Command and Control of Joint Air Operations through Mission Command

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As battle becomes more complex and unpredictable, responsibilities must be more and more decentralized. . . . This will require all commanders to exercise initiative, resourcefulness, and imagination—operating with relative freedom of action.

—Gen Bruce C. Clarke
Commander in Chief, US Army Europe

For centuries, the US armed forces have endeavored to find the perfect balance between higher headquarters control and delegation of authority to subordinate units and commanders. Whether framed as the US Air Force's tenet of centralized control / decentralized execution or the US Army's mission command,

the underlying concept of entrusting Soldiers, Sailors, Marines, and Airmen with increased responsibility and promoting initiative is the foundation of this much-needed effort. To effectively command and control (C2) joint air operations in today's contested and degraded environment while preparing for the volatile threats of tomorrow, the Air Force and joint community must instill the concept and principles of mission command in their culture. Consequently, this article discusses the origins and concepts of mission command, addresses and applies the principles of mission command to the Air Force and joint C2 decentralized operating environment, and outlines the C2 architecture systems, processes, and philosophy of command required to enable mission command effectively.

Mission Command Concepts

The concepts of mission command date back to the 1890s when Prussian-German tacticians, unhappy with overly directive types of command, developed a more flexible construct called *Auftragstaktik*, which empowered subordinate commanders to exercise initiative.[1] *Auftragstaktik*, according to US Army Training and Doctrine Pamphlet 525-3-3, *The United States Army Functional Concept for Mission Command*, "translates roughly to mission-type tactics" and essentially "held each German commissioned and noncommissioned officer duty bound to do whatever the situation required, as he personally saw it."[2] This concept was vital in allowing subordinates to exercise judgment and initiative in an operational environment characterized by slow communications—a place where a "decentralized approach to . . . [C2], or *Auftragstaktik*, proved more effective than a highly centralized command."[3] Approximately 90 years later, the Army had adopted those concepts officially into Army doctrine as *mission orders* or *mission command* and paved the way for injecting those terms into joint doctrine.[4]

Joint Publication (JP) 3-0, *Joint Operations*, defines mission command as the "conduct of military operations through decentralized execution based upon mission-type orders. Successful mission command demands that subordinate leaders at all echelons exercise disciplined initiative and act aggressively and independently to accomplish the mission."[5] Furthermore, as Lt Col James W. Harvard points out in his article "Airmen and Mission Command," Army Doctrine Publication (ADP) 6-0, *Mission Command*, encompasses not only the reference to decentralized execution but also the strategic linkage of the art of command and science of control.[6] Lastly, although the term *mission command* does not exist in Air Force doctrine, the basic principles are inherently illustrated in the service's *Basic Doctrine*: "Execution should be decentralized within a C2 architecture that exploits the ability of front-line decision makers (such as strike package leaders, air battle managers, forward air controllers) to make on-scene decisions during complex, rapidly unfolding operations."[7] Even though these principles of mission command have dwelled within the individual services for years, the Department of Defense needed a trigger to align the department as a whole and to enable a critical, synchronized, and integrated approach to leading the joint force.

Accordingly, in his 2012 *Mission Command* white paper, Gen Martin Dempsey, former chairman of the Joint Chiefs of Staff, outlines the vital need to instill and foster the concepts of mission command, noting that such a pursuit is "critical to our future success in defending the nation in an increasingly complex and uncertain operating environment."[8] He further points out that "the basic principles of mission command—commander's intent, mission type orders and decentralized execution are not new concepts. They are a part of current joint and service doctrine," as illustrated in the previous paragraph.[9] General Dempsey makes a key point by declaring that renewed emphasis on the concept of mission command is absolutely vital to executing operations effectively as "Joint Force 2020" in a future dynamic security and threat environment that is vastly different from the one in which we operate today.[10] Furthermore, as these smaller and lighter forces operate in geographically dispersed joint operations areas, the ability to conduct effective decentralized and distributed operations will be essential.

Additionally, General Dempsey asserts that these "smaller, lighter forces operating in an environment of increased uncertainty, complexity and competitiveness will require freedom of action to develop the situation and rapidly exploit opportunities."[11] This observation is especially true with respect to wielding airpower. Because of its unique capabilities, airpower—as well as the subsequent tactical- and operational-level C2 of airpower—relies on the centralized control / decentralized execution concepts grounded in the basic principles of mission command.[12] Through an effective application of these principles of mission command, the Air Force and joint C2 community can adeptly conduct distributed air operations in a contested environment.

