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Air Force Command and Control: The Need for Increased Adaptability

ABSTRACT

This paper captures the results of a CSAF directed study on USAF command and control (C2). The study examined Air Force C2 in seven cases covering the spectrum of conflict to determine whether doctrine and organizational structures require change to fit uncertain and dynamic future scenarios. A modified version of the Alberts and Hayes C2 approach space construct was used for the analysis.

The study's results showed that USAF C2 design must change in order to increase its adaptability. An overall goal for adaptive C2 design is offered along with six key variables to consider. The study's concluding analysis identifies three overarching problems the USAF must overcome to attain an adaptive C2 structure: lack of clarity among command relationships, lack of confidence and trust, and lack of capability and capacity regarding USAF integration elements. Several recommendations are presented that address these issues. The recommendations include: the need to broaden the understanding of Air Force personnel on the very concept of centralized control as well as improve their comprehension of command relationships—especially support. Also, the Air Force must organize, train, and equip for organizational structures that produce C2 elements at appropriate organizational echelons. Finally, the service should create a force-development strategy for subtheater commanders.

INTRODUCTION

On 23 November 2010, the chief of staff of the Air Force tasked the Air Force Research Institute to review the service's command and control to determine whether doctrine and organizational structures require changes to ensure success in uncertain and dynamic future scenarios. Moreover, any proposed structure must have sufficient adaptability to achieve success across the range of military operations and continue the focus on delivering the right effects at the right place at the right time.¹ The research team addressed the chief of staff's tasking by developing the following research questions: Does the command and control of Air Force capabilities (air, space, and cyber) need to become more adaptive to ensure both effective and efficient operations in support of the combatant commander's (CCDR) requirements across the range of military operations? If yes, what changes are needed to improve the service's command and control adaptability? The team used a variety of means to find answers to these questions, including a literature review of joint and Air Force lessons-learned documents, doctrine, and policy, extensive interviews, research conducted at the combined air operations center at Al Udeid Air Base, Qatar, and sponsorship of a command and control workshop.

The study developed in four phases. First, the research team identified criteria for effective command and control. Second, it used those criteria to conduct an analysis of the Air Force's command and control across seven operational examples that represent the range of military operations. This analysis sought to identify problems in the service's command and control structure and doctrine that indicated a need for enhanced adaptability. Third, based upon the problems identified, the team developed recommendations to improve adaptability of the Air Force's command and control. Finally, it validated the recommendations against key

characteristics of the operating environment expected in the future.

The results of the study showed that the design of Air Force command and control requires changes that will increase adaptability and thereby better support missions across the range of military operations. The analysis produced guidelines for an adaptive design for command and control. In addition, after discovering three problem areas that affected the adaptability of Air Force command and control, the team made seven recommendations that address those issues.

A Framework for Analyzing Command and Control Structures

The basis for an effective analysis across varied operations lies in establishing a common definition and developing an analytical model that captures the fundamental elements of command and control. For the purposes of this study, joint and Air Force doctrine supplies the necessary definition. Doctrine describes the concept of command and control as encompassing the way the Air Force organizes, commands, plans, controls, and executes capabilities to attain a joint force commander's (JFC) objectives. It further describes command and control as separate but interrelated functions.

Command "is the art of motivating and directing people . . . into action to accomplish missions." It includes authorities and responsibilities for the effective use of available resources.ⁱⁱ These authorities, also known as command relationships, are delegated to a commander by law or delegated by senior leaders and commanders over assigned and attached forces.ⁱⁱⁱ Combatant command, operational control (OPCON), tactical control (TACON), and direct support represent common types of command authorities.^{iv}

Doctrine describes control as a regulation function inherent to command. It is the commander's method for integrating and synchronizing functions by establishing requirements, allocating means, determining organizational effectiveness, identifying and correcting variance from set standards, and delegating authority. Ultimately, control gives commanders a means of measuring, reporting, and correcting performance.^v Simply put, "Command is perceiving and deciding, whereas control is communicating the decisions, organizing to carry them out, and then monitoring and measuring performance to feed back to command."^{vi} It is important to note that the process of commanding and controlling does not occur in isolation at one organizational level. Rather, it occurs at many organizational levels simultaneously, both independently and at all levels.^{vii}

Analytical Model

When Dr. David Alberts and Dr. Richard Hayes worked with the North Atlantic Treaty Organization (NATO), they developed an analytical model to evaluate command and control approaches, as described in their book *Understanding Command and Control*. Alberts and Hayes based this model upon ideas developed during their three-year involvement with an international research collaboration conducted under a charter from NATO's Research and Technology Organization.^{viii} The research team selected and adapted this model to guide analysis of the seven selected operational examples because of its inherent versatility in evaluating multiple command and control designs used to employ the Air Force's air, space, and cyber capabilities across the range of military operations. The model consists of three fundamental command and

control elements by which one can characterize and differentiate alternative command and control approaches.

The model's three fundamental command and control elements include *allocation of decision rights*, *patterns of interaction among actors*, and *distribution of information*.^{ix} Allocation of decision rights entails giving designated individuals the authority and responsibility to make decisions between possible options. While allocating decision rights can be achieved in a variety of ways the research team focused on the formal command relationships in order to understand at what organizational level the legal decision authority and responsibility resided. Patterns of interaction address who needs to interact (e.g., commanders, staffs, and employees), how they interact (e.g., face-to-face or by means of video teleconferences), and what types of transactions (e.g., decision, advice, and situational awareness) occur during the interaction. Distribution of information consists of the various ways and means of sharing information to inform all partners involved in an operation. It includes information sharing across command and control structures of service, joint, coalition, other-government, and nongovernment agencies.

The three fundamental elements describe an approach to command and control. Varying command and control approaches reside within the space bounded by the three axes in the figure below. The X axis represents the allocation of decisions, the Y axis the patterns of interaction, and the Z axis the distribution of information. The position from which an organization would operate within this space depends upon the degree of centralization of each of these elements. For example, an organization that limits its allocation of decisions, distribution of information, and patterns of interaction is in the centralized portion of this command and control design space.

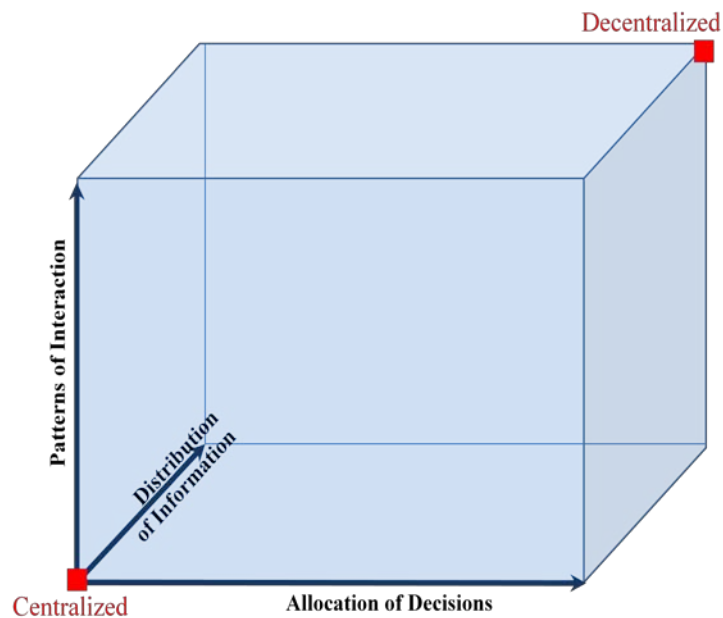


Figure 1. Analytical model. (Adapted from David S. Alberts and Richard E. Hayes, *Understanding Command and Control* [Washington, DC: Command and Control Research Program Publications, 2006], 75, http://www.dodccrp.org/files/Alberts_UC2.pdf.)

