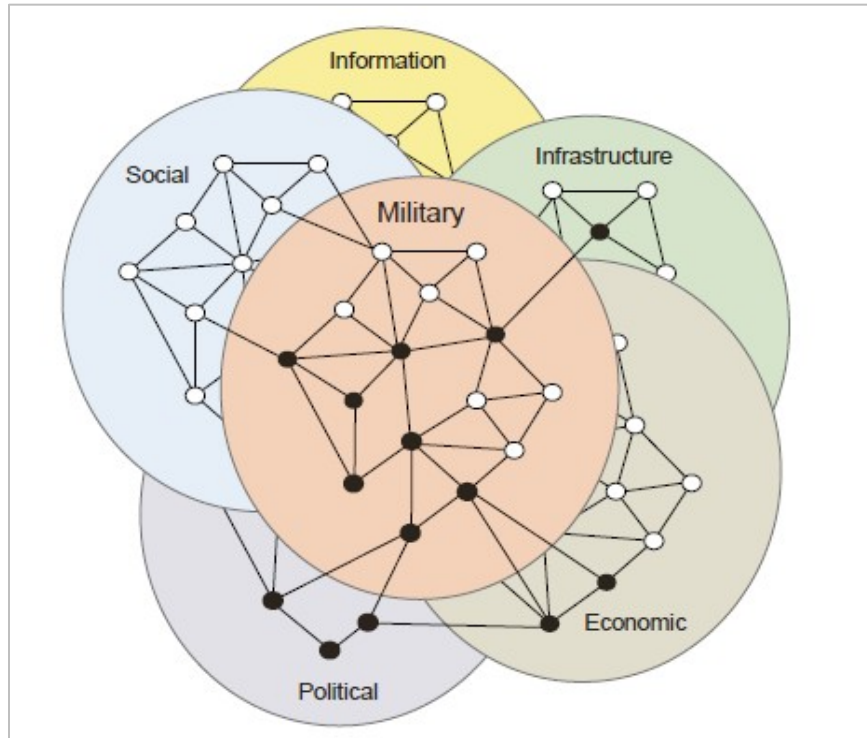
Note: This figure is merely an example schematic of a complex network that may include relevant actors needed to execute the operational approach and achieve the overarching purpose. The spheres, nodes, type of nodes, and connections are illustrative only. Real networks and nodal groupings will be reflective of the actual circumstances.

Figure 6.   Political, Military, Economic, Social, Information, and Infrastructure Systems Analysis

These questions should be addressed within the context of both the previously developed and directed operational approach, along with the circumstances affecting the operations being conducted. The answers to these questions define the *C2 approach actually implemented, which may be different from the one directed in the commander's guidance*.

As the preceding discussion illustrates, existing C2 structures and activities require continual assessment and modification in order to connect with all the entities (including, quite possibly, the enemy or adversary) that can influence attainment of the collective purpose. For each linkage (connection), the three dimensions of the C2 Approach Space must be considered: (1) patterns of interaction (collaboration); (2) distribution of information (information sharing); and (3) distribution of decision rights. For entities outside the commander's organization (e.g. Non-Governmental Organizations), these

linkage arrangements (taskings and rules) must be negotiated and in some cases, linkage arrangements may not be within the commander's control (such as communicating with the enemy, by words and actions).

F. Communicating the Initial C2 Approach

Communicating the desired C2 approach should include the following:

- A listing of the entities that must be linked together and the reason for each linkage (e.g. to ensure this entity can contribute to progress on LOE A, or can provide information supporting the continued assessment of Condition X for Decision Point Y, or can provide periodic insights needed to validate or refute planning assumption Z). This includes entities already linked (if changes to the link are necessary) as well as new entities. While it is not possible to predict in advance all the entities that must be linked, directing the establishment or sustainment of key linkages is critical to the shared understanding and co-creation of context needed for mission success.

- Guidance as to how existing linkages should be changed and how new linkages should be created. This guidance should include:

  – Who is responsible for establishing the linkage?

  – A description of the linkage (what should the linkage look like physically – not all need be or can be electronic).

  – When the linkage is necessary.

  – What types of information are expected to be exchanged? While it is not possible to predict in advance all the data that will be needed, enabling discovery is key. More specifically:

    ▪ What do we need from the entity?

    ▪ What will the entity need from us?

  – What restrictions, if any, may limit the exchange of information (e.g. access to classified information)?

  – How will this information be provided to the new entity?

  – Which entity has authority to make key decisions based upon new information?

  – The means and frequency (how often) for reporting the status of this linkage (e.g. command communications/assessment update)

G. Refining the C2 Approach in Parallel with the Operational Approach (Assessment)

Given the importance of C2, the C2 approach should be examined not only as part of the design process, but continually thereafter. Four questions remain important throughout any operation. The first, pertinent only if a new C2 approach was not established initially, is whether the C2 approach currently being practiced is adequate for implementation of the operational approach. Rarely is this the case, except when the circumstances happen to exactly match those envisioned when the operation was originally designed. The second question, even if existing arrangements are assessed as more or less adequate, is whether small adjustments to the C2 approach would better align it with the operational approach and better enable the lines of effort and other supporting functions envisioned. The third question, if a new C2 approach is intended, is whether the emergent best C2 approach is feasible from both technical and process perspectives. [25] Finding, implementing, monitoring and adjusting the best feasible C2 approach to implement the current operational approach is an iterative process that should continue throughout planning and execution of the operation. The fourth question leverages the C2 approach and concerns the C2 activities required to implement it. Are all the existing C2 activities actually needed or have some become superfluous? Do some activities need modifying? Are there C2 activities missing that should be included? These ideas are developed further in Chapter 3.

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[25] For example, sharing information with partners, especially classified information, is nearly always a problem.

3. C2 Assessment

> Once leaders share a common understanding, they are able to direct, lead, and assess. When assessing, it is more important to assess the adequacy of the plan itself rather than just compliance. [26]

A. Introduction

The joint operation planning process (JOPP) as described in Joint Pub 5-0 includes a brief (two-page) overview of the assessment process and its importance to success. It states that "assessment and learning enable incremental improvements to the commander's operational approach and the campaign or contingency plan," and that "assessments by joint force commanders allow them to maintain accurate situational understanding and revise their visualization or operational approach appropriately." Finally, "assessment precedes and guides every activity within the JOPP and concludes each operation or phase of an operation." [27] Additionally Joint Pub 5-0 includes a ten-page appendix on assessment.

Accepting the critical importance of assessment, this chapter focuses on assessing the C2 approach as actually practiced. Normally the C2 assessment is closely linked to and dependent upon the assessment of the operational approach, which in turn depends upon the assessment of the operational design itself. However, assessing the C2 approach in current use can also reveal flaws in the design or operational approach that require appropriate revisions.

B. Assessing the Design

The design effort defines the problem to be solved by developing a postulated understanding of the operational environment, which is based on many assumptions. The assessment of the design is essentially an assessment of the validity and relevance of the assumptions and the resulting understanding of current conditions, propensities, expected

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[26] LTG David L. Perkins, "Developing Competent and Committed Leaders Capable of Executing Army's Doctrine 2015," CGSC Foundation News, No 15/Fall 2013, page 9.

[27] Joint Pub 5-0, pages III-44 thru III-46.

responses to stimuli (actions), and ability to move the environment in the desired direction through actions. Design assessment should answer the question, *Is the design working?* If not, the assessment should lead to changes in the design to make it a better representation of the environment. This handbook assumes an ongoing design assessment that informs and improves assessments of the operational approach and the C2 approach.

C. Assessing the Operational Approach

The operational approach, derived from the design, is a visualization of actions along multiple lines. It too is based on assumptions that must be validated by outcomes as the operation unfolds. The operational approach is a set of ideas that comprise the path to attainment of military objectives and eventually the end state. The ideas are translated into combinations of concrete actions sequenced over time, which are grouped into lines of effort. Assessing the operational approach involves answering two basic questions. First, *What are we doing?* Are events unfolding as envisioned? Or has something happened which caused a deviation from the original design and approach? [28] If the operational approach was clearly articulated and the LOE events are observable and monitored, this question can be answered. If events are not unfolding as envisioned, the result of the assessment could be either an adjustment to the operational approach or a complete "reboot" to get back on track.

If the operational approach is unfolding as envisioned, the second question arises, *Is it working?* For each LOE, and for the operation as a whole, positive outcomes that are observable are expected for each action or set of actions. If the approach is not working, it may be that more than patience or greater effort will get it going. In all likelihood, however, examination of the underlying assumptions may indicate that adjustments to the operational approach are required. [29]

As with design assessment, this handbook assumes an ongoing operational approach assessment that would both inform and improve assessment of the C2 approach.

1. Assessing the C2 Approach at the Macro Level

As depicted in Figure 5 and described in Chapter 2, the C2 approach is tailored to the overall operational approach and its individual LOOs and LOEs. It is multi-

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[28] For example, Iraq in 2003–2004.

[29] For example, Iraq in 2007; see Thomas R. Ricks, *Fiasco* (2007) or Bing West, *The Strongest Tribe*, (2008).

dimensional and multi-level. Assessment needs to consider two levels: One of the operational approach itself (macro) and the other at the level of individual LOE (or LOE components), or at the level of cross-cutting battlefield functions (such as fire support or intelligence) and activities affecting more than one LOE (sub-systems).

The first step in assessing the C2 approach at the macro level is to understand what it is supposed to be. This includes the linkages, the desired information flows, expected collaboration and decision rights enabling actions and activities overall and on each LOE. The next step is to ascertain what is actually happening, *What are we doing?* Is what is happening what was intended? Assuming the intended C2 approach was clearly articulated, the elements of its instantiation should be observable. For example, if the C2 approach requires a new link to an actor outside the US military structure, is the actor now connected and is the desired information exchange occurring? If the approach required changes to linkages internal to the US military structure (for example, due to a change in a supporting-to-supported relationship, have they been completed?).

Macro assessment should also address the question, *Is the C2 approach working?* Even if the C2 approach has been implemented as initially envisioned in the commander's guidance, it may be incomplete, the expected outcomes may not pan out, or the environment itself may change as the result of operations. Fixing problems with the C2 approach requires re-examining the operational design, the operational approach, and the C2 approach to determine the underlying rationale. This step, coupled with learning from ongoing operations, may require adjustments to the C2 approach.

Assessment at the macro level is not simply a series of stoplight charts reporting the status of communications links. Rather, it is an assessment of whether the C2 approach is aligned with and supportive of the operational approach. This requires a deeper look into what is happening on important established links, including those that do not exist electronically (such as periodic meetings, exchange of information on paper, etc.) and whether what is happening makes sense with respect to the operational approach. The macro C2 assessment, then, should be designed to answer both questions (*What are we doing?* and *Is it working?*) in terms relevant to the operational approach, not just traditional C2 metrics.

In addition to the formal assessment, it would be prudent to have a separate red teaming effort. The red team would focus on the operational environment with an eye toward whether the operational approach and C2 approach remain aligned with it. Table 2 illustrates key elements of both macro C2 assessment and macro C2 red teaming.