Principles of Mission Command

Build Teams through Trust

The first and most important principle of mission command is the ability to build cohesive teams through mutual trust.[13] ADP 6-0, *Mission Command*, details this concept by noting that "mutual trust is a shared confidence among commanders, subordinates, and partners" and that "effective commanders build cohesive teams in an environment of mutual trust."[14] Such trust is mandatory for leading and executing in today's complex global and geographically dispersed environments. To the joint force, trust must also become as natural as breathing or walking. As Donald Vandergriff remarks, "Mission command will require an institutional culture that fosters trust among commanders, encourages initiative and expects leaders to take prudent risk and make decisions based on incomplete information."[15] In many instances, however, an abundance of available information drives the need for trust even more.

Operating in today's and tomorrow's networked and distributed battlespace, joint force commanders (JFC) at all levels have more data available to them than ever before. The sheer volume of information both facilitates effective joint C2 decision making and contributes to the temptation of micromanagement at the operational and strategic levels.[16] Not only are the concepts of mission command needed now

to meet the "broad range of potential missions, complex operations environment, and ill-structured situations" but also they "[correct] the 1990s defense transformation view that emerging technologies would lift the fog of war" and "permit an all-knowing headquarters."[17]

The cure to overreliance on technology and the attainment of a virtual flashlight to illuminate a path through the fog of war depend upon building and instilling trust. Simply put, it is not possible to execute any joint operation effectively without the central pillar of trust between commanders and subordinates. Although subordinates must still understand the commander's intent, it is in fact trust that "informs the execution of that intent."[18] Further, General Dempsey highlights the fact that "trust is the moral sinew that binds the distributed Joint Force 2020 together" and observes that "unless these attributes are made central to the basic character of the force, Joint Force 2020 will struggle to reach optimal performance levels."[19] Moreover, commanders of the joint force must leverage this mutual trust and their interpersonal relationships to build effective teams both inside their organizations and outside—with sister services and multinational partners.[20]

However, trust does not happen overnight, and since it is the cornerstone of mission command, a failure to garner trust poses a significant hindrance. Specifically, high-level commanders, especially at the combined air and space operations center (CAOC) have a multitude of available information that allows unprecedented access to operational- and tactical-level data. Although useful in providing a common operational picture to commanders, this data also enables them to see incredibly detailed data; evaluate real-time, tactical-level maneuvers; and virtually get inside the radar scope, cockpit, or boots of the Airmen and Soldiers executing the mission. This capability, in turn, can potentially cause an erosion of trust on both sides. Tactical commanders, air battle managers, and other elements of the joint C2 that lead the air campaign as part of the theater air control system (TACS) feel usurped when their actions are prematurely questioned or micromanaged from above. Thus, higher-level commanders feel the need to intervene in real time as they observe their subordinate commanders executing the mission differently than they themselves would.

One of the main pathways to establishing trust with respect to air operations involves allowing those tactical-level commanders in the control and reporting center (CRC), Airborne Warning and Control System (AWACS), Marine air command and control system (MACCS), air defense sectors, and other elements of the joint TACS to truly execute their missions based on well-defined guidance and directives. The latter are spelled out in various levels of detail in documents like the joint air estimate, joint air operations plan (JAOP), air operations directive (AOD), theater and campaign special instructions (SPINS), rules of engagement, and daily updates to the air tasking order (ATO) and daily SPINS.

Additionally, these subordinate commanders and their units must be allowed to show initiative and drive, managing the air campaign in a decentralized manner while maintaining the appropriate level of centralized control. These documents offer a formal, well-defined way of specifically authorizing decentralized execution of the TACS elements, as well as the pilots and aircrews who execute the ATO, doing so through the use of sound judgment and "Airmanship." However, Harvard emphasizes

the need for a proper balance of centralized control and decentralized execution based on the situation or nature of the operation.[21] The level of decentralization down to the tactical level for a conventional air defense or close air support mission is appropriately higher than that for a strategic nuclear attack or a space operation.[22] Finally, these governing documents and directives serve not only as a key to understanding the commander's guidance and intent with regard to planning and executing the air campaign but also as a critical enabler to establishing trust. Once trust becomes part of the joint force's DNA, the path toward instilling the concepts of mission command will become easier to traverse.