An organization's location in this space will vary, based upon function, type of capability, and time. For example, command and control for a humanitarian-relief effort would differ from that for a major conventional combat operation. Moreover, within the same

operation, command and control for cyber capabilities may differ from that for air capabilities. An effective command and control design creates the proper balance of centralization between each element.^x

Additionally, the three fundamental elements are interrelated. The design and implementation of one element will affect how the other elements react. Analyzing a command and control approach demands an understanding of the interaction among them.^{xi}

Having established a clear definition and analytical model, one then uses them to analyze varied command and control approaches used across the range of military operations. The research team selected four named operations—Operation Allied Force, the major combat phase of Operation Iraqi Freedom (OIF), the counterinsurgency (COIN) phase of Operation Enduring Freedom (OEF) and OIF, and the disaster-relief effort for Hurricane Katrina—and three mission sets (nuclear, space, and cyber) for evaluation.

ANALYSIS RESULTS

The research team sought to determine whether Air Force command and control is sufficiently adaptive to meet the varied needs of the JFC and, if not, identify areas needing improvement. The analysis used the three fundamental command and control elements from the Alberts and Hayes model to evaluate the command and control of Air Force air, space, and cyber capabilities at the global, theater, and subtheater levels during operations across the range of military operations. Doing so offers insight into the needed range of command and control means and the existence of capability gaps. The team selected the seven operational examples for the following reasons. First, Allied Force illustrated the coercive use of Air Force capabilities within an alliance without the presence of a substantial ground force. Second, the major combat phase of OIF depicted the use of Air Force capabilities in the presence of a large ground force. Third, the COIN phase of OEF and OIF evoked the use of those capabilities in a distributed land operation supporting two different joint task forces (JTF) within one CDR's area of responsibility. Fourth, disaster relief during Katrina illustrated the use of Air Force capabilities in support of a domestic relief effort. Finally, the nuclear, space, and cyber mission sets reflect the unique nature of these missions.

A comprehensive review of the issues showed that the Air Force needed adjustments to its command and control structures and processes—specifically, more adaptivity. The analysis indicates that the current Air Force structure (theater commander of Air Force forces / joint force air component commander [COMAFFOR/JFACC]) centralizes the command and control of capabilities primarily at the CDR level. Further, it demonstrates that, although productive for global and theater operations, this “one-size-fits-all” configuration runs contrary to fully effective command and control of Air Force capabilities across the range of military operations. JTF-led operations often rely heavily upon ad hoc arrangements of Air Force command and control organizational structures, equipment, and personnel to support the JTF commander's requirements. The ad hoc structures hindered the integration of Air Force air, space, and cyber capabilities into joint plans. At times unforeseen circumstances caused the unplanned arrangements; however, in many cases they resulted from a command and control structure not organized, trained, or equipped to fully integrate at the JTF level.

Traditional constructs within the Air Force would have space and cyber capabilities using one command and control model, which would retain OPCON and TACON with the functional commanders for space and cyber while providing direct support to a geographic CDR.

Although this is possible, actual operations need more adaptability. In practice, for some space and cyber capabilities, OPCON and/or TACON authorities passed from the functional commanders to a geographic CCDR. The delegation of OPCON and TACON relied upon ad hoc command and control arrangements. The Air Force must organize, train, and equip its command and control structures to support the delegation of OPCON and/or TACON to a geographic commander.

Synthesis of the issues found during the analysis of the seven operational examples led the research team to suggest improvements to the adaptability of Air Force command and control. These ideas include guidelines for adaptive command and control design as well as recommendations to overcome three major challenges that affect the service's ability to create adaptive command and control structures.

Guidelines for Adaptive Command and Control

Guiding a commander in developing an adaptive C2 structure requires two key elements. The first is clearly understanding the overall end state or goal of an adaptive C2 design, and the second is comprehending how key influences affect the final design.

Goal of Adaptive Command and Control

Analysis of the seven operational examples identified the following common traits needed for the development of adaptive command and control: focusing on unity of effort as well as unity of command, integrating command and control functions at the lowest appropriate level, creating agility, and enhancing speed of action. Combined, these traits provide an accurate description of the overall goal of adaptive command and control design for Air Force capabilities. The primary goal of adaptive command and control is the creation of unity of effort through integration at the lowest appropriate level, thereby achieving agility and speed of action in delivering desired effects.^{xii}

Unity of effort stresses coordination and cooperation toward common objectives from participants not necessarily part of the same command or organization.^{xiii} For most missions across the range of military operations, a commander will need to integrate capabilities that reside with other joint, interagency, multinational, and government as well as nongovernment partners. Some individuals consider such interdependence risky because success depends upon capabilities that a commander may not directly control. However, capabilities necessary to support missions across the range of military operations and the makeup of the current force structure render this situation a reality. Commanders do not need to "own or control" partners' assets to guarantee access to their capabilities. Adaptive command and control structures must create synergy through utilizing horizontal collaboration built on mutual trust among all war-fighting partners rather than simply emphasizing the traditional vertical interaction characteristic of the military hierarchy. Lack of trust among partners leads to the desire to "own" all assets needed for an operation, which leads to excessive control, which prevents synergy. Command and control that concentrates on unity of effort will enable a one-team, one-fight mind-set and will increase effective access to a wider range of capabilities.^{xiv}

Another key aspect of the overall goal of command and control involves maximizing agility and speed of action, thus allowing a commander to decide and act quicker than an adversary in order to produce the desired effects. One best produces agility and speed of action

by decentralizing command and control to the lowest appropriate level capable of integrating assets. Inappropriately centralized command and control structures may lose agility and impair initiative, resulting in mission failure. A commander's clear guidance, intent, and priorities, as well as acceptable risk and appropriate authority for the level of responsibility, must accompany the decentralization process. Further, command relationships that enable effective horizontal collaboration between partners can enhance both agility and speed of action.^{xv}

The design for attaining the goal of adaptive command and control will vary from situation to situation. A commander must understand what causes these variations or what influences the fundamental elements of command and control.

Influences on the Fundamental Elements of Command and Control

Many command and control scholars capture the idea that in a perfect world, the most effective way to realize unity of effort and speed of action during an operation entails decentralizing to the lowest organizational level the allocation of decisions, distribution of information, and patterns of interaction. In reality, however, certain influences—*common* ones and those *unique* to the Air Force's capabilities—limit the decentralization of these three fundamental elements of command and control.

Although countless influences can affect the design of a command and control structure, the key *common influences* identified across all seven operational examples include; the nature of an operation, available resources, capabilities of subordinate units, degree of trust and confidence, and political risk.^{xvi} In addition to the *common influences* the *unique capabilities* of Air Force assets; speed, range, flexibility, versatility, and battlespace perspective, also influence command and control design.

The level of impact from all these influences will vary according to the situation. Constant tension exists among a joint force's command elements during the process of determining the degree of centrally controlling Air Force capabilities. Thus, when designing a command and control approach, a commander should assess how these items will influence an operation. Turning both the common and unique capabilities influences into a series of questions, and using the descriptions below to help answer the questions, offers a practical way of aiding commanders in the "art" of designing adaptive command and control.

What is the nature of the operation? Different operations drive different balances of centralization among the three fundamental elements. For example, global operations such as airlift or some forms of strategic attack generally require a high degree of centralization in order to direct mission sequencing and make adjustments during execution. Contrastingly, air operations supporting ground forces in a distributed land fight are most effective when conducted with a higher degree of decentralization, given the desire to retain tactical responsiveness. Other operations, such as interdiction, benefit from a mix of centralization and decentralization. Centralization allows direction of overall priorities and weight of effort while decentralization enables a faster tempo of operations during execution.^{xvii}

What is the capacity of available resources versus the requirement? Simple supply and demand are significant determining factors with regard to the appropriate degree of centralization among the fundamental elements of command and control. If plenty of Air Force assets are available to deliver the desired effect, then one can highly decentralize the command

and control of those assets. However, scarce resources warrant a more centralized command and control approach in order to carry out the processes used to determine the prioritization and allocation against competing requirements.^{xviii}

Pre-established priorities of assets in limited supply but high demand, made in a centralized fashion, will allow decentralized decision makers to quickly adjust assets to execution realities. Effective prioritization permits commanders to take advantage of the unique speed, geographic range, flexibility, and versatility of Air Force capabilities. For example, if an event drives the need for change at the tactical level during mission execution, lower-echelon control nodes need not wait to receive higher-echelon approval to change targets for strike aircraft, to release satellites to other organizations, or to alter the cyber communications plan. Effective and clearly communicated prioritization of capabilities supports decentralization of integration, improving the speed of action.