Table 2.   Key Elements of Macro-level Assessment and Red Teaming

Macro Assessment	Macro Red Teaming
What is the intended C2 approach? • Metric: The C2 plan has observable elements Is the C2 approach as implemented what was intended? • Metric: Actual C2 structures and activities are observable Is the C2 approach working? Is it enabling both the operational approach as a whole and its individual lines of effort? • Metric: Bottom-up reporting, not just on linkages but, more importantly, on whether the information flows, collaborations, and decision authorities are healthy and enabling both timely decisions and action. Reporting would be on friendly C2 information requirements	What has changed or could change in the operational environment that will impact the C2 approach? Example categories: • Mission change or mission creep • Organization (own or external) • Actors (more or fewer) • LOE (progress or lack of progress) • Changes in the enemy situation (positive or negative) or in factors beyond the commander's control that work for against mission accomplishment (such as weather and terrain) • Communications security compromises What are the most important changes to address first? • Consider risk and urgency? How will the most important changes impact the C2 approach? • What adjustment would be required? What indicators would illuminate change in the operational environment and how can they be monitored? • How can this be implemented? What are the commander's C2 information requirements

2.   Assessing the C2 Approach at the Sub-System Level

C2 at the sub-system level may include any part of what comprises the macro level. This includes any sub-component or sub-network (not in the electronic sense) with two or more actors. The sub-system could be defined by a common function or need to exchange information and collaborate in order to accomplish a common mission or task. Examples would be a brigade combat team, a ship, a fire support netTablework, an airborne warning and control system, a sustainment group, a humanitarian relief task force, or a group of key actors on one LOE. Here, too, assessment of the C2 approach in more detail is important as it can both improve the operation of the sub-system and contribute to the maintenance or improvement of the macro C2 approach.

Assessment at the sub-system level is similar to the macro but is generally simpler because it involves fewer entities (nodes) and a more focused information/collaboration need. Because it is simpler, problems are easier to identify. The process parallels what has already been described, but with a sharper focus. Absent not only the details of the design and broad operational approach, but possibly also the C2 approach (depending on the level of the subsystem), it is still possible to make a useful C2 assessment.

The sub-system assessment requires, first, at least a general understanding of the operational approach (see box 1 in Figure 7 below). Specifically, it is important to know generally what the ongoing operation is trying to achieve. This includes the overarching purpose and the end state. Additionally the assessment must be based on a good understanding of how the sub-system fits into the operation (e.g., are we trying to destroy the enemy or compel surrender with minimal damage to infrastructure, and why?). Next, who are the other entities, both habitual and new, that must interact to ensure the sub-system activities are contributing to a successful outcome? Next the assessment requires an understanding of the sub-system C2 approach being used and whether that C2 approach is actually working (see box 2 in Figure 7).

C2 Sub-System Assessment

Operational Approach?
    Overarching purpose
    End state
Who are the relevant actors?

What are we doing relative to C2?
    Are the right relationships (links) established?
    Is the right information flowing?
    Is there adequate collaboration among the links?
    Are authorities clear and decisions distributed appropriately?
Is the Sub-System C2 approach working?
    Are C2 activities supportive of the overarching purpose and end-state?
    Are the right actors involved?

Figure 7.　C2 Sub-System Assessment

Then, viewing the sub-system as a whole, the C2 approach (Figure 5 above) should be evaluated from the perspective of either the operational approach or the overarching purpose and end state. Three questions help this assessment. First, what is the operational approach, if relevant and known to the sub-system? Second, whether the operational approach is known or not, what is the overarching purpose and end state? And third, who are the relevant entities necessary to execute the operational approach or overarching purpose and end state?

With respect to the sub-system itself, the first assessment question is, *Does what the sub-system is actually doing or attempting to do relative to C2 make sense?* For example, a fires sub-system re-tasked to take on an additional function (e.g. civil affairs) in a counterinsurgency operation would require significant C2 adjustments. This serves as a check on what is happening with respect to C2 within the sub-system. The answers to four sub-questions will help determine whether what the sub-system is doing makes sense: (1) Are all the right relationships (necessary links) established? (2) Do we have good two-way information flows on each link? (3) Is there adequate collaboration between and among links to achieve our overarching purpose? (4) Do we and others in the sub-system have the decision authorities needed to achieve the overarching purpose?

If what the sub-system is doing seems to make sense, the next question becomes, *Is it working?* Answering this question necessitates an examination of C2 activities. Two questions, when answered, provide the assessment: (1) Are the C2 activities supportive of the overarching purpose and end state? (Here it is important to understand whether the C2 activities contribute to building the shared understanding that enables necessary decision-making.) and (2) Are the right actors or entities involved? The answers to these questions will determine whether the sub-system C2 is healthy and, if it is not, where to make changes to improve the sub-system.

D.   Conclusion

Given that design and the resulting operational approach are based on a preliminary understanding of the operational environment, both are not only subject to change, but very likely to do so. Both require assessment to determine when change is needed, due either to assumptions that prove invalid or to the dynamics of the operation. Similarly, the C2 approach can be expected to change or require modification as events unfold and learning occurs. Thus rigorous and continuous C2 assessment is needed at both macro and sub-system levels to ensure the C2 approach is aligned with and supportive of the operational approach and its LOOs and LOEs. The vignettes in Appendix A illustrate the importance of assessing whether C2 must be changed to support a new operational approach.

4. Concluding Observations and Recommended Way Ahead

A. C2 Agility: From Theory to Practice

C2 Agility theory holds that a unique and tailored C2 approach can and should be associated with every operational approach derived as a product of operational design, and that a significant change in circumstances can and probably should necessitate a change to the C2 approach. Moving C2 Agility from these ideas–which are supported by a growing body of empirical evidence from lessons learned via recent operations, experiments, case studies, and analyses—to an operational capability requires a sustained effort over a broad front. It includes engaging all the communities that develop and influence doctrine, organization, training, materiel, leader development and education, personnel, facilities, and policy (DOTMLPF-P). As progress is made, the focus of the involvement will shift from the research and analysis communities to professional military education, concept development and experimentation, training, systems design and acquisition, and, finally, to the operational community that will determine the state of the practice. This handbook is an important first step toward "operationalizing" C2 Agility, intended to create both awareness of the need for Agile C2 and an understanding of the basics of C2 Agility, and thereby prepare commanders at all levels to apply these ideas regularly.

B. Using this Handbook

This handbook seeks to help commanders and staffs improve their C2 Agility by changing the way they think about and practice C2. The next step is to determine whether, when individuals are exposed to this material, they (1) appreciate why more Agile C2 is needed to meet mission challenges, (2) understand how to determine whether their current approach to C2 is appropriate, (3) are able to identify a more appropriate approach to C2 if one is needed, and (4) know how to transition from one approach to another.

Each of these tasks involves a set of more specific understandings. For example, to appreciate why more Agile C2 is needed, commanders need to understand that an inappropriate approach to C2 can lead to mission failure, as well as to appreciate that the

C2 approach being applied is not necessarily the C2 approach that was specified in their planning guidance. To assess the appropriateness of the C2 approach currently in use, a commander needs to understand how to think about mission challenges and circumstances, as well as understand the C2 approach space and which regions of the C2 approach space correspond to various types of missions and circumstances.

The material in this handbook should be exposed to a variety of experienced practitioners to determine their understanding of C2 Agility concepts, their level of comfort with the changes proposed, and their ability to apply these ideas in practice. Based on this broad exposure, changes necessary to improve and/or augment the material in the document will be identified, and the handbook revised and expanded accordingly.

C. Moving Beyond a Handbook

Changes in the broader force development environment will be needed to help inculcate understanding of C2 Agility throughout the joint force. While ultimately it will be necessary to look across all of DOTMLPF-P, the initial focus is on the key areas of education, training, and exercises, which could include experimentation with alternative C2 approaches.

With respect to education, officers and non-commissioned officers should be instructed in the principles and methods of C2 Agility. Over the past 15 years, DoD's Command and Control Research Program has produced a wide variety of excellent books, papers, and other materials that instructors can use to add or modify appropriate modules in their C2 courses. Particularly applicable recent CCRP products include two books (*The Agility Advantage,* and *The NATO NEC C2 Maturity Model*); the "NATO SAS-085 Final Report on C2 Agility;" and the "C2 Agility Tutorial" that was presented to the 18th International Command and Control Research and Technology Symposium in 2013.

At a minimum, instructors should describe thoroughly the meaning and value of the three dimensions of a C2 approach: (1) how decision rights are allocated; (2) how entities interact with one another; and (3) how information is distributed. Students should learn how to characterize an existing C2 approach, determine changes in mission or environment that could necessitate changes in that approach, and adopt an appropriate changed approach in a timely manner. Ideally, joint and Service courses should provide this instruction, but in the current absence of such courses, unit commanders should take the lead to inculcate the principles and methods in training their subordinate leaders, drawing on their own experience and case studies as necessary.

Commanders should also see that necessary enablers are in place. For example, they should address cultural factors affecting trust to enable delegation and ensure that unit members have a proper appreciation of how broadly they may have to reach out in their interaction with other parties. In addition, commanders should see that the proper technical and procedural means are in place for information sharing. This means assuring the proper interoperability among systems and the establishment of knowledge management procedures so that, when necessary, the information resources of the unit and the larger force and set of partners can be fully exploited.

Exercises are an important vehicle for training at the mission-oriented level. Exercises should not just prepare forces for the given mission but also give them a general mindset for thinking in terms of C2 Agility. Mission types chosen can span the full range of military operations, from peacekeeping to joint and combined air operations against sophisticated defenses. Exercises should be designed to insert sufficient complexity and uncertainty to force consideration of changes in C2 approach. The ability of the force to understand and adapt along each of the three axes of a C2 approach can then be tested in the exercises. Representative assessment factors are:

- **Allocation of decision rights**. Is decision authority being adequately delegated? Is the proper initiative being displayed by those to whom the authority is delegated? Is intent being adequately conveyed, understood, and adjusted as the situation changes?

- **Patterns of interaction.** Are the units engaging with all parties that should be involved in planning? Is this engagement systematic and enduring or is it just ad hoc?

- **Distribution of information.** Are the parties generating information making it adequately available? Can the individuals accessing the information properly assimilate the amounts that may be made available? Is shared context and understanding being achieved?

Lastly, it is important to maintain awareness of the actual state of linkages and C2 activities. Are the actual connections among entities—electronic and otherwise— adequate and fully functioning? Are all relevant commander and staff C2 activities operating, and are they effective?

Ideally, semi-quantitative metrics at least should exist for measuring the answers to questions such as the above. These metrics do not exist now, but as exercises are designed, attention should be paid to developing them. Existing methods for designing, conducting, and assessing exercises should provide a starting point.

Finally, it is critically important to understand the *implementation risk* associated with changing the C2 approach. It is not enough to specify a new approach; the feasibility of realizing it also must be assessed. For example, has sufficient trust been established to enable increased delegation? Could unacceptable security risks (insider and outsider) be introduced by allowing greater information sharing? A systematic approach for raising and addressing such questions does not exist at this time, but these considerations need to be included in the design and execution of exercises as described above.