Create a Shared Understanding and Provide a Clear Commander's Intent

According to ADP 6-0, *Mission Command*, the process of creating a shared understanding of the joint operational environment, including its purpose, problems, and ways of solving them, is a "defining challenge for commanders and staffs."[23] Furthermore, as General Dempsey comments, "Understanding . . . equips decision makers at all levels with the insight and foresight required to make effective decisions, to manage associated risks, and to consider second and subsequent order effects."[24] To effectively create a shared understanding, the commander must "blend the art of command with the science of control," thereby integrating the joint functions and expertly "understand[ing] the problem, envision[ing] the end state, and visualiz[ing] the nature of the operation."[25] This understanding is then translated into guidance and direction in the form of assigned missions. However, the latter (e.g., C2; air defense; defensive/offensive counterair; close air support; strike; interdiction; intelligence, surveillance, and reconnaissance) must be within their capabilities: "The commander must understand what his subordinates can do, and trust—but not blindly—them to do it."[26]

Again, the basic concept of mission command, as well as the concept of a clear understanding, relies heavily upon solid comprehension of the commander's overall intent and the updated guidance that develops as the air campaign progresses. According to JP 3-0, *Joint Operations*,

> Commander's intent is the commander's clear and concise expression of what the force must do and the conditions the force must establish to accomplish the mission. It is a succinct description of the commander's visualization of the entire operation and what the commander wants to accomplish. Commander's intent supports mission command and allows subordinates the greatest possible freedom of action.[27]

In terms of the joint force, the JFC sets this intent as described above, and it encompasses all unified operations conducted in the various domains under the JFC's direction such as land, air, space, maritime, and special operations. The JFC will appoint a joint force air component commander (JFACC) to plan, coordinate, task, execute, and assess joint air operations based on the JFC's intent and guidance as well as the theater, campaign, or operations plans.[28] Some of the responsibilities of the JFACC include developing a JAOP, recommending air apportionment, allocating and tasking air assets, developing daily guidance for the AOD, "provid[ing] oversight and guidance during execution of joint air operations," assessing results of joint air

operations, and performing roles of the airspace control authority and area air defense commander.[29]

Thus, it is the responsibility of the JFACC to synchronize the efforts and overall understanding with the intent and guidance laid out by the JFC. To do so, the JFACC will issue a subsequent supporting mission statement and intent outlining the purpose and desired military end state as illustrated in the example commander's intent extracted from JP 3-30, *Command and Control of Joint Air Operations*:

> The purpose of the joint air operation is to deter aggression. Should deterrence fail, I will gain and maintain air superiority, conduct joint offensive air operations, and support the JFLCC [joint force land component commander] counter-offensive in order to restore the territorial integrity and ensure the establishment of a legitimate government in a stable Pacifica region.[30]

In addition to the commander's intent, the desired military end states are also included in the JAOP, along with other documents such as the AOD. The end states outlined by the JFACC are well defined and support the overall objectives directed by the JFC. However, they also include some airpower-centric goals:

> a. Adversary military forces will be capable of limited defensive operations, have ceased offensive combat operations, and complied with multinational war termination conditions.
> b. Adversary will retain no WMD [weapons of mass destruction] capability.
> c. Allied territorial integrity will be restored.
> d. JFACC-West will have passed ATC [air traffic control] to local authorities.[31]

Although this guidance starts at the top of the strategic and operational levels, it flows down to experts executing the air campaign at the tactical level. It is vital that such messaging and intent are clearly evident in the daily products that the joint force uses to execute the air campaign. These products, such as the AOD, SPINS, ATO, and airspace control order, are the primary focus of the tactical-level force and therefore the primary vehicle for signaling intent.

However, it may seem redundant to develop, present, and repeat the JFC's and JFACC's mission statement, commander's intent, and end states throughout numerous documents (campaign plan, JFC estimate, JFACC staff estimate, JAOP, AOD, area air defense plan, airspace control plan, and JFACC's daily guidance). Nevertheless, doing so is absolutely required for effective execution, and it serves two purposes (see the figure below). The first is to ensure that all efforts are clear, understood, and synchronized across the entire joint force and associated components and domains. The second is to be certain that all levels of execution—from the strategic and operational "big picture" planners, through the operational 72-hour ATO cycle planners and CAOC crew members, to the tactical-level C2 units and individual air assets flying the missions—completely understand their role. That role entails executing their "ATO line" as tasked; it also involves understanding the overall intent of the campaign, operation, and mission as it evolves daily. Through this funneling effect and synthesis, these Airmen, under the concepts of mission command, can then be prepared to execute as ordered—or, more importantly, exercise disciplined initia-

tive, particularly in a degraded and contested joint operational environment when and where necessary.