What are the capabilities of subordinate units? Other influences may allow for greater decentralization of the three fundamental elements, but unit capabilities may not permit this form of command and control. To perform the function of command and control successfully, units must be properly organized, trained, and equipped—a process that demands clear direction concerning a unit’s types of decision authority and that calls for proper development of communications infrastructure, which facilitates effective interaction and sharing of information.

What is the degree of trust and confidence among partners? Can it be changed? In general, the greater the confidence and trust among commanders, subordinates, and partners, the more likely the decentralization of fundamental command and control elements. Trust builds confidence in others. The presence of confidence regarding the competence and actions of others encourages greater willingness to grant decision authority and share information with others. Trust is built through interaction, whereby partners must plan for that virtue and continually reinforce it. In general, when designing a command and control approach, one must understand that trust begins with shared experiences and face-to-face interaction. In light of the perishable nature of confidence and trust, one best establishes those qualities in person, not virtually, and should take pains to guard that confidence, which is difficult to rebuild once lost.

What is the political risk? In general, a command and control architecture should let frontline decision makers make on-scene decisions, especially during the execution of complex, rapidly unfolding operations. However, as commanders and staffs build plans for operations, political considerations may dictate a more centralized approach to command and control. For instance, significant political concerns could arise due to the potential for collateral damage, or creation of a strategic-level effect with nuclear or cyber weapons would likely dictate a centralize approach. It is critical to keep such instances to a minimum. Modern information technology may entice commanders to command and control operations centrally even when those operations do not warrant such control. Despite vast improvements in technology, a single person cannot gain full situational awareness during operations with multiple, simultaneous engagements throughout a large operating area. Senior commanders must balance overall campaign execution against the pressing need for tactical flexibility. The proper mix of fundamental command and control elements should enable a subordinate’s decision to support the commander’s intent and meet campaign objectives.^{xix}

At what echelon should authorities reside and planning and execution take place in order to exploit the speed, range, flexibility, versatility, and battlespace perspective of Air Force capabilities? It is likely that the influences identified to this point are applicable to all Services however, the Air Force's *unique capabilities* require special command and control design consideration. Exploitation of the Air Force's *unique capabilities*: speed, range, flexibility, versatility, and battlespace perspective, leads Air Force personnel to a more centralized approach to decision making, interaction, and distribution of information.^{xx} Coordinating and integrating global, theater, and subtheater operations; managing scarce assets against high demand; conducting real-time mission retasking; and simultaneously creating strategic- to tactical-level effects make a centralized approach desirable. A centralized command and control approach allows a commander to respond to changes in the operating environment and to take advantage of fleeting opportunities.

Having established a clear goal for effective and adaptive command and control across the range of military operations and having identified influences that affect the actual design, one should then identify and recommend solutions to problems that hinder realization of this goal. To do so, the research team identified three overarching problems involving organizing, training, and equipping that the Air Force must overcome.

Organize, Train, and Equip: Observations and Recommendations

The research team's review of the seven operational examples identified three major problems areas: lack of clear command relationships, lack of confidence and trust, and lack of capability and capacity of Air Force integration elements. Although these problems manifested themselves in different ways during each operational example, they accurately describe the fundamental issues requiring Air Force action if the service wishes to reach the goal of unity of effort through integrating assets at the appropriate level and thus enabling agility and speed of action in delivering effects. If the service does not adequately address these issues, it once again will be forced to rely upon ad hoc means to meet demands for command and control across the range of military operations. While this research effort specifically looked at Air Force command and control it is likely that the following observations and recommendations are not limited to the Air Force. Other Services involved in similar operations could expect facing the same challenges.

Observation 1: Agility and Speed of Action Suffer from Unclear Command Relationships That Hamper Vertical and Horizontal Integration

Establishing clear command relationships is critical to effective vertical and horizontal integration. Without them, one faces confusion and misunderstanding with regard to decision authority, which leads to difficulty in determining with whom one should interact vertically or horizontally within an organization to exchange information in order to make decisions. Poor vertical and horizontal integration hinders the ability of a commander and staff to make timely and accurate decisions, ultimately impeding agility and speed of action in delivering desired effects.

The research team identified the lack of clear lines of authority as a major issue in five of the seven selected operational examples. Exceptions included the nuclear mission set and the

major combat portion of OIF, both of which enjoyed clear command relationships because of the emphasis placed on this critical concept for these events. The importance of the nuclear enterprise's mission demands that all partners understand the clear lines of authority, a requirement facilitated by constant exercises involving nuclear command and control. Regarding OIF's major combat phase, commanders and staffs spent considerable time jointly developing and then disseminating the command relationships to all partners, a process that began early in the planning phase, with refinements occurring during execution. In addition, the fact that the commander of US Central Command led secure video teleconferences while staffs held synchronizing conferences allowed for both vertical and horizontal integration producing a truly joint campaign plan.

Vertical and horizontal integration of planning and execution suffered in the other five operational examples due to lack of clear command relationships, although the causes differed. In four of the operational examples, failure to fully utilize capabilities of the support command relationship prevented effective horizontal integration of the partners. For example, during the COIN phase of OEF and OIF, as well as during the Katrina relief effort, lack of clear guidance on priorities and intent from the establishing authority impaired the supported/supporting relationship. Moreover, several of the command and control models for space and cyber capabilities overemphasize the "ownership" of forces provided by OPCON and TACON at the expense of the support relationship. During Allied Force, dual command structures caused confusion about who had decision authority, a situation that affected the distribution of information and damaged vertical and horizontal integration. When OEF and OIF entered the COIN phase, the failure to understand space command relationships adversely affected the employment of space capabilities. This poor understanding resulted from the fact that competing space command and control models placed authorities at different echelons for different assets and that many space personnel were not accustomed to working at the theater level. The relief effort following Katrina saw confusion of command authorities among active, reserve, and guard forces, which caused the timeliness of decisions and distribution of information to suffer. Finally, cyber command relationships, a subject currently under intense debate, involve three models, each with different command relationships. The first model retains OPCON/TACON at the US Cyber Command level, with direct support to a geographic CCDR. The second retains OPCON at the Cyber Command level, with TACON passed to the geographic CCDR. The third passes OPCON and TACON from the commander of Cyber Command to a geographic CCDR. Unclear cyber command relationships will hinder the development of an effective command and control approach for this capability.

Although reasons varied from operation to operation, the analysis indicated that indistinct command relationships inhibited interaction between commanders and staffs as well as the sharing of information, resulting in poor vertical and horizontal integration. The research team offers three recommendations for improving the clarity of command relationships.

Recommendation: Broaden the understanding of Air Force personnel on the concept of centralized control by changing policy, doctrine, training, and education. The current interpretation of the concept of centralized control stands as the greatest impediment to an Airman's understanding of how to develop appropriate command relationships that support an adaptive approach to command and control. Mainstream Air Force thought holds that centralized control of its capabilities occurs only through the command of a senior Airman at the CCDR level, supported by centralized planning. The theater COMAFFOR/JFACC model, supported by

the air and space operations center (AOC), translates this philosophy into reality. The command authorities for this model are very straightforward. OPCON and administrative control (ADCON) of attached Air Force forces reside with the theater COMAFFOR. TACON of other joint capability can be passed to the JFACC for execution in support of the JFC's objectives. If JTFs are created, then liaison elements assist in the integration of Air Force and possibly some naval air capabilities, but all command authorities still reside at the theater COMAFFOR/JFACC level (see figure 1). The present philosophy dictates that attaching forces