Appendix A. C2 Agility Vignettes

Seven short vignettes in this appendix illustrate C2 Agility. Six describe successful applications of the concept; the seventh is an example of C2 Agility failure. They are included in the handbook for four reasons:

- First, they illustrate that even without theoretical underpinnings or the benefit of a handbook, C2 Agility has been demonstrated before. In each of the successful cases, the command had a problem, the solution to which required changes in the way the organization had been conducting C2. The changes were driven by the nature of the operation envisioned—the operational approach. In retrospect, it often seems that the C2 Agility that occurred was bound to happen or not terribly difficult to envision or plan. But in each case there were other approaches that might have been attempted. Matching the C2 approach to the operational approach is not mechanical; rather, it is a highly cognitive endeavor. Every aspect requires careful thought, and implementation often requires overcoming organizational, cultural or resource limitations. The successful commanders didn't just see a need for C2 Agility; they made it happen.

- Second, the vignettes are real-world examples of what C2 Agility looks like in practice, including how commanders chose to alter their activities and a snapshot of the transformed approach.

- Third, the vignettes reinforce the logic of the arguments in Chapters 2 and 3.

- Finally, they are easily-remembered stories from which lessons can be drawn and applied in the future, either directly or as a reminder to refer to the handbook.

A. Nelson's Victory at Trafalgar

The Battle of Trafalgar, fought off the southwestern Spanish coast, on October 21 1805, ranks as one of the most decisive naval engagements in history. The British fleet under Admiral Nelson with 27 ships of the line defeated the combined fleet of 18 French and 15 Spanish ships of the line commanded by Admiral Villeneuve, capturing or sinking 22 while losing none.[1]

The battle was the culmination of the operational effort[2] to draw the combined French and Spanish fleets into a decisive engagement that would change the strategic balance in favor of Britain and its allies during the Napoleonic Wars. The British strategic objective was to so weaken the French and Spanish fleets that they would never again be capable of challenging British control of the Mediterranean or Atlantic approaches to Europe, or of enabling an invasion of the British Isles. As long as the opposing fleets existed they constituted a threat, one that meant the British Navy was largely committed to keeping them bottled up in Atlantic and Mediterranean ports.[3]

The decisive victory undoubtedly was due in part to the superior seamanship and battle competence of the British crews as well as the high leadership standards exhibited by the ship Captains. But it is likely that the outcome would have been less one-sided and perhaps even indecisive, had Admiral Nelson not made two critical decisions in advance about how the battle would be fought when the British fleet located the enemy. These two decisions required thinking outside the box and deviating from what until that day had been widely accepted by both sides as conventional naval C2 doctrine.

Due to both the limitations on maneuver of sailing ships and the difficulty of rapidly signaling (with pennants) battle instructions to large formations of ships, during this period the accepted practice when engaging an enemy fleet was to approach the opponent in a single line. This meant that in the battle, the fleets were parallel to one another. This tactic had the advantage of allowing all ships to engage, and it maximized the number of targets. It also facilitated signaling forward and to the rear of the flagship, which normally was positioned near the center. However, if the fleets were of approximately equal size, gaining a decisive advantage was problematic since an opponent could always

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[1] Wikipedia contributors, "Battle of Trafalgar," Wikipedia, The Free Encyclopedia, http://en.wikipedia.org/w/index.php?title=Battle_of_Trafalgar&oldid=590724309 (accessed January 22, 2014).

[2] Julian Stafford Corbett, The Campaign of Trafalgar, 2 vols. (London, New York etc.: Longmans, Green and co., 1919). Republished by Nonsuch Publishing (2005)

[3] John Keegan, The Price of Admiralty : (London: Hutchinson, 1988), 21-22

break off the fight by turning away and withdrawing if it perceived itself to be losing. If the side with the advantage tried to follow, its control and firepower would be significantly diminished. Thus most battles of the period were indecisive.

Senior British naval officers were well aware of the limitations of their tactics but had not yet conceived of an alternative that would overcome the limitations of their C2 system, which in turn limited their tactical options. For example in 1800 the official signals book was revised to improve the speed of signaling by flags, but that alone was not sufficient to bring about changes in battle tactics.[4] Nelson had been ruminating for several years on this C2 limitation and how to overcome it in order to bring about decisive action.[5] He knew he needed a different tactical concept for decisive battle and a C2 approach that supported it.

Nelson's solution to the tactical problem was to try to cut the opponent's line into thirds by approaching perpendicular to it, in two columns, if possible from the windward. One column, which he would lead, would attempt to break the line by crossing in front of the French flagship, while the second, led by his second-in-command, would cross about a third of the way forward from the rear of the enemy's line. This would take the leading third of the combined fleet out of the battle for an extended period since it took considerable time to turn back and join the fight. The enemy ships in the center would be outnumbered and subject to rapid defeat at which time the rearmost third could be dispatched. Nelson hoped that by attacking the French flagship directly early, its ability to direct its own fleet would be crippled during its fight for survival.[6] This concept required accepting great physical risk, particularly to the lead ships, but also risked a C2 breakdown in the confusion following the breaking of the enemy's line.

Nelson knew this concept for decisive action could not be implemented using the customary centralized C2 from his flagship. His solution to the C2 problem was to organize his force and develop a battle concept so that minimal signaling would be necessary, and to take advantage of the superior experience, skill and initiative of his Captains. He relied on their understanding of his intent. To ensure that understanding, in

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[4]   This advance had been put to good use by Nelson for his frigates on picket duty during the blockade of Toulon in 1803 (Keegan p. 22). But it was still much too cumbersome and time consuming for use in a major battle.

[5]   He was well aware of Admiral Rodney's successful deviation from standard practice at the Battle of the Saints in 1782, but that had happened due to a sudden shift in winds rather than by design (Keegan, p. 48). There were other examples but each seemed based on unique circumstances, including his own victory in the battle of the Nile in 1798 when the French Fleet was at anchor.

[6]   Corbett, p. 204-214.

the months before the battle, Nelson had meetings with different groups of his Captains to discuss the new tactical concept and the critical role of individual initiative, while adhering to the overall concept. He wanted to ensure that as the battle developed each Captain would know what to do with his ship[7] to best contribute to success of the concept without the need for signals. He followed up the meetings by putting the concept in writing for distribution to each ship's Captain.[8]

Nelson's concept accepted the uncertainties of the battle he intended to fight and his inability to exercise centralized control in the traditional way. He admitted that "nothing is sure in a sea fight beyond all others" and he relied on his Captains' initiative to adjust to circumstances by instructing "no Captain can do very wrong if he places his ship alongside that of the enemy."[9]

C2 Agility Summary: Nelson's ruminations (deep thinking) about how to achieve the objective of decisively defeating the combined French/Spanish fleets was akin to the design process. He understood the problem was not the opposing fleet as much as the standard approach to battle, which made decisive outcomes unlikely. His operational (in this case "tactical") approach was to abandon convention by adopting his radically different concept for maneuvering his fleet. Once initiated, this approach to maneuver could not be executed successfully using the "normal" C2 system. Instead, Nelson conceived of C2 not dependent on signals from the command ship, but rather relying on command through intent. He had high confidence that his Captains could gain thorough understanding of the concept and plan, through face-to-face discussions that he supplemented in writing. This was underpinned by extraordinary trust among the leaders, expectations of horizontal collaboration and support during the engagement, and understanding that once battle was joined, the individual Captains had all the information needed to make good decisions and that they would do so.

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[7]   To help in distinguishing friend from foe, Nelson's fleet was painted in a distinctive pattern (later known as the Nelson Chequer).

[8]   Corbett p. 204-214 includes a lengthy discussion of the famous memorandum, and provides a copy as an appendix.

[9]   Corbett pp. 271-272

B. Battle of Britain [10]

In early June 1940, after the 2evacuation from Dunkirk, there was fear in the England of a German cross-Channel invasion. The Germans considered mounting an invasion, but knew that one prerequisite would be gaining control of the airspace over the Channel and in the landing areas. The Luftwaffe attempted to achieve this but failed, despite having numerically superior air forces. The young British pilots flying Spitfires and Hurricanes normally get most of the credit for defeating the Germans in the air, thereby forestalling a landing attempt. Less well known is the critical importance of the C2 approach that enabled the fighters and ground weapons to be employed with maximum effectiveness, thus compensating for their inferior numbers.

Between 1936 and 1940, the Royal Air Force (RAF) Fighter Command transformed its air defense C2 approach from a loose collection of fighters (open cockpit biplanes without radios)—whose tactics were to employ airborne patrols, ground observers with only local reporting, and ground anti-aircraft guns defending key installations—to a well-coordinated system that could skillfully orchestrate the air battle. By June 1940, the transformed C2 approach could put the fighters where they were needed, at the critical time; enable rescue of downed pilots; prevent fratricide from the ground; and manage the vital, but highly constrained, associated logistics. The C2 system also masked its presence and importance from German intelligence. In retrospect, this example of C2 Agility seems obvious, but at the time it was controversial with many detractors, both within the RAF, including much of the old school fighter community and the bomber community (which was much better resourced), and among politicians. The system incorporated new technology, but its key feature was a new operational approach and a corresponding C2 approach that knit the pieces together and managed them appropriately.

The pieces included the coastal radio detection and ranging stations (early radar), the ground observers (who supplemented the radars by providing estimated enemy raid strength and altitude), airfields and fighters, the ground air defense units, tethered balloons, and elements of the navy coastal command and air units. Integration efforts included introducing a rudimentary two-way radio in new fighters, developing dedicated telephone links buried and protected in concrete sheathing, and, most importantly, creating an RAF Fighter Command Operations Center. This operations center conducted

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[10] See Michael Korda, *With Wings like Eagles,* Harper Perennial, New York, 2009 for a detailed description of the C2 approach. See also Wikipedia, cited below, section on the Dowding system for a shorter synopsis.

two new activities: it received reports from the radar facility crews, ground observers and radio intercepts; and it used that information to accurately predict the routes, altitudes and targets of German raids. It also shared this information about the developing situation with four subordinate Group Command Centers, thereby enabling them to alert their subordinate airfield (sector) air defenses, determine the best allocation of available fighter squadrons, launch fighters in time to reach optimal altitude, and vector them to intercept the incoming German bombers. Throughout the battle, the Fighter Command Operations Center maintained what today would be called a common operating picture, which was shared with the four groups. The Fighter Command Operations Center also controlled the logistic supply chain from the factories to the airfields, which enabled the four groups to continue operating despite air losses and ground damage suffered during raids.

The groups maintained tactical control of the battle, which involved successfully orchestrating several C2 activities. They determined the response to each raid based on the status of their squadrons, time, expected raid location, the weather, and other factors. The C2 approach also enabled them to request collaboratively support from adjacent groups if required. Below the group level, a system of sectors was devised to control each airfield and its squadrons. The British airspace was divided into four Groups as shown in Figure A-1.