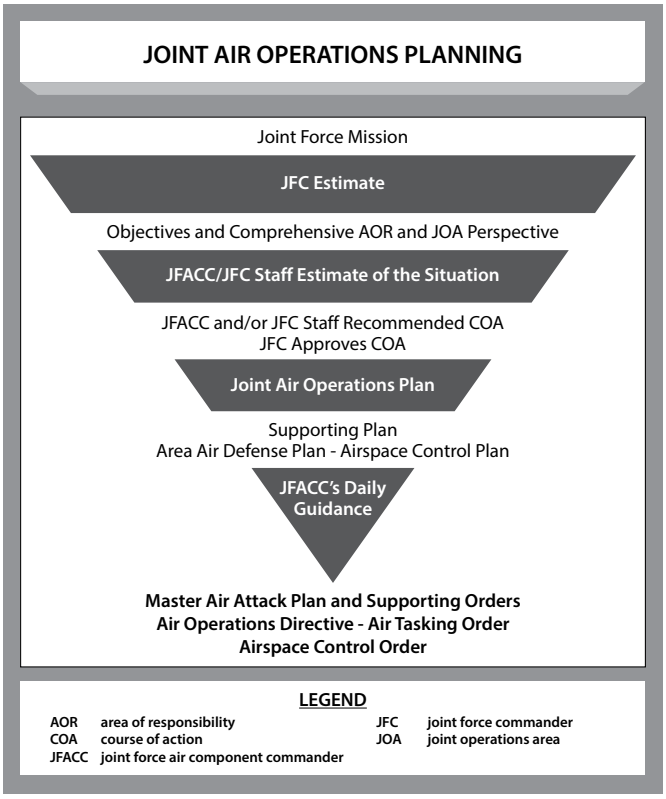

Figure. Joint air operations planning. (Reprinted from Joint Publication 3-30, *Command and Control of Joint Air Operations*, 10 February 2014, III-2, http://www.dtic.mil/doctrine/new_pubs/jp3_30.pdf.)

Exercise Disciplined Initiative

Promoting and instilling the concept of "exercise disciplined initiative" are a key component of mission command, relying greatly not only on the shared understanding developed through the commander's guidance and intent but also on the critical foundation of trust. ADP 6-0, *Mission Command*, defines disciplined initiative as "action in the absence of order, when existing orders no longer fit the situation, or when unforeseen opportunities or threats arise."[32] Additionally, JP 3-30, *Command and Control of Joint Air Operations*, states that "joint air operations are normally conducted using centralized control and decentralized execution to achieve effective control and foster initiative, responsiveness, and flexibility."[33]

Both of the above definitions outline the main goal of mission command and centralized control / decentralized execution: to build a culture with a solid foundation of trust that encourages leaders to make sound decisions based on the information

available to them and the way that information relates to their current situation. Although ADP 6-0 specifically mentions "disciplined" initiative, an additional requirement must be "educated" initiative. This education comes from a clear understanding of the mission objectives, desired effect, and overall commander's guidance. Specifically, the Airmen, Soldiers, Sailors, and Marines executing the air campaign must have solid knowledge of the appropriate governing documents, regulations, and guidance, such as the theater SPINS, rules of engagement, AOD, and daily updated/adjusted guidance provided by the JFACC.

Education also applies to the top-level commanders who develop and disseminate their intent, objectives, and overall guidance. In order for the operational- and tactical-level commanders to exercise disciplined and educated initiative, they must have a well-defined and clear intent from which to guide their initiative. General Dempsey supports this concept by asserting that "officers must be taught how to receive and give mission-type orders, and critically, how to clearly express intent."[34]

Furthermore, trust—which is built through that education—is a critical need for effective mission command both up and down the chain. According to General Dempsey, "Trust too is a learned behavior to be developed during education. . . . As responsible exercise of mission command does not entail blind trust, education must give officers the ability to recognize the capability for mission command in subordinates and the skills to know when and how to adjust their supervision."[35] Additionally, that trust emphasized by General Dempsey, along with the ability and will to exercise disciplined initiative, is of key importance to executing the air campaign in a geographically dispersed and contested environment. It is one thing to effectively run decentralized and distributed operations in an environment in which the United States or coalition has full, uncontested use of all the needed mediums, such as the radio frequency spectrum, satellite access, line of sight (LOS) and beyond line of sight (BLOS) communications, and all of the data and information that flow across those mediums. Even in those permissive environments, leaders at operational levels have a difficult time truly letting the tactical-level units and commanders execute according to guidance and intent, particularly if the air campaign faces no robust air threat. This type of full or partial centralized execution inhibits tactical-level initiative as the lower units become desensitized to making decentralized decisions.