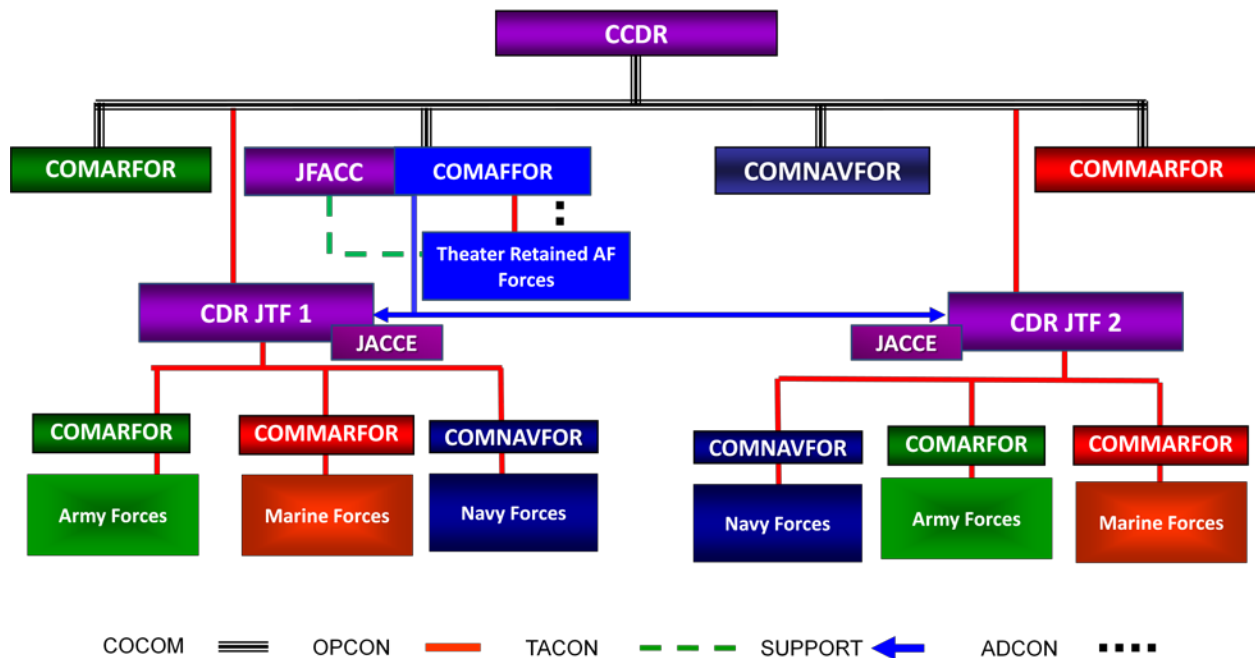


Figure 1. Single Theater COMAFFOR/JFACC Supporting Multiple JTFs. (Diagram developed at the Curtis E. LeMay Center for Air Force Doctrine Development and Education, Maxwell AFB, Alabama.)

and passing command authorities to a JTF commander would “penny-packet” Air Force capabilities, violating centralized control.^{xxi} Using the term *penny-packet* automatically demeans the concept, by virtue of the pejorative sense it has acquired in Air Force history and lore. So the current interpretation of centralized control forces Air Force members thinking into a one-size-fits-all command and control model that limits the way to think about command authorities. Even though joint and Air Force doctrine allows for the attachment of forces to a JTF with specification of OPCON and TACON, the Air Force is not fully organized, trained, or equipped to support this idea.^{xxii}

The problem with this rigid command and control approach is that members of the Air Force have tried to force-fit this model, along with the accompanying command relationships, into all missions across the range of military operations rather than let operations adjust the model. Sending an Air Force commander together with appropriate command authorities to an echelon below the CCDR level or attaching Air Force forces to a JTF does not violate the doctrinal concept of centralized control. The research team’s analysis of the seven operational examples concluded that effectual command and control of Air Force capabilities require flexible control, with decision authority centralized at the appropriate echelon of command. At times the theater COMAFFOR/JFACC model is best suited for an operation, as it was during the major

combat phase of OIF. Other operations, such as the COIN phase of OEF and OIF, dictate the need to send an Air Force commander below the theater COMAFFOR/JFACC level. The concept of command and control in depth captures the essence of adaptive command and control, a fact that would help broaden the contemporary interpretation of centralized control.

One obtains command and control in depth by inserting commanders with legal decision authority in control nodes placed at appropriate organizational levels capable of integrating Air Force capabilities with those of other partners to produce unity of effort. The command and control node must have the situational awareness to understand the requisite actions and the authority to direct forces or delegate decision authority to allow them autonomy.^{xxiii} This concept better supports the overall command and control goal of integration of assets at the lowest appropriate organizational level. Commanders must decide the appropriate level at which to place both commanders and control elements, basing that decision on the influences discussed earlier—not on a rigid, incorrect interpretation of centralized control.

The recent creation of Air Force subtheater commanders in Iraq and Afghanistan represents a step toward broadening the concept of centralized control and creating command in depth. To ensure success, the service must evaluate the concept and organize, train, and equip to best practices.

Recommendation: Educate Air Force personnel on proper global, theater, and subtheater command relationships, especially support, during training, education, and exercises. Learning is a never-ending process—a statement that rings true in terms of understanding command relationships. Developing the expertise to establish effective command authorities among all partners involved in an operation is no trivial matter. It takes deliberate action throughout an Air Force member’s career to provide appropriate training, education, and experiential opportunities that will impart the knowledge necessary for success. These events must employ the full spectrum of Air Force capabilities and cover the variety of missions expected across the range of military operations. In addition, they must incorporate interaction with joint, coalition, and other-government agencies as well as nongovernment agencies. Prior to actual operations, exercises that include partners will help develop a better understanding of different command and control philosophies. Furthermore, the service must quickly roll knowledge gained from recent operations into these events, which should include such concepts as command and control in depth as well as a broader definition of centralized control.

An understanding of all command relationships (e.g., OPCON, TACON, and ADCON) is critical; however, analysis of the seven operational examples identified support as one of the most powerful but least understood of these. More emphasis on the support command relationship should occur at appropriate training, education, and experiential events because that relationship conveys the authority and basis for effective horizontal integration that proves extremely important in dealings with joint, coalition, and other-government agencies, as well as nongovernment agencies. Gaining OPCON and/or TACON of these partners’ capabilities may be neither possible nor necessary. The support relationship makes supporting commanders responsible for the success of the supported commander—a concept essential to horizontal integration, creating unity of effort that allows access to capabilities “owned” by other partners. Successful completion of most missions across the range of military operations requires commanders to rely on partners’ capabilities.

Learning events that include the support command relationship should cover several key ideas. That relationship works best when subordinates receive clear direction regarding a

commander's priorities and intent. Creation of an establishing directive that states the desired effects, time, place, and duration of the supporting effort and that establishes priority relative to other missions is critical to the effective use of this authority.^{xxiv} Such learning events should stress the importance of an establishing directive, and appropriate events should require the writing of that directive. The understanding obtained from clear direction allows subordinates to work horizontally with each other in carrying out tasks. The establishing authority for the supporting relationships must then set conditions for and demand cross talk among supported and supporting commanders.^{xxv} Subsequently, the supported and supporting commanders must do the same within their own organizations. Establishing liaisons between supported and supporting commanders will assist in bringing about the effective exchange of information, leading to improved integration. The cross talk will build and reinforce the necessary horizontal personal relationships, trust, and confidence. After establishment of the conditions for horizontal cross talk, all levels of a command and control structure should attempt to "self-regulate" their apportionment of capabilities to one another through horizontal cross talk. The cross talk among partners will allow them to arrive at the optimal apportionment of capabilities that will complete their assigned tasks and support the designated supported commanders. Finally, the establishing authority must stay involved and, when necessary, arbitrate and resolve conflicting understanding of priorities or revise guidance, based on subordinates' input.^{xxvi}

Recommendation: Review all concept and operational plans to ensure the realism of command and control approaches. To paraphrase Helmuth von Moltke the elder, no plan survives first contact with the enemy. Although this is true, that fact does not constitute an acceptable excuse for poor planning. The Katrina relief effort revealed that the worst time to start sorting out command authorities is during a crisis or the middle of an ongoing operation. A well-thought-through and coordinated plan can save much time, confusion, and, possibly lives. Plans that rely on extensive capabilities from coalition, other-government, and nongovernment agencies contain some of the most complex command relationships in existence. To ensure the practicality of command authorities and to guarantee all partners' understanding of them, one must review these types of plans.