Source: Map from Wikipedia. See
http://en.wikipedia.org/wiki/File:Battle_of_Britain_map.svg#filelinks

Figure A-1.   Divisions of British Airspace by Group

Like Nelson at Trafalgar, the RAF found it had to change its C2 approach as events unfolded. Initially it was necessary to centralize C2 at the RAF Fighter Command Operations Center and the Group Command Centers because they were the nexus of information needed to respond to a particular set of threats. But once Fighter Command determined the best response, and fighters were launched and vectored (by their respective sectors), the fighters could see their targets and determine the best attack options, so C2 was decentralized. Overall C2 activities continued to support the unfolding operations; for example, the centers helped prevent fratricide by passing the routes and locations of friendly fighters to ground air defense units and naval forces. Operations at each air base (and in each sector) were also decentralized, including launch, recovery, refitting and re-launch, as well as defense.

This process was repeated several times each day as successive waves of German attackers crossed the Channel. Fighters scrambled in response to an earlier wave might still be airborne as Fighter Command was preparing for the next one. Fighters often flew multiple sorties, even when their bases were under attack, with their ground crews and base operations exposed (they were located above ground in wooden huts). Fighter Command monitored the status of all fighter squadrons and managed the replacement of aircraft, pilots and ground personnel on a daily basis as the battle raged.

Another key component of the C2 system's design was redundancy of the command centers and a robust capability to repair telephone lines (using dedicated telephone engineers) that were cut despite their initial hardening. Sector operations rooms used to control base activities also had a nearby backup facility available.

C2 Agility Summary: In order to achieve the overarching purpose of avoiding a ground invasion of Britain, the RAF devised a new operational approach for air defense. Accordingly, it also implemented a corresponding C2 approach to allow varying degrees of centralized control over its newly-created integrated air defense system. The C2 approach was evident in a variety of newly created C2 activities, including reports provided to the Operations Center from radar facilities, ground observers, and radio intercepts; as well as developing predictions about where the attacking Germans were going to strike and passing them to subordinate units. The C2 approach was also evident in the procedures used to determine which component of the air defense system would respond to an attack. C2 Agility enabled authority to be exercised as needed according to the circumstances, so that air controllers could vector aircraft towards incoming enemy aircraft, and then, when fighters were in visual contact, they could assume control of the engagement.

C. UNITAF (Unified Task Force) in Somalia

The events in October 1993 described in the book *Black Hawk Down* occurred during a UN-led operation in Somalia called United Nations Operations in Somalia II (UNOSOM II). Less well known are the manifestations of C2 Agility that occurred during the five-month UNITAF period that followed UNISOM I, before the UN again took over in May 1993.

For months during 1992, Somalia had been on a downward spiral due to the collapse of its government and fighting among its many rival clans. Large segments of the population were facing starvation because the clans were using food as a weapon by preventing the international relief organizations from distributing it where needed.[11] Then on 4 December 1992, President George H. W. Bush announced the initiation of Operation Restore Hope. Under the terms of UN Security Council Resolution 794 (passed the previous day), the United States would both lead and provide military forces to a multinational coalition to be known as the Unified Task Force, or UNITAF. This force would create the security conditions necessary for a peacekeeping operation or until the situation stabilized enough for it to be turned over to a permanent UN peacekeeping force. [12] The US portion of the mission, which lasted five months, fell to US Central Command (CENTCOM.) The CENTCOM mission statement read:

> When directed by the NCA, USCINCCENT will conduct joint/combined military operations in Somalia to secure the major air and sea ports, key installations and food distribution points, to provide open and free passage of relief supplies, provide security for convoys and relief organization operations, and assist UN/ NGOs in providing humanitarian relief under UN auspices.[13]

Due to the geography, response times and ready capabilities, including an offshore Marine Expeditionary Unit (MEU), CENTCOM requested the First Marine Expeditionary Force (IMEF) from Camp Pendleton, California, to lead the US forces in Somalia and provide a C2 structure for the international effort. CENTCOM was alerted to the possible mission about two weeks before the initial forces were scheduled to land on 9 December. IMEF had even less time to deploy its headquarters, the lead elements of which arrived shortly after the MEU had landed and secured the airport on the coast. When IMEF headquarters (HQ) deployed it had only a rough idea of which US forces

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[11] CENTCOM had been directing an airlift of relief supplies into the interior of Somalia since August 1992, but this did not solve the underlying problem or the clan stranglehold on Mogadishu.

[12] Kenneth Allard, *Somalia Operations: Lessons Learned,* CCRP Publication Series, 1995, page 13.

[13] Ibid. pp. 13-14.

would participate,[14] and it did not have a clear picture of the situation on the ground.[15] It did not even have a complete list of the countries that would comprise the coalition, nor their size and capabilities. Due to the time constraint, IMEF HQ deployed "as is." As it engaged the various entities within the operational environment, it immediately began to demonstrate C2 Agility, adapting the initial C2 approach it brought with it to the realities on the ground.

Over the next few weeks, the IMEF HQ staff was augmented by other Service expertise and in some cases by coalition representatives. At a minimum all coalition members established liaison teams at IMEF HQ. These teams were often headed by a senior officer regardless of the size of the coalition member's actual contribution. Soon after arriving, IMEF determined there was no requirement for its air wing HQ or for the joint force air component commander (JFACC) that had deployed. Accordingly they were sent home. Early on, IMEF created a civil-military operations center (CMOC), headed by a colonel, within its operations directorate (CJ-3).[16] This center was a critically important addition to the HQ, because it ensured that non-governmental organizations (NGOs) had the security they needed to distribute relief supplies—the very essence of UNITAF's mission. At the time, the NGOs were fiercely independent and wary of letting it appear they were associated with, or agents of, UNITAF. The center's daily close coordination with NGOs was a challenge, but it was also an essential C2 activity. IMEF also created numerous liaison teams, some out-of-hide and some consisting of special operations forces (SOF)[17], to establish linkages with members of the coalition and other entities in Somalia, including most of the clans, as discussed below. Additionally an Army psychological operations (PSYOP) unit ran a radio station and published a newspaper to ensure UNITAF intentions and actions were understood, the rules of engagement were clear, rumors were squelched, and daily developments were reported factually.

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[14]   Major headquarters were identified but size of each Service contribution was not yet decided, as it depended on the size and capabilities of coalition force contributions, which were not yet known on 9 December 1992.

[15]   Somalia was a low priority for US intelligence organizations during the Cold War and its aftermath. For example, HUMINT (human intelligence) was virtually nonexistent and maps were 20 years out of date.

[16]   Allard, pp. 97-99.

[17]   Richard W. Stewart, T*he US Army in Somalia: 1992-1994,* Center for Military History Online Pub 70-81-1, 2003

Externally, IMEF faced two C2 challenges. The first was to establish appropriate C2 arrangements among US and coalition forces from more than 20 countries. C2 of US forces was straightforward, because the Marines were assigned to UNITAF and the other US forces were governed by established command relationships. However, many of the coalition forces were subject to restrictive national caveats. As a result, IMEF and UNITAF had to negotiate assigned missions with these forces, which also required varying degrees of vetting through their national channels. These operational restrictions significantly impacted the flexibility and responsiveness of the force, and required a more flexible C2 approach. The UNITAF force structure and command relationships are shown in Figure A-2.
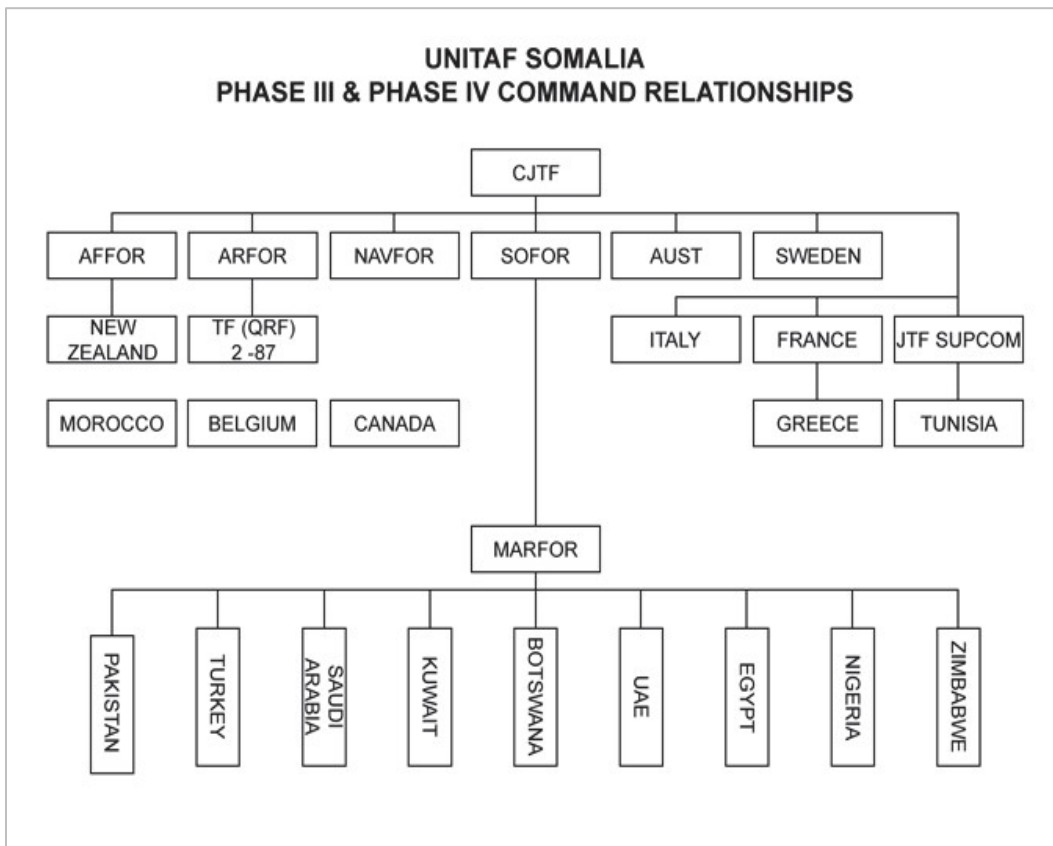
Figure A-2. UNITAF Force Structure

The second external UNITAF challenge was ensuring that all the other organizations and groups in the area of operations (roughly the southern third of the country) either supported what UNITAF was trying to accomplish or at least did not impede it. Since none of these entities were under UNITAF's direct control, the effort relied upon a variety of C2 activities that a US-only operation would not have had to

consider. These activities included diplomacy, cajoling, extensive coordination, offers of security and logistic support, and, in some cases, direct threats and even application of force. Fortunately, Ambassador Robert B. Oakley was appointed as President Bush's special envoy to Somalia at the beginning of the operation. Oakley, a former ambassador to Somalia, knew many of the key clan leaders and understood the internal dynamics of the country.[18] These attributes were crucially important in convincing the clans not to resist UNITAF's efforts and to stand aside during UNITAF operations. Although Oakley was not part of IMEF, he fully supported its operations, as did other elements of the US Government that were not under IMEF's control. This was not C2 in the classic sense; rather, it was a continuous effort to gain a shared focus on the purpose of the endeavor at hand, and convergence on the ways and means of accomplishing it. Without this indirect C2 approach, and the focus and convergence it enabled, UNITAF could not have succeeded. Important external linkages were as shown in Figure A-3.