Accordingly, injecting a significant amount of communications degradation; vast, geographically dispersed units; and a robust air threat into that same environment makes the problem more complex. In this contested environment, with communications and data links either degraded or completely lost, it is imperative that the tactical-level joint C2 units and commanders execute disciplined and educated initiative based on their understanding of the intent and guidance provided throughout the campaign. Moreover, that level of decentralization also extends to the pilots and aircrews flying the missions in the event of lost or degraded communications with their tactical C2 units. Such decentralization—or mission command—permits the joint force to maintain the proper tempo and, according to General Dempsey, "operate at the speed of the problem."[36]

Lastly, in addition to understanding the intent and guidance based on all the mission planning and execution documents previously mentioned, the joint C2 units

must also receive more defined guidance based on the desired mission results. This time-tested, well-defined tool that should be used to guide tactical-level execution is known as mission-type orders.[37]

Use Mission-Type Orders to Empower Subordinates

ADP 6-0, *Mission Command*, describes mission orders as "directives that emphasize to subordinates the results to be attained, not how they are to achieve them."[38] Further, ADP 6-0 notes that such orders are used by commanders to "provide direction and guidance that focus the force's activities on the achievement of the main objective, set priorities, allocate resources, and influence the situation."[39] In essence, these mission-type orders are designed to convey well-defined guidance on the results desired while providing subordinates the maximum amount of freedom of action and promoting disciplined initiative.[40] Additionally, the use of these orders still allows commanders to supervise their subordinates, but rather than overcontrolling the situation, they intervene only when necessary to direct big-picture changes to the overall concept of operations.[41] Such restraint, especially in today's vastly networked battlespace, is critical and relies on the commanders' ability to provide appropriate guidance and supervision while executing a "continual cognitive effort to understand, adapt, and to direct effectively the achievement of intent."[42]

Although this concept grew primarily out of efforts to C2 land forces efficiently, it certainly applies to the joint C2 of air operations. In an air defense scenario, for example, mission-type orders could include simple desired results such as "defend the critical assets listed in Defended Assets List (DAL) from air and missile attack" or "defend and protect strike package alpha and bravo throughout all phases of the mission to include marshal, ingress, target, and egress phases" in accordance with the AOD priorities. This type of direction allows the tactical-level joint C2 commanders and air battle managers to deal with the assets available to them according to the priorities and mission intent laid out by the JFACC.

Consequently, the commander of a CRC, serving as regional air defense commander or a subordinate sector air defense commander or senior director on board an E-3G AWACS is responsible for the management and employment of the air assets under his or her control. Specifically, these air battle managers, or their joint counterparts, are authorized to position combat air patrols, retain "commit authority," scramble additional assets when deemed necessary, manage airborne tanker fuel offload/positioning, direct intercepts, decide on prioritization, direct hostile engagements, compile strike packages and appropriate supporting assets, and conduct a host of other air battle management tasks based on guidance and priorities. Further, the tactical-level joint C2 executing the air campaign makes these decisions and carries out disciplined, educated initiative based on the guidance found in the JFC and JFACC documents developed for the campaign (e.g., the JAOP, AOD, ATO, SPINS, and daily updated commander's guidance). These documents are the framework and standards from which the joint C2 commanders and units apply the directed guidance found in the mission-type orders and subsequently synergize into a well-focused, decentralized effort to execute the overall air campaign.

However, as Harvard points out, promoting such initiative through tools like mission-type orders requires striking an appropriate balance of centralized control: "Overcontrolling air and space power robs it of flexibility, taking away initiative from operators. Undercontrolling air and space power fails to capitalize on joint force integration and orchestration, thus reducing its effectiveness."[43] As the adage goes, "It depends," and there is no black or white answer or Jominian formula for when and to what extent to decentralize the level of execution. The level is influenced by many factors such as mission type; threat and "robustness"; intensity, levels, availability of communication, and data flow; and other operational environment factors. However, the level of decentralization and associated initiative taken by subordinate commanders via the execution of mission-type orders also relies on the willingness to accept prudent risk at both the operational and tactical levels.

Accept Prudent Risk

The principle of accepting prudent risk depends upon a firm understanding of and adherence to the rest of the principles of mission command. It is not necessarily a step-by-step process of executing mission command but a synergistic integration and application of all the principles of mission command.