Observation 2: Lack of Two Key Influences—Confidence and Trust—Affects Partners' Willingness to Decentralize Authority, Share Information, and Interact Productively

Confidence and trust between commanders, between staffs, and between partners help make any command and control approach more effective. When confidence and trust suffer, so does the command and control approach. Establishing confidence and trust between partners is an issue for any operation. Establishing these two qualities does not happen by accident but through a deliberate effort to interact and build relationships. Furthermore, the means of interacting has significance. Leaders must decide when face-to-face meetings or the use of information technology is more appropriate.

Analysis of the operational examples showed that, although the effectiveness of all seven relied on confidence and trust between partners, five of the seven suffered from problems with those two influences, with nuclear operations and the major combat phase of OIF affected the least. The constant training and exercising of nuclear command and control help create confidence and trust among the individuals and organizations involved. During the planning phase for major combat operations in Iraq, commanders made a concerted effort to ensure personal and virtual interaction among themselves, their staffs, and their partners. The

confidence and trust built during these events carried over into the execution phase of the operation, easing friction between partners over the proper employment of command and control capabilities.

The lack of confidence and trust affected the other five operational examples to varying degrees, most notably during the COIN phase of OEF and OIF. Personal interaction and common understanding of the situation between commanders and staffs suffered because the JTF commanders did not have a senior Airman with command authorities at their echelon of command. The theater COMAFFOR/JFACC model did not provide for an Airman with command authorities below the CCDR level, making personal relationships difficult to maintain due to this structure's reliance on a virtual rather than physical presence. A virtual relationship does not facilitate the ability of senior air component commanders to build close, trusting relationships with JTF counterparts, thus hindering the ability of Air Force personnel to advocate effectively for the proper use of Air Force capabilities.^{xxvii}

The research team found that confidence and trust issues also cause friction in the command and control of space and cyber capabilities—prime examples of low-density, high-demand assets, which encourage command and control approaches that overemphasize the need for “ownership” of capabilities through OPCON and TACON authorities. “Ownership” ensures availability of the limited capability for a specific operation and lessens the likelihood of its redirection in support of another mission. Though good for the owner, this situation may impede others' access to these capabilities. On the one hand, lack of confidence and trust inspires belief in ulterior motives or the feeling that “I am not getting my fair share.” On the other hand, their presence between partners increases the likelihood of sharing access to capabilities through command authorities such as support. The establishment of trust allows partners to count on support and have confidence that other commanders do not “hoard” assets by means of “ownership-type” command authorities.

Finally, habitual relations between commanders and staffs help fortify confidence and trust, unlike the situation during the COIN phase of OEF and OIF as well as the Hurricane Katrina relief effort. Continuity of the relationship between commanders and the staffs of supporting and supported components remains critical to the success of virtually all operations.

The Air Force must create the opportunity for commanders and staffs to build confidence and trust with each other and with partners involved in operations. The research team offers two recommendations for doing so.

Recommendation: Create organizational structures that, by design, produce command and control capabilities at appropriate organizational echelons. Building confidence and trust among service, coalition, other-government, and nongovernment agencies is essential to an effective command and control approach. When gaps in interaction occur, perceived and/or real, partners need to close the seams by using organizational structures that establish command and control capabilities at appropriate organizational echelons. The Air Force's current one-size-fits-all command and control model limits the organizing, training, and equipping of mobile command and control elements. Adopting a philosophy of in-depth command and control would provide the basis for organizing, training, and equipping a more adaptable command and control approach. Obviously, in the absence of a structure that permits individuals to work together and establish habitual relationships, they cannot effectively interact to build trust.

Recommendation: Establish habitual relationships through routine exercises, predeployment spin-ups, and force-rotation policies. Habitual relationships aid in the development of confidence and trust through long-term interaction that produces a common perspective and the shared sense of problem/solution ownership. One can take several actions to establish such relationships. First, partners that normally work together and deploy together should attend routine and predeployment exercises together. Second, force-rotation policies between partners should align as closely as possible. Although capability and capacity issues cause differences in force rotations, one should keep the gap as small as possible. Clearly, if one partner's personnel turn over four times faster than another's, relationships will not develop easily. Lastly, established relationships need nurturing through commander and subordinate cross talk at all command and control echelons.

Observation: Lack of Capability and Capacity of Air Force Command and Control Elements Limits Integration with Partners

Command and control structures designed to integrate assets at the lowest appropriate organizational level are a critical factor in the quest to reach the goal of adaptive command and control. Thus, the Air Force must present to the CCDR command and control elements that are ready to command, plan, execute, and support simultaneous global, theater, and subtheater operations. Unfortunately, the service has not organized, trained, or equipped its command and control structure to fully integrate with partners at levels below the CCDR level and faces issues with the communications capabilities that support both, at and below the CCDR level. These deficiencies leave gaps in the number of command and control elements needed and in the capability within existing elements. An insufficient number of these elements (or fully capable ones) adversely affects the ability to decide, interact, or inform at the appropriate level.

The research team found that five of the seven operational examples exhibited problems with the capability and capacity of Air Force command and control elements. Common themes included sending command and/or control capability to echelons below the CCDR level; integrating with a broad range of partners, which drives the requirement for liaison capability; and effectively supporting communications equipment.

During the Katrina relief effort, poor integration between Air Force and civilian entities impeded unity of effort. Further, the lack of interoperable, deployable communication equipment hampered effective communication across service, joint, and interagency partners. Use of liaison officers at the proper channels could have smoothed operations and aided in coordination and cooperation toward common objectives.

During the COIN phase of OEF and OIF, the issues concerned the joint air component coordination element (JACCE) concept, appropriate planning expertise at lower echelons that would integrate the full range of Air Force capabilities into joint plans, and capabilities of the theater air control system for supporting distributed land operations.^{xxviii} Questions about the rank and liaison status of the JACCE director (a liaison officer with no authority to make command decisions), along with the lack of sufficient JACCE staff, stymied this concept for years. After lengthy debate, elevating the rank of the JACCE director to O-8 helped that individual access the JTF commanders, but it did little to address the absence of command authority. Without the latter, the JACCE could not consolidate operations within the joint operations area and lessen the Air Force Central Command commander's span-of-control challenges with an intermediate echelon of command between the multiple air and space expeditionary wings and Air Force Central Command. In addition, for many years the makeup of

the JACCE staff lacked robustness and good integration with the JTF staff, hurting the effective integration of Air Force capabilities into joint plans and helping to create the perception that the service had not fully committed itself to support the JTF.

The nature of the IW operations in both Iraq and Afghanistan drove the paucity of sufficient operational planners at echelons below the CCDR level during the COIN phase of OIF and OEF. In a COIN fight, much of the ground planning occurs at the tactical level to encourage small-unit initiative. Most Air Force planning expertise, other than close air support, however, resides at the CCDR level. Having only a few planners with expertise in intelligence, surveillance, and reconnaissance; space; mobility; and interdiction at lower echelons also contributed to the poor integration of Air Force capabilities into joint plans. Finally, all theater air control system elements, including the AOC, experienced integration problems with other service and coalition command and control systems. A dearth of common digital data links and of systems' ability to accept transmission formats impedes integrated war-fighting command and control.

Cyber and space operations rely heavily on integration elements in order to support operational- and tactical-level actions. This reliance is based upon their global missions and the fact that limited quantities exist, compared to the demand. In order for CCDRs and JTF commanders to tap into space and cyber capabilities, integration elements must exist within their command and control organizations. The Air Force faces the challenge of having enough trained cyber and space operators to support all the required integration cells, in addition to supporting other national agencies.

An adaptive command and control structure depends upon command and control at all organizational levels. The research team makes three recommendations for improving the capability and capacity of Air Force command and control elements.