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[18]   Due to illness he was later replaced by another Africa-experienced ambassador.
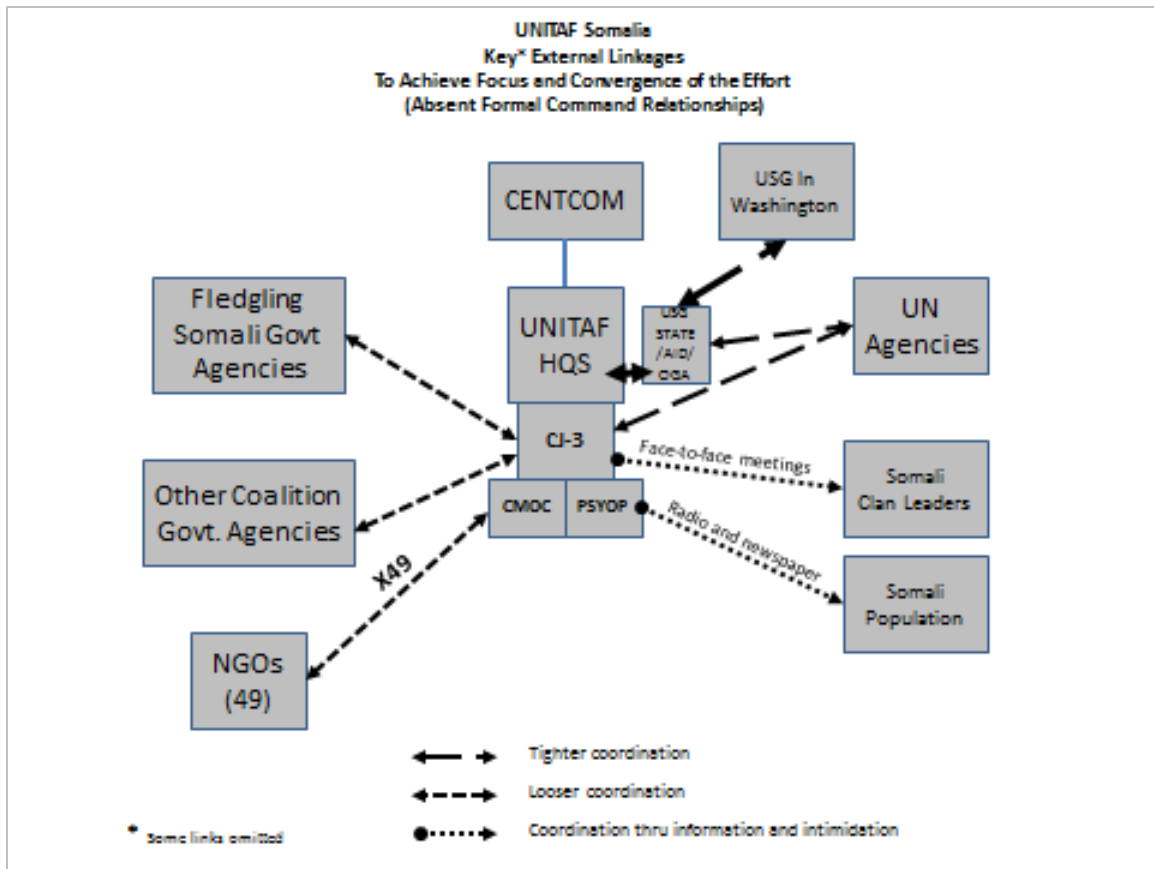
Figure A-3. UNITAF's External Linkages

C2 Agility Summary: By early January 1993, less than a month after entering Somalia from a cold start, IMEF/UNITAF had adapted its C2 approach to align it with the realities of its environment, its mission, and its derivative operational approach. It had shed C2 structure that was not needed and created new structure that was needed. Further, it had incorporated coalition members of varying capabilities and had established relationships tailored to the entities involved (and to their various degrees of subordination). Upon recognizing the need to establish linkages (relationships)—and, if possible, communities of interest—with all the relevant external actors, including the clans that were the underlying cause of the crisis, it established those links. This led to the beginnings of a shared understanding of what was to happen (providing focus) and the necessary cooperation of all actors needed to achieve the limited objectives (enabling convergence). In summary, despite an extremely austere and initially hostile environment, IMEF's C2 Agility yielded an effective UNITAF in a very short time.

D. Joint Special Operations Task Force in Iraq

As commander of Joint Special Operations Task Force (JSOTF) in Iraq, General Stanley McChrystal found that his existing command and control approach impeded his ability to implement a new concept of operations focused on fighting the enemy's network. [19] So he set about making his C2 approach more agile, as he described later:

> But fashioning ourselves to counter our enemy's network was easier said than done, especially because it took time to learn what, exactly, made a network different. As we studied, experimented, and adjusted, it became apparent that an effective network involves much more than relaying data. A true network starts with robust communications connectivity, but also leverages physical and cultural proximity, shared purpose, established decision-making processes, personal relationships, and trust. Ultimately, a network is defined by how well it allows its members to see, decide, and effectively act. But transforming a traditional military structure into a truly flexible, empowered network is a difficult process.
>
> Our first attempt at a network was to physically create one. We convinced the agencies partnered with the JSOTF to join us in a big tent at one of our bases so that we could share and process the intelligence in one location. Operators and analysts from multiple units and agencies sat side by side as we sought to fuse our intelligence and operations efforts—and our cultures—into a unified effort. This may seem obvious, but at the time it wasn't. Too often, intelligence would travel up the chain in organizational silos—and return too slowly for those in the fight to take critical action.
>
> It was clear, though, that in this fusion process we had created only a partial network: Each agency or operation had a representative in the tent, but that was not enough. The network needed to expand to include everyone relevant who was operating within the battlespace.
>
> Incomplete or unconnected networks can give the illusion of effectiveness, but are like finely crafted gears whose movement drives no other gears.
>
> This insight allowed us to move closer to building a true network by connecting everyone who had a role—no matter how small, geographically dispersed, or organizationally diverse they might have been—in a successful counterterrorism operation. We called it, in our shorthand, F3EA: find, fix, finish, exploit, and analyze. The idea was to combine analysts who found the enemy (through intelligence, surveillance, and reconnaissance); drone operators who fixed the target; combat teams who finished the target by capturing or killing him;

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[19]   Stanley A. McChrystal, "Becoming the Enemy," *Foreign Policy*, no. 185 (2011): 66-70.

specialists who exploited the intelligence the raid yielded, such as cell phones, maps, and detainees; and the intelligence analysts who turned this raw information into usable knowledge. By doing this, we speeded up the cycle for a counterterrorism operation, gleaning valuable insights in hours, not days.

But it took a while to get there. The process started as a linear, relatively inefficient chain. Out of habit (and ignorance), each element gave the next group the minimum amount of information needed for it to be able to complete its task. Lacking sufficient shared purpose or situational awareness, each component contributed far less to the outcome than it could or should have.

This made us, in retrospect, painfully slow and uninformed. The linear process created what we called "blinks" —time delays and missed junctures where information was lost or slowed when filtered down the line. In the early days of the effort, we had multiple experiences where information we captured could not be exploited, analyzed, or reacted to quickly enough—giving enemy targets time to flee. A blink often meant a missed opportunity in an unforgiving fight.

The key was to reduce the blinks, and we did so by attempting to create a shared consciousness between each level of the counterterrorism teams.

We started by sharing information: Video streamed by the drones was sent to all the participants—not just the reconnaissance and surveillance analysts controlling them. When an operation was set in motion, information was continuously communicated to and from the combat team, so that intelligence specialists miles away could alert the team on the ground about what they could expect to find of value at the scene and where it might be. Intelligence recovered on the spot was instantly pushed digitally from the target to analysts who could translate it into actionable data while the operators would still be clearing rooms and returning fire. This knowledge was immediately cycled back through the loop to our intelligence and surveillance forces following the results of the raid in real time.

The intelligence recovered on one target in, say, Mosul, might allow for another target to be found, fixed upon, and finished in Baghdad, or even Afghanistan. Sometimes, finding just one initial target could lead to remarkable results: The network sometimes completed this cycle three times in a single night in locations hundreds of miles apart—all from the results of the first operation. As our operations in Iraq and Afghanistan intensified, the number of operations conducted each day increased tenfold, and both our precision and success rate also rose dramatically.

This example vividly illustrates the importance of adapting command and control approaches to the circumstances of the environment, organization, and the mission—the object of C2 Agility as presented in this handbook. Although the improved C2 approach General McChrystal describes was developed without prior exposure to the concept of

C2 Agility, it nevertheless illustrates the richness of the concept and its potential value in guiding future assessments and adjustments to C2 practices.

C2 Agility Summary: General McChrystal realized he needed a new operational approach in order to defeat the enemy's network. His description of the changes to his C2 approach illustrates the importance of thinking about C2 in a systematic way. This is because changes in one dimension often create the need to change in another dimension. In essence *decentralization* was needed to accelerate the pace of operations. But to achieve decentralization, *collaboration* needed to improve and *information flows* needed to accelerate. This example also illustrates how the activities associated with a C2 approach can morph and grow, one step often leading to another. For example, the linkages among all parties were at first linear, resulting in gaps or "blinks" in shared awareness. Over time it became clear that merely establishing linkages was not sufficient, if the amount of information passed along the links was minimized. It was only by changing their activities—in this case, by widely sharing the drone video—that shared awareness started to develop, which in turn led to even more intelligence sharing with combat teams. Further, by continually assessing the results—and measuring how the increased C2 activity led to increases in operational tempo, precision and success—the JSOTF could definitively conclude that it was on the right track.

E. Unity of Effort in Security Force Assistance Operations

After nearly a decade of war in Afghanistan and following the surge of US forces in 2010- 2011, the US Army assessed that a larger combat advisory effort to Afghan National Security Forces (ANSF)—comprised of the Afghan National Army (ANA), Afghan Border Police (ABP) and Afghan Uniform Police (AUP)—was required to sustain the security gains of the surge. Combat advisors with the ANSF would allow the International Security Assistance Force (ISAF) to continue to assist in the maturation of the ANSF, as the drawdown of coalition forces began in 2012 and progressed towards a minimal international presence by the end of 2014.

The Army took lessons learned from previous combat advisory efforts in Iraq and Afghanistan by Military Transition Teams (MiTTs), and built the Security Forces Advise and Assist Team (SFAAT) program to conduct this advisory effort in Afghanistan. These teams were led by a Major or Lieutenant Colonel and Master Sergeant or Sergeant Major, and had ten other officers and non-commissioned officers with skills in combat arms, intelligence, fire support, and logistics. SFAATs were formed from across the Army at Fort Polk, LA and received specialized combat advisor training prior to deploying to Afghanistan. Some SFAATs deployed directly into Afghanistan from Fort Polk, while others joined deploying Brigade Combat Teams (BCTs) as part of their organization. Five SFAATs would deploy in this manner with the 3rd BCT, 101st Airborne Division.