To allow the joint force to accept prudent risk, commanders must first understand the various levels and definitions of risk since they vary from service to service and tactical level to strategic level. ADP 6-0, *Mission Command*, observes that it is necessary for commanders to accept risk due the volatile, uncertain, complex, and ambiguous elements that exist in all military operations.[44] Furthermore, that document defines prudent risk as "a deliberate exposure to potential injury or loss when the commander judges the outcome in terms of mission accomplishment as worth the cost."[45] "Annex 3-30, Command and Control," published by the Air Force's LeMay Center for Doctrine Development and Education, notes that "commanders should rely on delegation of authorities and promulgation of commander's intent as methods to control forces. The commander's intent should specify the goals, priorities, acceptable risks, and limits of the operation."[46] It is through such well-defined intent, analysis, and acceptance of risk that the joint force can reasonably weigh the benefits of a successful mission or strike against the potential cost.

This mission focus is paralleled in the risk assessment definition in JP 5-0, *Joint Operation Planning*, but it also breaks the risk down into four categories:

(a) Extremely high: loss of ability to accomplish the mission;
(b) High: significantly degrades mission capabilities in terms of required mission standards;
(c) Moderate: degrades mission capabilities in terms of required mission standards; and
(d) Low: little or no impact on accomplishment of the mission.[47]

In any case, it is imperative for both the commanders issuing mission-type orders and the subordinates receiving them to analyze and assess the appropriate level of risk. This in turn builds upon the understanding and intent provided and facilitates the aforementioned disciplined and educated initiative. Ultimately, it is the culmination of making a mission-focused decision at the tactical level based on the guid-

ance and information available and how that information and "picture" relate to the current situation.

Accordingly, the CRC, AWACS, or other tactical-level joint C2 commander must assess the risk based on his or her responsibilities, tasks, and objectives as they relate to his particular "lane" or battle management area. What is the risk of letting a threat penetrate defenses because they are unable to completely fill the identification matrix? At what point is the judgment call made to defend a protected area (civilian populace, infrastructure, etc.) from a high-speed air threat instead of waiting on a delayed clearance to engage from higher headquarters or in the event of degraded communications? What is the risk if the CRC or other joint C2 element does directly engage?

All of these risk questions are common and have occurred repeatedly in just about any air campaign scenario ever executed. They are inherent questions that the operational- and tactical-level commanders must address and continually assess while fulfilling their responsibilities in executing air operations. The simple, underlying fact is that these tactical-level commanders must know that their superiors trust them to make these decisions based on the information available to them at the time of decision. Furthermore, it is the responsibility of the tactical-level commanders and units to put extreme effort into knowing their operational environment and adequately preparing, studying, and applying the guidance, intent, and mission priorities to the situation. In short, it is not the "blind trust" that General Dempsey mentions but a credible trust earned through effort, education, experience, and training.[48] This vital trust serves as the "green light" for tactical-level commanders to make decisions and judgments during the fog of war while knowing they have the well-earned support and confidence of their superiors. That well-earned trust serves as the same green light for operational commanders to feel confident about how their subordinates will make decisions and adapt to the dynamic battlespace environment.

Processes, Systems, and Philosophy of Command

The final concept of mission command involves the processes, systems, and philosophy of command required to effectively execute joint air operations in a contested environment via mission command. The primary Air Force system used to C2 joint air operations is the C2 architecture itself, referred to as the TACS. This system and the processes and weapons systems (e.g., CAOC, CRC, air defense sectors, AWACS, and air support operations center) that make up the TACS, along with the sister services' joint C2 systems (MACCS, Aegis, E-2D, etc.), are the critical vehicle for executing the centralized control and decentralized execution of the air campaign. According to Air Force doctrine, "Centralized control and decentralized execution are key tenets of C2; they provide Airmen the ability to exploit the speed, flexibility, and versatility of airpower."[49] Furthermore, Air Force *Basic Doctrine* maintains that "because of airpower's unique potential to directly affect the strategic and operational levels of war, it should be controlled by a single Airman who maintains the broad, strategic perspective necessary to balance and prioritize . . . a . . . limited force."[50]

Execution of the air campaign translates into a single air component commander (i.e., C/JFACC) with the assets and mechanisms necessary to effectively synchronize, plan, execute, and assess combined or joint air operations in support of the JFC's objectives.[51] However, the span of control and associated balance of control are important factors to consider, as Harvard points out: "We could characterize airpower operations in Iraq and Afghanistan as having a favorable span of control at the operational level—one enabled by a robust and uncontested C2 infrastructure."[52] However, in a contested, less permissive operational environment characterized by communications degradation, jamming, and a robust air threat, the need for effective decentralized execution will outweigh efforts to sustain such a large span of control.[53]