Recommendation: Organize, train, and equip for more than one primary command and control construct. Adopting the broader concept of command and control in depth would require the Air Force to develop scalable command and control capabilities for lower-echelon units. These units will promote effective integration and synchronization of the service's capabilities with the joint mission, including aligning forces and establishing command authority, along with planning expertise, at the appropriate organizational level. Further, lower-echelon units must effectively integrate with global and theater command structures. Such integration, from the global to subtheater levels, will preserve flexibility at the strategic and operational levels of war while increasing tactical flexibility. Including lower-echelon elements in a command and control design will help preserve the proper degree of centralization versus decentralization among the three fundamental elements of command and control. Expectations regarding future defense budgets suggest that the Air Force likely will find itself unable to fully staff and equip an AOC to support every lower-echelon unit, such as a JTF. With this constraint in mind, the service must address the matter of organizing, training, and equipping appropriate command and control forces below the CCDR level along two tracks.

The first track, developing Air Force command elements below the CCDR level, demands greater attention. Doctrine development is not the problem. Chapter 7 of Air Force Doctrine Document (AFDD) 1, "Air Force Basic Doctrine, Organization, and Command"—thoroughly covers the concept of sending an Air Force commander to lower echelons. As discussed previously, the problem lies in the fact that the current philosophy of centralized control does not require these elements, so the Air Force is not organized, trained, or equipped to

create them. The following two options for creating lower-echelon command elements involve either attaching forces to a subtheater-level JTF or organizing them to support the JTF directly.

In option one, the CCDR may decide to attach Air Force forces to a JTF, a preferable action when span of control or scope of operations is less than theaterwide or when operations are fluid, requiring planning and execution at more tactical levels.^{xxix} If the CCDR does attach forces, such as an air and space expeditionary task force (AETF), to a JTF, then the AETF commander would be designated COMAFFOR for those assigned forces (see figure 2). If the JTF already has a JACCE assigned, then the latter can be dual hatted as COMAFFOR,

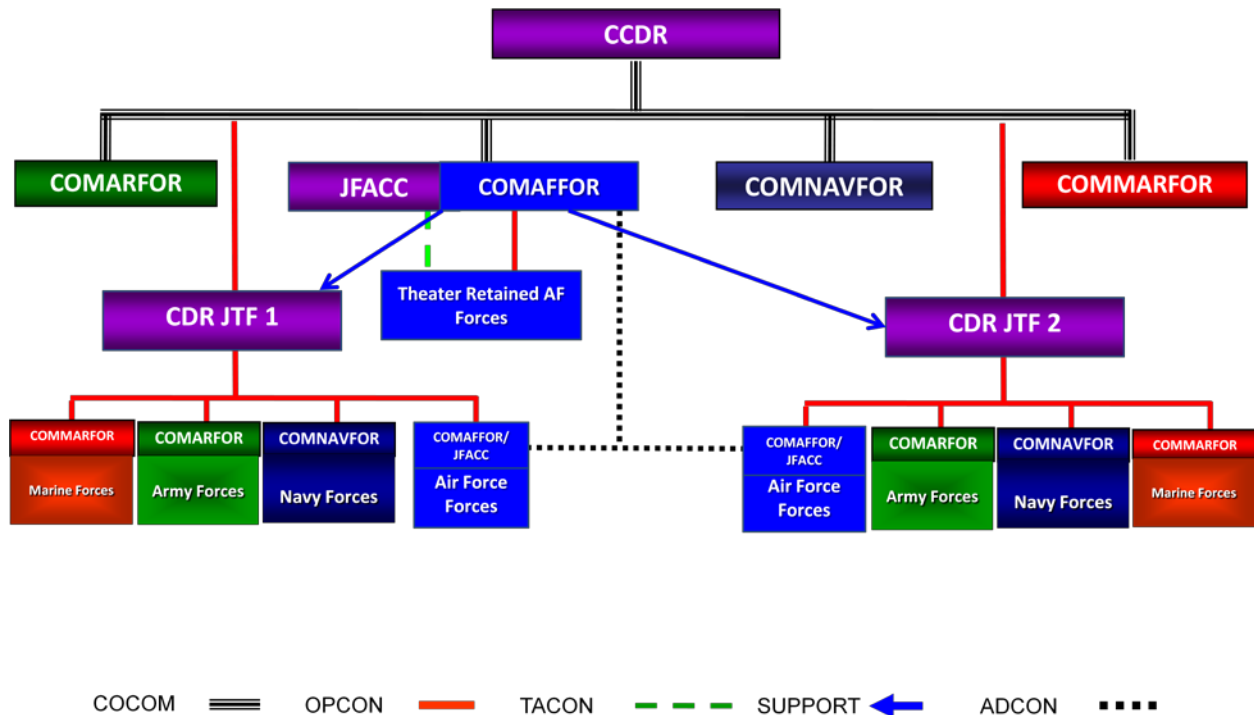


Figure 2. Option 1: Air Force Forces Attached to a JTF (Diagram developed at the Curtis E. LeMay Center for Air Force Doctrine Development and Education, Maxwell AFB, Alabama.)

retained as a separate position, or eliminated. Unity of command and effort for attached Air Force forces will occur at the JTF level. Command of global and theater forces not attached to the JTF but supporting it will remain at or above the theater JFACC level. This arrangement allows for unity of command and effort of forces that routinely range throughout the theater and around the globe. If the CCDR needs them, that individual has the authority to reassign forces attached to a JTF to address higher theater priorities.

Even though joint and Air Force doctrine describes this option and although actual operations demonstrate the need for it, the service is totally unprepared to support this option other than through ad hoc means.

If, however, the CCDR decides not to attach forces to an established JTF but needs a lower-echelon Air Force command element, then the Air Force service commander may create a single-service task force. This second option may occur when dealing with more than one joint operating area of significant size and complexity within a CCDR's area of responsibility and when the JACCE option does not sufficiently integrate operations (see figure 3). Execution of

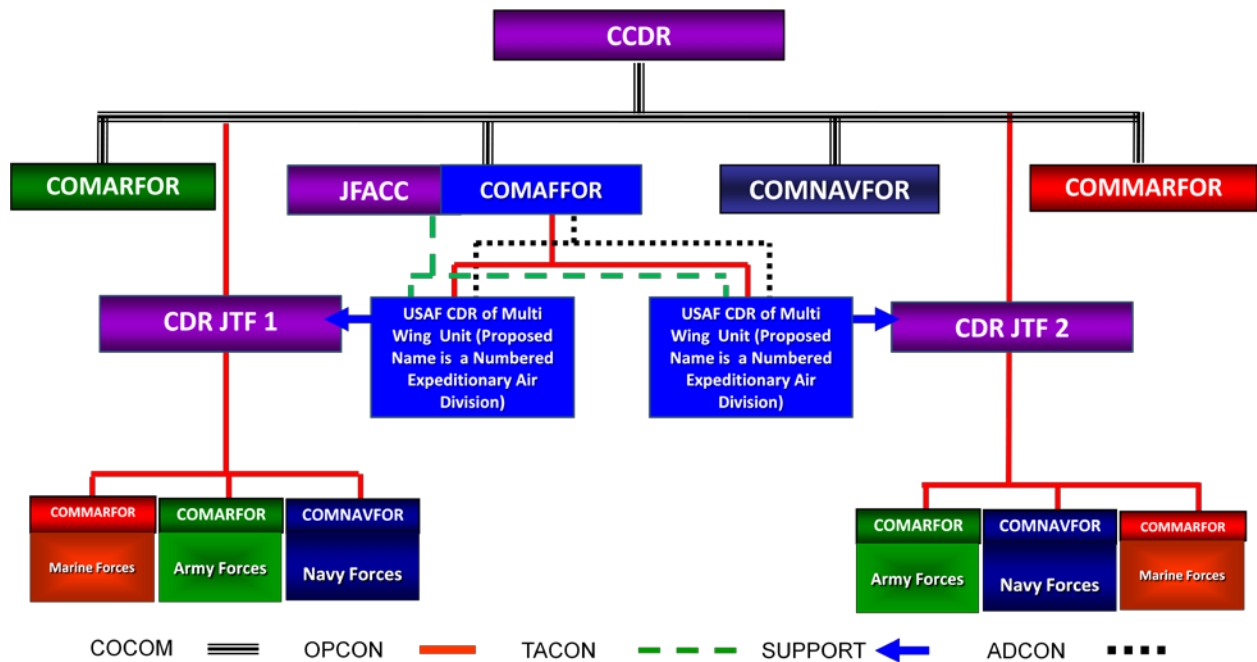


Figure3. Option 2: Air Force Forces in Direct Support of a JTF (Diagram developed at the Curtis E. LeMay Center for Air Force Doctrine Development and Education, Maxwell AFB, Alabama.)