In the months prior to the 3rd BCT's deployment to Afghanistan, the brigade's commander, Colonel (COL) RJ Lillibridge, and his senior staff wrestled with the C2 approach needed for this complex operation. Specifically, they sought to identify appropriate command relationships among their headquarters and the many other organizations present in their future area of operations (AO) in eastern Afghanistan, including Provincial Reconstruction Teams (PRTs), the United States Agency for International Development (USAID), other government agencies (OGAs), and the Commander, Joint Special Operations Task Force (CJSOTF). Despite some muddled and non-standard relationships with these organizations, all had been operating in Afghanistan for years and had established relationships and coordination methods with the brigade that the 3rd BCT would replace.

The SFAATs would be the only new entity in the AO. Integrating these teams carried even higher stakes than did working with the organizations already operating in the 3rd BCT's area because transferring responsibility for Afghan security to local

authorities was the coalition's primary purpose.[20] Thus it was vital for the BCT to make every effort to ensure their success.

The 3rd BCT would deploy with the five internal SFAATs mentioned above, but would also be responsible for the efforts of 16 additional SFAATs from across the active Army, Army National Guard, and Army Reserve that would be in the AO. Some would arrive to Afghanistan prior to the BCT, some after. More importantly, when 3rd BCT leaders visited Afghanistan four months before deployment, they found that the ANSF units with whom they were to partner lacked the competence and confidence to lead unilateral Afghan operations. As a result, the BCT's planned C2 activities, which assumed Afghan forces would be operating on their own, would have to change. SFAATs alone could not remedy these shortcomings.

BCT leaders recognized that their organic infantry rifle companies and reconnaissance troops were fully trained and were mentally prepared to conduct partnered operations in order to increase the ANSF's collective competence and confidence at the tactical level. But these companies and troops had neither the rank nor experience to advise Afghan battalion-level formations, commanded by Afghan Lieutenant Colonels and Colonels. SFAATs were intended to fill this organizational gap. But two previous deployments with MiTTs in Iraq had shown COL Lillibridge that without clearly delineated roles, responsibilities, and command relationships between battlespace-owning units (in this case the BCT's companies and troops) and combat advisors, well-intentioned MiTT officers and NCOs often found themselves working at cross-purposes, thus losing credibility with their Iraqi partners. He was determined to not repeat this error.

As the commander and staff dug into the Regional Command-East (RC-E) orders and directives, they could find no clear articulation or intent outlining the relationships or authorities between Army formations with responsibility for security and other missions in a geographic area (the battlespace owners) and SFAATs. They queried the SFAAT academy at Fort Polk for ideas, to no avail. The problem they were trying to resolve is depicted by the following battlefield geometry (Figure A-4).

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[20]   Marine Corps Gen Joseph F. Dunford Jr., ISAF commander, articulated this overarching purpose in a speech to the Reserve Officers Association in August 2013. "Winning means setting the conditions for the Afghans to exploit opportunities while developing the Afghan forces and sustaining them," Dunford told the audience. This can be done, he added. "It is by no means inevitable, but it is achievable," Dunford said. See http://www.defense.gov/News/newsarticle.aspx?ID=120598.
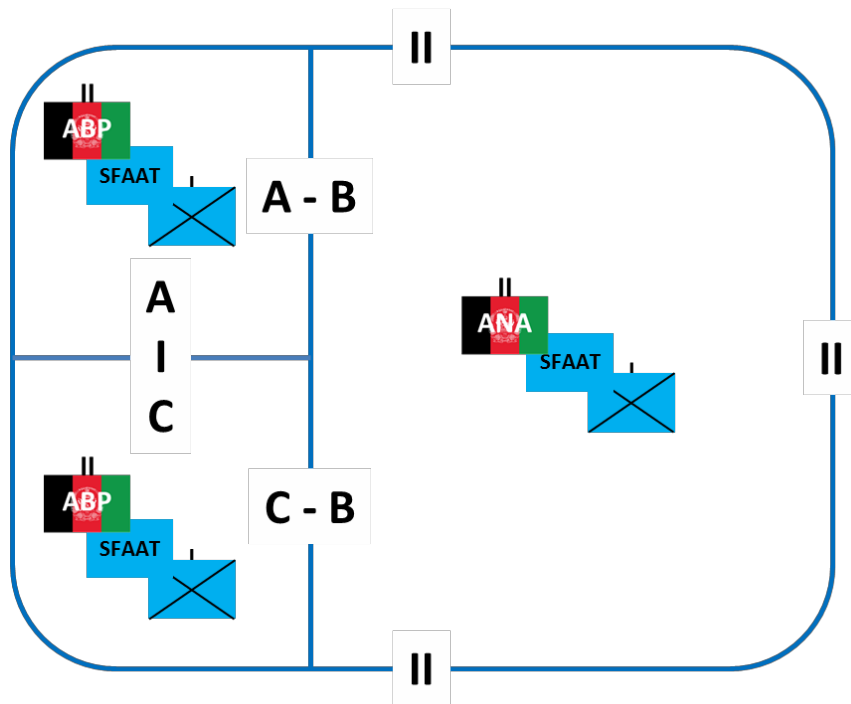
Figure A-4.   Battalion-level Battlespace Geometry

The battalion commander was responsible for the battlespace within the outer border (depicted by the "**II**" symbols). In this example, that meant the actions of the battalion's three companies and two ABP battalions plus an ANA battalion. The three companies (depicted by "**I**" symbols and the letters **A**, **B**, **C** respectively) were responsible for their areas of operation (AOs), the smaller areas, in concert with their partnered ABP or ANA battalion. But the SFAAT teams, led by field grade officers and senior non-commissioned officers, would be collocated with those companies, and would outrank the companies' senior leaders. This had created friction in COL Lillibridge's two previous Iraq deployments, when combat advisors attempted to take command of collocated companies and troops, or had worked at cross-purposes to the battlespace-owning battalion commander.

BCT leaders finally resolved that a defined command relationship among all parties was less important than achieving unity of effort by concentrating on ISAF's purpose. With this new focus upon assuring unity of effort, they established the following roles and responsibilities to guide the activities of the involved parties:

- Battalion Commanders ("**II**") were the battlespace owners, responsible for all US and Afghan actions and activities in their AOs. These commanders would

encourage the ANSF commanders in their battlespace to work in support of one another, or, at the very least, not to work at cross-purposes.

- SFAATs were responsible for advising and assisting their respective ANSF headquarters and staff, in accordance with COL Lillibridge's, and more importantly the battlespace- owning battalion commander's, guidance and intent. SFAATs were prohibited from participating in combat operations unless their Afghan battalion commander personally went on the operation. This was a significant deviation from the role of MiTTs in Iraq and Afghanistan, where the MiTT had been required to participate in all combat operations as the MiTT was the only conduit to coalition combat enablers, such as reconnaissance, fires, and medical evacuation.

Rifle Companies and Reconnaissance Troops were responsible for partnered combat operations with their collocated ANSF units and the application of any coalition combat enablers. These companies and their ANSF partners would conduct the operations planned by the ANSF HQs and SFAATs. But these companies and troops took their orders from their battalion commander, not the SFAAT.

In order to assure all involved understood COL Lillibridge's intent, the BCT published this guidance in a Terms of Reference prior to deploying, and COL Lillibridge personally briefed every SFAAT already operating in the brigade's AO when the 3rd BCT arrived in Afghanistan. In addition, each SFAAT that arrived after September 2012 spent a day at the BCT headquarters, receiving orientations on the AO and personally hearing COL Lillibridge describe the roles and responsibilities he had established. The 3rd BCT's battalion and company commanders all reinforced these points every day as they circulated within the battlefield.

According to COL Lillibridge, the end result was an outstanding unity of effort by all involved in the AO. Issues rarely arose between commanders and SFAATs, and, more importantly, US forces never found themselves at cross-purposes with one another or with their Afghan partners, even as they successfully transferred a larger portion of security responsibilities to the Afghans every month. As the ISAF commander stated in August 2013, "If the trajectory that we've been on for the past couple of years continues for the next 16 months, I am very comfortable about where we will be with the Afghan forces." [21]

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[21] Jim Garamone, "ISAF Chief Briefs Reservists on Afghan Progress, Future,' US Department of Defense, American Forces Press Service, August 8m 2013. http://www.defense.gov/News/newsarticle.aspx?ID=120598.

C2 Agility Summary: In order to enable ground forces to build the capacity and capability of Iraqi and Afghan security forces, the Army created new types of units, the MiTTs and SFATTs, but the operational approach and C2 approach were not changed commensurately. This led to the friction COL Lillibridge had experienced in Iraq, where the lack of clarity on how to interact with battlespace owners, coupled with the seniority of the MiTT leadership, had led them to exert authorities that were at cross-purposes with other units. Therefore, the BCT devised an operational approach that maximized interaction between SFATTs and the ASF, while enabling the BCT to take the lead for all other operational tasks and to participate in all combat operations. The new C2 approach was tailored to support this operational approach in several key respects. First, it assigned authority to the battlespace owners for all missions, and gave them control over enablers provided by the coalition. Second, it restricted the authority of the SFATTs, thereby removing conflict over who was in charge between them and the battlespace owners. Lastly, the C2 activities continually reinforced and supported the C2 approach, for example by commanders reiterating the ground rules as they circulated around the battlefield, and SFATTs participating in operations only when their Afghan partner was present.

F. Brigade Counterinsurgency Assault, 2005 [22]

In October 2005, the US-led coalition faced a stubbornly persistent insurgency in Anbar Province, Iraq. The province accounted for 20 percent of US troops but 40 percent of US casualties. [23]

US forces were approaching a strategic inflection point, in which they would shift from counter-insurgency efforts toward a more population-centric stability operation. Against this backdrop, the 2nd Marine Division's Regimental Combat Team 2 (RCT 2) planned Operation River Gate, which was aimed at retaking three Anbar Province cities that were under control of insurgents that included Ansar al Sunna and Al Qaeda. As part of the operation, Task Force 3-504 (TF 3-504) of the 82nd Airborne Division was attached to RCT 2 and assigned the mission of seizing the town of Haqlaniya. With a population of 15,000, Haqlaniya was essentially an insurgent sanctuary with no coalition presence following the departure of Iraqi forces in August 2005. The TF 3-504 Commander's intent was to focus on the enemy, break patterns set by previous units, and achieve surprise by conducting a decentralized attack against specific insurgent cell leaders using detailed intelligence provided by displaced persons recruited from Mosul.

Initially, the task force commander envisioned a multi-axis, nearly simultaneous infiltration which would require tight control and precise timing. During this phase, centralized control was needed to safely move four companies of airborne infantry into assault positions around the target. Associated activities included a coordinated truck- and foot-infiltration from the south, a company air assault to the north, establishment of blocking positions on all approaches, pre-assault fires, and electronic attack.