To effectively execute a robust, contested air campaign, the JFACC must ensure decentralized execution "within a C2 architecture that exploits the ability of frontline decision makers (such as strike package leaders, air battle managers, forward air controllers) to make on-scene decisions during complex, rapidly unfolding operations."[54] Such execution is the core concept of mission command and an absolute requirement for successful mission operations, particularly in this type of joint operational environment. In addition to instilling and adhering to the principles and concepts of mission command, various planning considerations such as coverage, connectivity, functionality, and placement are vital to ensuring that an effective C2 system and process are put in place.

Considerations for the Command and Control of Joint Air Operations

One of the first things to consider in building a viable joint C2 architecture for executing the air campaign through mission command is the overall force laydown of the TACS, including types of sensor and communications coverage, as well as connectivity back to the senior C2 element of the TACS—the air operations center (AOC).[55] Additionally, "Annex 3-30, Command and Control," points out that "the AOC should have secure and redundant communications with higher and lateral headquarters, as well as subordinate units."[56] Lastly in most scenarios, it will take a truly joint effort of Air Force, Marine, and Navy joint C2 assets to cover the joint operations area fully. Developing the right mix of joint ground-based (CRC, MACCS), seaborne (Aegis), and airborne (E-3G AWACS, E-2D, E-8C Joint Surveillance Target Attack Radar System) C2 elements is particularly critical in a geographically dispersed environment with varying types of terrain and open seas from which to operate.

Connectivity is yet another important factor during development of an effective joint C2 architecture. According to "Annex 3-30," "The structure and positioning of the TACS elements adapt as needed to effectively control airpower," emphasizing the importance of not only the geographic placement and proximity of the sensors and communications nodes mentioned above but also the type of sensor and the medium used to connect.[57] Planning guidance, intent, and subsequent mission-type orders are transmitted via the various types of mediums, such as radio frequency, LOS, BLOS, tactical satellite communications, fiber optic, and the types of communication (voice, data, "chat" protocols, cloud computing). In addition, these mediums are the primary method for real-time communications during execution of the air

campaign, depending upon the mission and/or level or permissiveness. On the one hand, cloud computing could be used as the primary means of communication to transmit mission-type orders for nonkinetic, less-than-time-sensitive missions.[58] On the other hand, multiple means such ultrahigh frequency and other LOS and BLOS tactical communications would be used to transmit time-sensitive kinetic-attack mission orders. Lastly, should communications become degraded or denied by the enemy, redundant planning and execution capabilities, such as cloud computing, are critical to ensure continuity of operations based on the commander's intent and desired end states (i.e., mission-type orders), especially in a distributed operations environment.[59]

After determining the types of sensors and communciations, as well as the joint or coalition partners that will provide them, the CAOC C2 planners must then decide where to put them. There are many factors to consider, but sensor capability, availability, and geographic location (i.e., terrain) are at the top of the list. Ideally, planners would place both ground-based and airborne assets based on capability and proximity to the battle management area. However, host-nation permissions, the threat environment, and base support may drive less than optimal or tactically sound placement. Additionally, a viable joint C2 architecture must have redundant and backup capabilities that ensure continuity of operations and enable the JFACC to continue effective C2 of joint airpower in a partially or completely degraded environment. Col Matthew Smith, former commander of the 505th Test and Evaluation Group, emphasizes the importance of such continuity of operations: "The concept of mission command is critical to effective execution of the air campaign in a contested environment, and tools such as mission-type orders and cloud computing will leverage great benefits to ensuring continuity of operations in such an environment."[60] Moreover, the techniques and procedures developed to maintain the air campaign's continuity of operations in a contested environment will translate to facilitate maritime, land, space, and cyberspace operations.[61] If a joint force—whether air, sea, land, or space based—is operating with dispersed elements in a contested environment, the concepts of mission command and the tools used to execute those concepts apply. Furthermore, these collective constraints placed on CAOC C2 planners will indeed drive the capacity for the joint force to execute distributed operations.