this option entails designation of an appropriately sized expeditionary unit composed of all Air Force forces physically present within the JTF commander’s area of operations in direct support of that commander.^{xxx} Since the forces are essentially dedicated to the JTF commander under a single Air Force commander, this construct provides unity of effort at the JTF level. This arrangement retains unity of command at the CCDR level by the theater COMAFFOR, unlike the attachment of forces to a JTF, giving the COMAFFOR the authority and flexibility to shift those forces as required in response to the CCDR’s direction without first having to regain control from the JTF commander. Creation of this new intermediate level of command supplies unity of effort at the JTF level while retaining unity of command and effort at the CCDR level. As with any tailored organization, the process should involve careful consultation among the service and joint force commanders involved. Obviously, the CCDR makes the final decision on establishment of the subordinate organization and distribution of command authorities. This option describes the new Air Force command and control structure that supported operations in Iraq after November 2010 and supports current operations in Afghanistan. To ensure the greatest success, the Air Force must review and implement the best practices from this concept and then organize, train, and equip forces to execute the concept routinely.

Neither of these options eliminates the need for the current JACCE concept, which is well suited for situations that require an integration element without command authority. This concept lends itself perfectly to scenarios in which on-hand air component expertise and a direct link back to the theater JFACC and AOC is sufficient.

The successful command and control of Air Force capability also depends upon the second track—effective integration of operational joint planning processes at lower echelons. As with command authority, the current interpretation of centralized control excessively places Air Force planning expertise at the operational level of war. Such centralization at the theater COMAFFOR/JFACC level becomes detrimental when distribution of information and

interaction necessary for planning occurs at lower echelons. Decentralized planning consists of placing the correct expertise and appropriate planning tools at locations where operational plans are born and refined.

The location of a planning cell depends on the partner's command and control design. It should reside at the appropriate levels where plans are developed and integration occurs within organizations.

If a JTF established by the combatant command without a ground component needs Air Force asset integration, then the service must possess an adaptive command and control structure to send an integration team to support the JTF. If the latter does contain a ground component, then the Air Force can attach additional planning capability to tactical air control parties, which offer ready structures for placing experienced personnel with expertise in air planning, electronic warfare, intelligence, space, airlift, and cyber, thus improving planning integration. Establishing a standing requirement for a broader range of planning expertise would replace the current ad hoc tactical air control party organization that supports the noncontiguous fights in Iraq and Afghanistan.

However, the Air Force has no defined core operational and tactical requirement for deployable, scalable command and control capability. Without additional funding, developing the necessary scalable equipment capabilities for both of the tracks mentioned above calls for an integrated Air Force command and control planning, programming, and budgeting effort. Without integrated, defined requirements, various functional mission areas pursue similar capability independently, an approach that leads to interoperability problems along with wasteful spending caused by overlapping development efforts. Consequently, the service needs a concept of operations for AETF command and control. As the strategy document that serves as the basis for the command and control core-function master plan, the concept of operations should designate a lead agency organized and equipped to develop integrated command and control requirements. A clearly defined command and control strategy will go a long way toward concentrating scarce resources to develop integrated requirements that support the full range of military operations.

Recommendation: Develop a subtheater COMAFFOR/JFACC force-development strategy. Adopting the command and control in-depth concept, demands the presence of COMAFFORs and JFACCs at lower echelons of command. In turn, the effective preparation of future COMAFFORs/Air Force JFACCs requires a force-development strategy that ties together the needed education, training, and experience which emphasizes several items. First, the Air Force must identify a cohort of individuals that will someday become commanders at the subtheater level and then deliberately develop them. This process should begin at preaccession training and education, with reinforcement at education and training events throughout their careers. Although this pool will be substantial early on, it will shrink as the careers of these personnel under consideration by the Air Force progress and as early development, continued screening, and tracking occur.

Second, to enhance experiential learning, the service must emphasize the value of candidates' operational assignments—such as tours at an AOC; on an Air Force forces or a CCDR staff; or at a contingency response group, air support operations group, or air support operations squadron—which would round out the ADCON experience acquired as Air Force wing commanders. Although important, ADCON experience does not imbue an individual with skill sets for commanding and controlling airpower at the operational level of war.

Third, the Air Force must change the normal assignment path for command by forming a structure that allows personnel to step away from typical career paths without limiting their opportunities. Instead of insisting on the two traditional command tours, the service should allow them one group or wing command (O-6 level) and then an equivalent operational-type assignment (e.g., AOC division chief, Air Force forces staff, commander of an air support operations group, etc.). This change would signal that the Air Force values these positions and would allow people time to gain both ADCON and operational command experience within a normal career time frame.

Finally, the Air Force personnel system needs an effective tracking mechanism to identify people with the training, education, and experience for command at the subtheater level. The complex and uncertain global environment demands that the service identify and track people who will fill subtheater command and control elements at a moment's notice. Currently the Air Force has no easy way to gather this information.

CONCLUSION

The Air Force possesses an effective command and control structure optimized for directing, planning, and executing its capabilities to support operations at the global and theater levels. This study suggests that the service needs adjustments in its command and control design to maximize effects across the range of military operations. Specifically, the Air Force must organize, train, and equip its command and control structure to increase adaptability and thereby improve integration with partners, especially below the theater level. These improvements will ensure both effective and efficient operations in support of JFC requirements across the entire range of military operations. The nature of current and future operations dictates such a change. That is, both the emerging operating environment and modern military air, space, and cyberspace operations will become increasingly joint, coalition, distributed, complex, intense, and global. These conditions demand adaptive command and control of airpower with appropriate decision authority at the most appropriate level of command.

Before making any adjustments, the Air Force must agree upon a clear goal for the design of an adaptive command and control structure. Again, this study suggests that an adaptive design for command and control has the critical goal of creating unity of effort through integration at the lowest appropriate level, producing agility and speed of action in delivering effects. Such unity of effort occurs through horizontal collaboration built on mutual trust among all war-fighting partners rather than an emphasis on the traditional vertical interaction within the military hierarchy. The research team found that commanders do not need to “own/control” partners’ assets to guarantee access to their capabilities. Further, the decentralization of command and control to the lowest appropriate level capable of integrating assets maximizes agility and speed of action. The challenge for commanders lies in agreeing on what constitutes the lowest appropriate level.

Understanding how the variety of common and Air Force–unique influences affects the design of command and control will help determine that level. The Air Force’s dogmatic interpretation of centralized control stands as the greatest obstacle to resolving this issue. Without a broader interpretation, the lowest appropriate level will remain that of the theater COMAFFOR / JFACC.

Expanding the concept of centralized control is not a doctrinal issue. As currently written, Air Force doctrine describes adaptive command and control models. Rather, Air Force personnel

must believe in the concept that creating command and control in depth by attaching Air Force forces to a JTF does not imply the penny packeting of capabilities, as they once did. Once this paradigm shift occurs, the service will realize that problems exist with organizing, training, and equipping. Solutions to these problems must address the development of clear command relationships that produce effective vertical and horizontal integration, create confidence and trust among partners, and engender the appropriate capability and capacity of integration elements.

Solving these problems will pave the way for a command and control framework with supporting capabilities that can make proper adjustments to the allocation of decisions, distribution of information, and patterns of interaction, based upon needs across the full range of military operations. Properly balancing the three fundamental elements will lead to effectual command and control of Air Force capabilities through flexible control, with decision authority centralized at the appropriate echelon of command.