However, once the assault phase began, both the operational approach and the C2 approach needed to change significantly. Retaining tight control would have dictated a linear, block-by-block clearance operational approach, requiring a central control node to keep track of and issue directions to a swarm of platoons and squads. Moreover, such a linear operation would have forfeited the advantage of surprise, thereby allowing the enemy to escape. Therefore, the commander chose to shift to a C2 approach consistent with the tenets of mission command—command by intent with decentralized execution. In so doing, he enabled his soldiers to maintain momentum and to maneuver in a nonlinear, and therefore less predictable, fashion.

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[22] This vignette is based on working papers provided by COL Larry Swift, US Army. In 2004-2005, COL Swift served in Iraq as Commander, 3rd Battalion, 504th Parachute Infantry Regiment.

[23] Bing West, *The Strongest Tribe* (New York: Random House, 2008)

Using this second operational approach, the three assaulting companies executed platoon release points as they moved out of their assault positions, breaking each company apart into platoon formations. Upon entering the city, the platoons further broke apart into squads. Under the cover of darkness in an unfamiliar city, the squads exploited detailed intelligence, GPS technology, and superb non-commissioned officer leadership to move independently to some 30 separate locations and kill or capture enemy insurgents. Recognizing that some of the targets would move to other locations in the city, the C2 approach was altered to permit squads to conduct the initial assault and tactical site exploitation (to include tactical questioning) without seeking higher-level direction. Furthermore, if squads gained actionable intelligence on insurgent locations, they had the authority to immediately move to and assault the follow-on targets. The squads were given common graphics which included company boundaries and a city-wide building numbers system, thereby enabling them to maintain shared situational awareness as they moved through the city. Platoon leaders and company commanders worked to shift enablers such as Explosive Ordnance Disposal, Human Intelligence teams, Point of Capture teams, helicopters, close air support, and quick reaction forces; and to track squads as they pursued the enemy wherever the intelligence took them. Deconfliction of direct fires was achieved through a prior agreement to fire on identified targets only, and by shifting company boundaries as the squads attacked follow-on targets. The battalion intelligence officer tracked changes in the enemy situation as the operation progressed by closely watching the "kill list." In addition, he updated the enemy network template based on the results of each raid's detainees and tactical questioning.

The intelligence-driven maneuver continued for 36 hours, yielding five insurgents killed in action, 120 insurgents and foreign fighters captured, and a covert medical facility destroyed. The operation also led to the discovery of vehicle-born improvised explosive devices (VBIEDs) and a VBIED factory, enemy computers and electronic media, and documents including those of Al Qaeda leader Abu Musab al Zarqawi's propaganda chief. Intercepted enemy communications indicated that the remaining insurgents were trapped and unable to move and were requesting assistance as a result of the continuous and unpredictable movements of "crack US troops."

C2 Agility Summary: The mission success of TF 3-504 was the result of the two differing operational approaches, and supporting C2 approaches, that were chosen, effectively leveraging the aggressive actions and initiative of US airborne infantry. Successfully transitioning from an assault operation based on companies to a distributed operation conducted by squads required a major change in the C2 approach at a critical juncture. Prior planning enabled the task force to transition from a tightly controlled C2 approach to one that allowed for decentralized decision-making and initiative. As authority was decentralized to the squad level, higher-level commanders retained authority over critical resources that could be directed to specific squads as needed. In addition, information (graphics and building numbers) was widely distributed, and flexible means were developed for adjusting decision rights, including pre-arranged firing rules and moveable boundaries between units, that helped prevent friendly-fire incidents. As a result, US forces maintained a rapid operating tempo, achieving decisive outcomes while preventing the insurgents from exercising initiative.

G. The Battle of the Frontiers, 1914

The German invasion of France and Belgium in 1914 is widely regarded as a failure. Although many explanations have been proffered for Germany's lack of success in its bid to quickly defeat French forces during the Battle of the Frontiers, it is only recently that the German C2 approach and activities have been more closely examined. The analysis below is drawn from a 2005 article that summarized the findings of a seminar entitled "Logistics in War" held at the Georgia Institute of Technology's Sam Nunn School of International Affairs.[24] The seminar's findings strongly suggest that the German forces' C2 approach and activities were inappropriate given the situation, thus creating the conditions for defeat.

The German offensive employed a modified version of the Schlieffen Plan, with a right wing advancing eastward through Belgium into France and a left wing intended to draw French forces westward where they would be vulnerable to envelopment by the encircling right wing. Several changes made by Chief of General Staff Helmuth von Moltke, the Younger, weakened the right wing and increased German resistance to an expected French assault on the left. These changes led to a situation in which the French were less likely to be drawn sufficiently far to the west to create a vulnerability that German forces could exploit. It also "created the conditions that led the Germans to believe, once the fighting started, that they could mount a successful counter-offensive" with the left wing. [25] Such a counter-offensive, if successful, could have led to a double envelopment of French forces and a decisive victory for Germany. But by compressing French forces instead of drawing them westward, the left wing's counter-offensive placed at risk the success of the right wing—and with it that of the entire invasion.

An inappropriate C2 approach exacerbated these operational difficulties. The Germans chose to maintain the approach to command and control that they had successfully employed in the Franco-Prussian War in 1870. It featured mission type orders (*Auftragstaktik)* and afforded field commanders maximum latitude to make the decisions they thought best as their circumstances changed. However, this approach gave commanders no doctrinal means of accomplishing certain C2 activities, such as crossing organizational seams to obtain information, either from headquarters or from one another, about the situation of other German armies. Given that the size of the battlefield was

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[24] Matthew Fuhrmann, Nathan Edwards & Michael Salomone (2005): The German offensive of 1914: A new perspective, Defense & Security Analysis, 21:1, 37-66.

[25] Ibid., p.40.

much greater than that of the Franco-Prussian War, with German armies spread over hundreds of miles, this limitation was particularly acute. Although information could be shared voluntarily and supporting actions advised on an *ad hoc* basis, there was no one decision-maker who had full situational awareness. Further, information about deviations from the original plan was neither fully vetted nor widely shared. As discussed above, although it was allowed by Von Moltke, Crown Prince Rupprecht's decision to attack on the left wing was particularly consequential for Germany, in that it "abandoned the essence of their war plan." [26]

In addition to the German failure to systematically share vital information among field armies, many preplanned C2 activities contributed to a lack of situational awareness across the force. These activities were designed to support the chosen C2 approach of mission type orders, but they were not supportive of other approaches. For example, each army could communicate internally using balloons, motorcycles, and short-range radios; however, these activities could not be rearranged to foster communication across armies, particularly in hostile territory. In addition, communications jamming by the French coupled with complex codes led to long delays in the receipt of messages. These environmental conditions could have been foreseen and overcome by devising work-around operating procedures, but could not be corrected in the heat of combat. A solid operational design process could have anticipated these circumstances, recognized they were exacerbated by the size of the battle being contemplated, and provided a more resilient communications system and processes.

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[26]   Ibid., pp. 41-42.

C2 Agility Summary: A C2 approach optimized for mission-type orders given to each army was insufficient to support the operational approach, which required close coordination. And, lacking a C2 assessment process, German forces were unable either to recognize this shortcoming in advance or to adapt their C2 approach to the conditions they encountered.[27] Through careful analysis of the C2 implications of the Schlieffen Plan, they might have identified the desired information flows across armies, the expected collaboration between adjacent units, and the need for decision rights to be assigned to an echelon with adequate situational awareness. This would have led them to select a different C2 approach. Then, they could have noted, perhaps in an exercise, that their activities did not match the approach; for example, because one unit's alterations to a planned maneuver were not communicated to other units, or because decisions were not reached in a timely manner. In addition, since the approach required changes to communications linkages among German army headquarters and armies, it would have been reasonable to assess whether those linkages were in place.

The above analysis points to the need to ensure C2 Agility in advance of an operation. This is because mistakes will certainly be made, unexpected events will occur, and circumstances will change. One of the most quoted axioms along these lines, that "no plan survives first contact with the enemy," is attributed to von Moltke, the Elder (1800-1891), who was the uncle of the senior German commander in this battle. Given this insight, it is reasonable to assess whether the German headquarters and field commanders were sufficiently agile in the face of change. Collective agility was required because the situation was complex and thus could not be decomposed into independent parts. In fact, individual agility in the absence of shared awareness was a cause of the ultimate German failure in the Battle of the Frontiers.

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[27] Ibid., p. 55.

Appendix B.   Aggregating C2 Approaches

This appendix expands upon the assertion that "every organization that has members reporting to and working together to inform a leader charged with making decisions or providing decisional recommendations has a C2 approach in practice." The first example diagrammed below is a Mission Command System. A typical Mission Command system has many subsystems. One set of subsystems relates directly to the joint warfighting functions[28] as illustrated below in Figure B-1. Each warfighting function has a functional leader (e.g. the unit Fire Support Coordinator or FSCOORD, as assisted by a Fire Support Officer or FSO, is the functional leader for the fires subsystem).
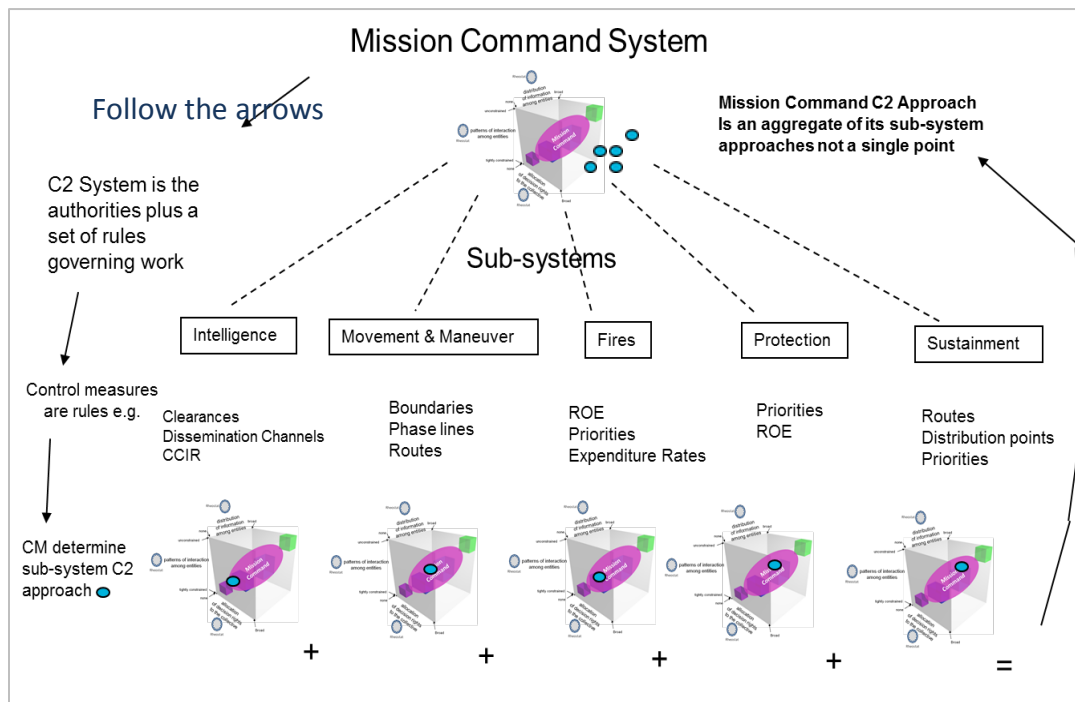

Figure B-1.   Mission Command System C2 Approach

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[28]   The US Army describes a warfighting function as a group of tasks and systems (people, organization, information, and processes) united by a common purpose that commanders use to accomplish missions (ADP 3-0, page 13, 10 Oct 2011)

As depicted, each warfighting function would have a C2 approach in practice. In order for that C2 approach to be constructive towards the overarching purpose, it should be attuned to the current or anticipated circumstances (i.e. mission or task, organization, and operational environment). Clearly, while each subsystem may share the same operational environment, each has its own unique organizational structure, people, and specific tasks. These variations in circumstances beg for each subsystem to consider forming its own C2 approach. Altogether, the subsystem C2 approaches can be aggregated into a Mission Command System C2 approach as shown in Figure B-1. In the aggregate, the system C2 approach becomes a collection of individual subsystem approaches (a shot-group).

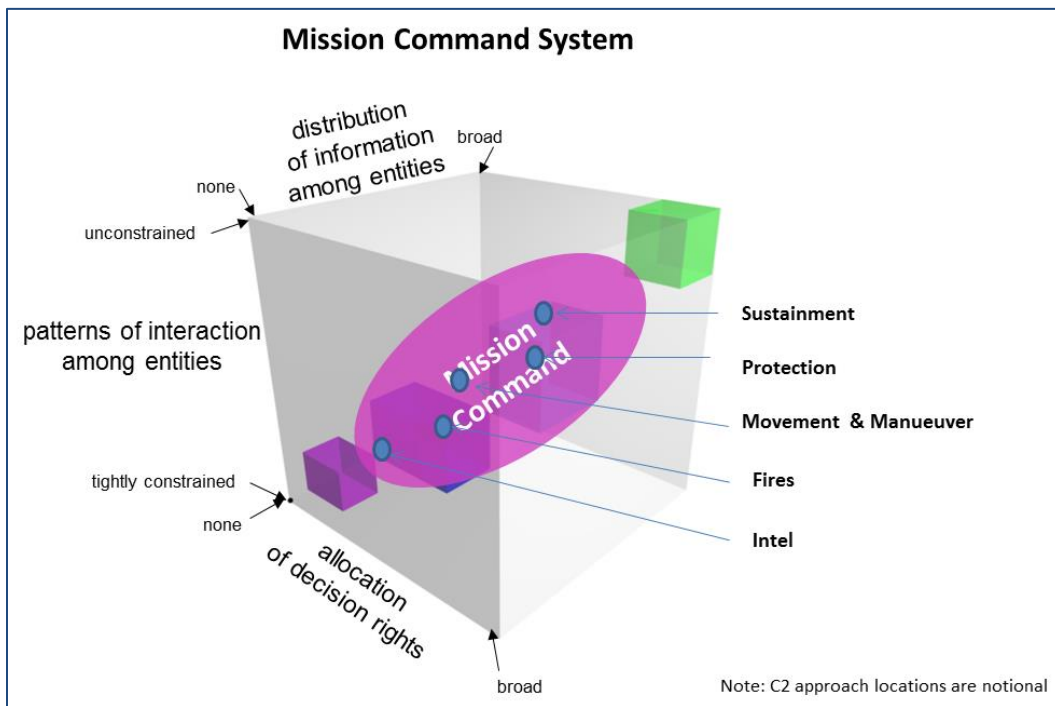A closer look at the aggregated C2 approach is illustrated in Figure B-2.

Figure B-2.   Aggregated C2 Approach

Another perspective of mission command could be organizational. Within each organization there is a headquarters element and each organization has sub-organizations (units) as shown in Figure B-3. Again, the circumstances for each unit may be different and beg for a different C2 approach. Overall the aggregate C2 approach for the headquarters could be represented as a shot-group of sub-organizational approaches.
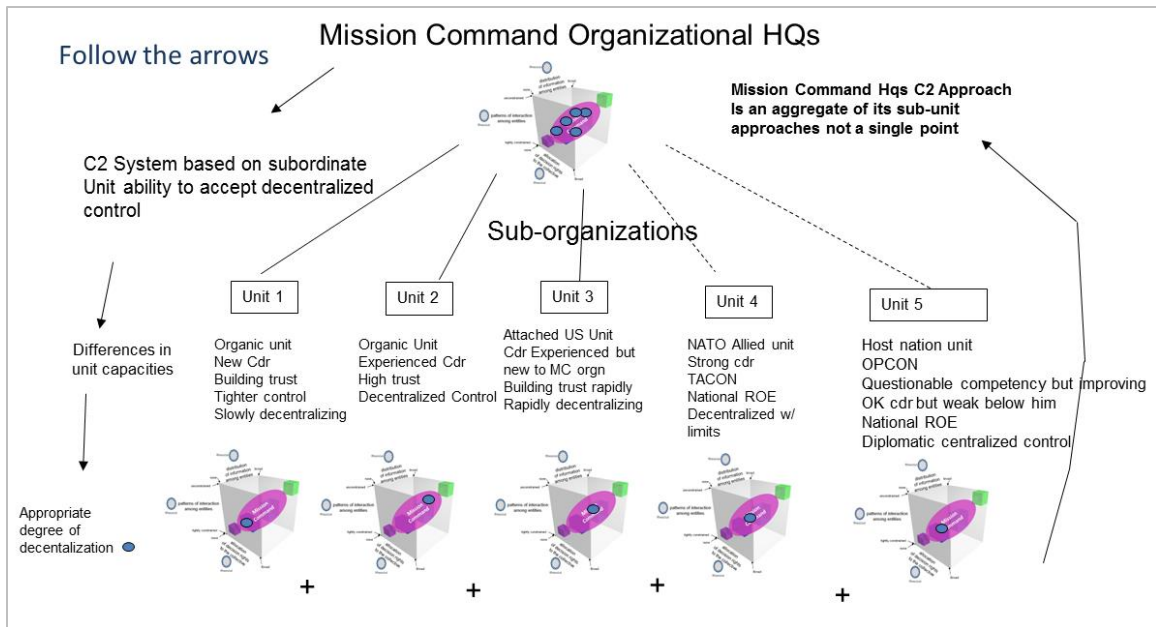
Figure B-3.   Mission Command Sub-Organizational Approaches

A closer look at the aggregated C2 approach is illustrated in Figure B-4.
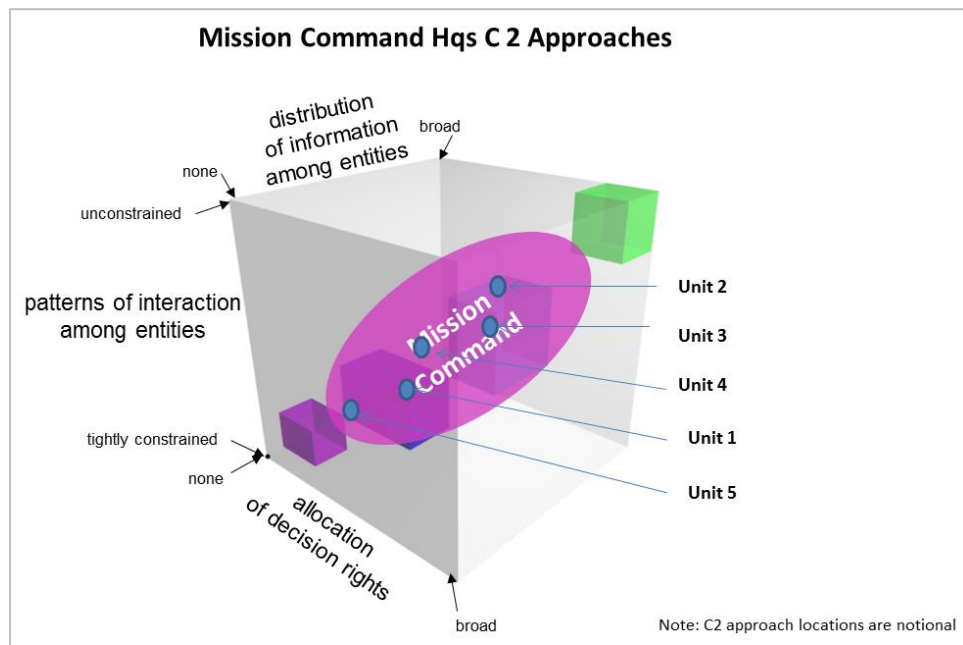

Figure B-4.   Aggregated C2 Approach, with Each Sub-unit Having Its Own C2 Approach

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Appendix D. Abbreviations

ABP	Afghan Border Police
AFFOR	Air Force forces
ANA	Afghan National Army
ANSF	Afghan National Security Forces
AO	area of operations
AOC	air operations center
ARFOR	Army forces
AUP	Afghan Uniform Police
BCT	brigade combat team
C2	command and control
CCIR	commander's critical information requirement
CCRP	Command and Control Research Program
Cdr	commander
CENTCOM	US Central Command
CGSC	Command and General Staff College (US Army)
CJSOTF	Commander, Joint Special Operations Task Force
CJTF	combined joint task force; commander, joint task force
CMOC	civil-military operations center
CM	control measures
COA	course of action
COL	Colonel (US Army)
DoD	Department of Defense
DOTMLPF-P	doctrine, organization, training, materiel, leadership and education, personnel, and facilities, plus policy
F3EA	find, fix, finish, exploit, and analyze

FSCOORD	fire support coordinator (Army)
FSO	fire support officer
GPS	Global Positioning System
HQ	headquarters
HUMINT	human intelligence
IMEF	First Marine Expeditionary Force
ISAF	International Security Assistance Force
JFACC	joint force air component commander
JOPP	joint operation planning process
JSOTF	joint special operations task force
JTF	joint task force
LOE	line of effort
LOO	line of operation
MARFOR	Marine Corps forces
MEU	Marine expeditionary unit
MiTT	Military Transition Team
NAVFOR	Navy forces
NGO	nongovernmental organization
OEF	Operation ENDURING FREEDOM
OGA	other government agencies
OIF	Operation IRAQI FREEDOM
OPCON	operational control
PRT	provincial reconstruction team
PSYOP	psychological operations
Pub	Publication
QRF	quick reaction force; quick response force
RAF	Royal Air Force (UK)
RC-E	Regional Command - East
RCT	regimental combat team

ROE	rules of engagement
SFAAT	Security Forces Advise and Assist Team
SOF	special operations forces
SOFOR	Special Operations forces
SUPCOM	support command
TACON	tactical control
TF	task force
UNITAF	Unified Task Force
UNOSOM	United Nations Operations in Somalia
USAID	United States Agency for International Development
USCINCCENT	United States Commander in Chief, Central Command
USG	United States Government
VBIED	Vehicle-born improvised explosive device