"Annex 3-30, Command and Control," indicates that "distributed operations occur when independent or interdependent nodes or locations participate in the operational planning and/or operational decision-making process to accomplish goals/missions for engaged commanders."[62] In the case of split operations—a type of distributed operations—a single C2 entity such as the CAOC can be split up between multiple locations, but the single commander (i.e., JFACC) "should have oversight of all aspects of a split C2 operation."[63] This oversight allows the CAOC to conduct manpower-intensive tasks, such as developing the majority of the ATO at a rear or backup location while reducing the forward-deployed footprint.[64] Even if the CAOC is comprised of two or more forward locations instead of a rear and forward setup, the inherent redundancy allows for continuity of operations and makes it more difficult for the enemy to disrupt and degrade operations.[65]

Additionally, as identified in the key consideration areas of coverage and connectivity, "Annex 3-30" highlights that "communications and information systems should provide a seamless information flow of prioritized data to and from forward and rear locations."[66] Even though it is critical to maintain the appropriate level of centralized control, commanders must resist the urge to "take direct control of distant events and override the decisions of forward leaders," especially given the degree and amount of information provided by modern communications and sensors.[67] In any case, the degree and effectiveness of C2 through mission command will hinge greatly on the commander's leadership style and philosophy.

Philosophy of Command

Regardless of adherence to the concepts and principles of mission command and the effectiveness of the C2 architecture and systems used, the commander serves as the cornerstone of effective execution of mission command by setting the tone, communicating effectively, and leading by example.[68] Additionally, efficient communication of the vision, plan, or intent comes from a complete understanding of the problem and the tasks at hand. Similarly, productive communication skills are critical. Even if commanders fully comprehend the mission and guidance they want to provide, they must be able to offer clear, concise, correct, and effective communication. Without this skill, even the most fail-safe, perfectly analyzed, and expertly crafted plan can fall through the cracks created by poor communication and misunderstanding. Finally, it is the commander who establishes and builds that vital culture of trust without which mission command and effective air operations cannot succeed.

In terms of air operations, that trust is developed and cultivated through the JFACC and his or her staff. They provide opportunities that allow the tactical-level joint C2 commanders and units to exercise initiative and make decisions based on the situation/threat as it relates to their own specific battle management areas. Those commanders and units must be allowed to make mistakes and then learn from them. The quickest way to stifle trust and effective decentralization is to restrict those individuals and organizations from making decisions at their appropriate level, micromanaging them from above based on the sheer abundance of information and communications available, as discussed earlier.

There may be times, though, as Harvard observes, when specific direction and less decentralization are required, but centralized control and centralized execution should be the exception—not the norm—especially in a nonpermissive, degraded environment.[69] It is up to the commander to determine when and how he or she decides to empower the subordinate units, but that decision will certainly drive the willingness or reluctance of the tactical-level commanders to genuinely exercise disciplined initiative. Again, a solid foundation of trust is essential, and that trust must be developed and cultivated from the very beginning.

If the concepts and principles of mission command are to fully thrive in the joint air operations arena, the JFACC must (1) possess a command philosophy that parallels and supports the concepts and principles necessary to execute mission command, (2) adroitly communicate guidance and intent via multiple means (documents,

mission-type orders, etc.), and (3) promote disciplined and educated initiative on the part of subordinate commanders and units. Further, the productive implementation of mission command does not rest solely on the shoulders of the JFACC and operational- or strategic-level commanders. The brunt of the work and responsibilities lies with the tactical-level joint C2 units and commanders. It is their responsibility not only to train and educate their units but also to read and know all of the governing regulations, planning and execution documents, and daily guidance/intent sent from the JFACC. Only a thorough understanding of their responsibilities, compared to the intent and guidance provided, will allow the tactical-level units to give the JFACC the confidence required, while building a foundation of trust so essential to the effective execution of mission command.

Conclusion

To productively C2 joint air operations in today's contested and degraded environment while preparing for the volatile threats of tomorrow, the US Air Force and joint community must instill the concepts and principles of mission command in their culture. Doing so requires that operational-level commanders at the CAOC and tactical-level joint C2 commanders and units executing the joint air campaign first build and establish a vital foundation of trust. In addition, the operational-level commanders must create a shared understanding of the overall campaign objectives and offer well-defined, clear, and concise intent and guidance that the tactical-level commanders and units can leverage in order to exercise disciplined and educated initiative. Furthermore, the use of mission-type orders from the JFACC will facilitate decentralized execution and initiative in conjunction with the assumption and acceptance of appropriate risk. Lastly, it is critical to develop and employ effective C2 architecture systems and processes to lead joint air operations through mission command. However, it is even more essential that commanders develop and employ a philosophy that enables a vital culture of trust without which mission command and effective air operations have absolutely zero chances of success. ✪

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