Notes

i. The range of military operations varies “in size, purpose, and combat intensity within a range of military operations that extends from *military engagement, security cooperation, and deterrence* activities to *crisis response and limited contingency operations, and if necessary, major operations and campaigns*” (emphasis in original). Joint Publication (JP) 1, *Doctrine for the Armed Forces of the United States*, 2 May 2007, incorporating change 1, 20 March 2009, xi, http://www.dtic.mil/doctrine/new_pubs/jp1.pdf.

ii. JP 3-0, *Joint Operations*, 11 August 201, III-2, http://www.dtic.mil/doctrine/new_pubs/jp3_0.pdf.

iii. The term *assign* is defined as “plac[ing] units or personnel in an organization where such placement is relatively permanent, and/or where such organization controls and administers the units or personnel for the primary function, or greater portion of the functions, of the unit or personnel.” *Attach* is defined as “the placement of units or personnel in an organization where such placement is relatively temporary.” *Ibid.*, GL-6.

iv. Combatant command (COCOM) (command authority) is the authority of a CCDR to perform those functions of command over assigned forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction over all aspects of military operations, joint training (or in the case of [US Special Operations Command], training of assigned forces), and logistics necessary to accomplish the missions assigned to the command. It cannot be delegated or transferred.

OPCON is the command authority that may be exercised by CDRs [commanders] at any echelon at or below the level of combatant command and may be delegated within the command. When forces are transferred between combatant commands, the command relationship the gaining CDR will exercise (and the losing CDR will relinquish) over these forces must be specified by the SecDef. OPCON is inherent in COCOM and is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. OPCON includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command.

TACON is the command authority over assigned or attached forces or commands, or military capability or forces made available for tasking, that is limited to the detailed direction and control of movements or maneuvers within the operational area necessary to accomplish assigned missions or tasks. TACON is inherent in OPCON and may be delegated to and exercised by CDRs at any echelon at or below the level of combatant command. When forces are transferred between CCDRs, the command relationship the gaining CDR will exercise (and the losing CDR will relinquish) over those forces must be specified by the SecDef.

A support relationship is established by a superior CDR between subordinate CDRs when one organization should aid, protect, complement, or sustain another force. Support may be exercised by CDRs at any echelon at or below the combatant command level. This includes the SecDef designating a support relationship between CCDRs as well as within a combatant

command. The designation of supporting relationships is important as it conveys priorities to CDRs and staffs that are planning or executing joint operations. The support command relationship is, by design, a somewhat vague but very flexible arrangement. The establishing authority (the common superior CDR) is responsible for ensuring that both the supported CDR and supporting CDRs understand the degree of authority that the supported CDR is granted. There are four defined categories of support that a CDR may direct over assigned or attached forces to ensure the appropriate level of support is provided to accomplish mission objectives. These include general support, mutual support, direct support, and close support. JP 1, *Doctrine for the Armed Forces of the United States*, xv-xvi.

v. JP 3-0, *Joint Operations*, III-5.

vi. Lt Col Michael Kometer, *Command in Air War: Centralized versus Decentralized Control of Combat Airpower* (Maxwell AFB, AL: Air University Press, June 2007), 56, <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA473231&Location=U2&doc=GetTRDoc.pdf>.

vii. As described by Albers and Hayes, command and control are fractal concepts that one can apply to all subsets of an enterprise, functions performed, levels of the organizations, and focus of the activity, whether strategic or tactical. Membership in these fractals may overlap with individual entities and groups belonging to multiple fractals dynamically. David S. Albers and Richard E. Hayes, *Understanding Command and Control* (Washington, DC: Command and Control Research Program Publications, 2006), 9, http://www.dodccrp.org/files/Albers_UC2.pdf.

viii. *Ibid.*, v.

ix. *Ibid.*, 75.

x. *Ibid.*, 76.

xi. *Ibid.*, 113.

xii. A variety of lessons learned documents emphasize this idea to include United States Joint Forces Command, *Joint Operations: Insights and Best Practices*, 3rd ed. (Suffolk, VA: Joint Training Division, Joint Warfighting Center, United States Joint Forces Command, 12 January 2011), 6, https://jko.harmonieweb.org/coi/JointTrainingDivision/Documents/Insights_3rd_edition_Jan_12_2011.pdf.

xiii. The term *unity of effort* is defined as “coordination and cooperation toward common objectives, even if the participants are not necessarily part of the same command or organization—the product of successful unified action.” JP 1, *Doctrine for the Armed Forces of the United States*, GL-11. In the book *Understanding Command and Control*, authors David S. Albers and Richard E. Hayes use the term *unity of purpose* instead of *unity of effort* because they feel it is a more accurate description of what one can actually achieve. This paper uses the terms interchangeably.

xiv. United States Joint Forces Command, *Joint Operations: Insights and Best Practices*, 3rd ed. (Suffolk, VA: Joint Training Division, Joint Warfighting Center, United States Joint Forces Command, 12 January 2011), 6, 24, https://jko.harmonieweb.org/coi/JointTrainingDivision/Documents/Insights_3rd_edition_Jan_12_2011.pdf.

xv. *Ibid.*, 6, 20.

xvi. The common influences were developed from analysis of the seven selected operational examples as well as from other sources, including Lt Col Clint Hinote, *Centralized Control and Decentralized Execution: A Catchphrase in Crisis?*, Research Paper 2009-1 (Maxwell AFB, AL: Air Force Research Institute, March 2009), 59-64, http://aupress.au.af.mil/digital/pdf/paper/Hinote_centralized_control_and_decentralized_execution.pdf; AFDD 1, *Air Force Basic Doctrine, Organization, and Command* 14 October 2011, chaps. 2-5, <http://www.e-publishing.af.mil/shared/media/epubs/AFDD1.pdf>; and United States Joint Forces Command, *Joint Operations*, 17.

xvii. Hinote, *Centralized Control and Decentralized Execution*, 59-60.

xviii. *Ibid.*, 61.

xix. AFDD 1, *Air Force Basic Doctrine*, 39.

xx. For a detailed description of each of these unique characteristics, see *ibid.*, chaps. 4 and 5; and AFDD 2, *Operations and Organization*, 3 April 2007, chaps. 1 and 2, <http://www.e-publishing.af.mil/shared/media/epubs/AFDD2.pdf>.

xxi. Since World War II, the term *penny packet* has meant parceling out airpower to ground forces. The use of penny packets serves the individual ground commander, but it prevents air commanders from concentrating airpower to support important ground operations or to strike strategic targets.

xxii. For a detailed discussion on Air Force command and control structures see AFDD 1, “Air Force Basic Doctrine, Organization, and Command,” 14 October 2011, Chapter 6, Joint Publication (JP) 1,

Doctrine for the Armed Forces of the United States, 2 May 2007, incorporating change 1, 20 March 2009, Chapter IV, and Joint Publication (JP) 3-30, *Command and Control for Joint Air Operations*, 12 January 2010, II-18 – II-21, http://www.dtic.mil/doctrine/new_pubs/jp3_30.pdf.

xxiii. Kometer, *Command in Air War*, 62.

xxiv. United States Joint Forces Command, *Insights and Best Practices: Air Component Integration in the Joint Force*, Focus Paper no. 6 (Suffolk, VA: Joint Warfighting Center, United States Joint Forces Command, 20 March 2009), 22.

xxv. “The supported commander is given access to supporting capabilities and has the authority to provide general direction, designate and prioritize missions, targets, or objectives, and other actions for coordination and efficiency (to include requesting liaison and directing of reporting requirements). . . . The supporting commander is responsible to both ascertain and satisfy the needs of the supported commander within the priorities directed by the establishing authorities.” For more information on best practices of supported and supporting commanders, see United States Joint Forces Command, *Joint Operations*, 29–30.

xxvi. *Ibid.*, 29.

xxvii. Office of Air Force Lessons Learned, *Integration of Airpower in Operational Level Planning*, Lessons Learned Report (Washington, DC: Office of Air Force Lessons Learned, 22 August 2008), 1, 16.

xxviii. The term *air component coordination element* (ACCE) changed to *joint air component coordination element* (JACCE). JP 3-30, *Command and Control for Joint Air Operations*, 12 January 2010, I-2-II-2, http://www.dtic.mil/doctrine/new_pubs/jp3_30.pdf.

xxix. AFDD 1, “Air Force Basic Doctrine, Organization, and Command,” 14 October 2011, 97.

xxx. Direct support is defined as “a mission requiring a force to support another specific force and authorizing it to answer directly to the supported force’s request for assistance.” JP 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 8 November 2010 (as amended through 15 May 2011), 110, http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf.