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Through restructuring its doctrinal implementation of centralized control and decentralized execution by embracing mission-type orders, the Air Force will enable maximum tactical initiative to the lowest echelon commanders when joint executing missions in contested environments across all domains against a peer enemy. Mission-type orders provide a new avenue for service interoperability and overcoming the challenges associated with command and control in contested domain warfare. The associated concepts of mission-type orders (commander intent; trust through common operating paradigms, similar training and education, and preplanned responses; and risk acceptance) demand conscious development as an appropriate progression towards more agile, flexible command and control in an environment of increasing peer threats. Within these factors, the Air Force will maintain a high operational tempo and tactical initiative in the future contested environments of JADO. Mission-type orders will enhance unity of effort across the joint force to efficiently utilize JADC2 advances in a reciprocal trust relationship between command hierarchies.

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Air Force Command Tenet: Framing Mission-Type Orders in Future Conflict for Air Force Leaders

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Executive Summary

Title: Air Force Command Tenet: Framing Mission-Type Orders in Future Conflict for Air Force Leaders

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Thesis: Through restructuring its doctrinal implementation of centralized control and decentralized execution by embracing mission-type orders, the Air Force will enable maximum tactical initiative to the lowest echelon commanders when executing missions in contested environments across all domains against a peer enemy.

Discussion: Mission-type orders provide a new avenue for encouraging service interoperability, and overcoming the challenges associated with command and control in contested domain warfare. In an era of increasing threats and accelerating information velocity, the associated concepts of mission-type orders (clearly defined authority, roles, and responsibilities; timely communication, decision making, and coordination mechanisms; and mutual trust, understanding, and intent) demand conscious development as an appropriate progression towards more agile, flexible command and control. Mission-type orders focuses on dutiful (versus disciplined) initiative, takes advantage of the primacy of proximity, allows for increased risk acceptance based on stated desired outcomes, increases decision discernment through pattern recognition and preplanned responses, and increases trust and mutual understanding. It promotes coherence of action among decentralized decision makers, even in degraded communications environments, by identifying operational purpose. Successful execution of mission-type orders depend on the quality of commander's intent, trust between command echelons, and a command and control architecture that rewards risk acceptance within commander's intent. These advantages will permit the Air Force to maintain a high operational tempo and tactical initiative in the future contested environments of JADO.

Conclusion: Mission-type orders will enhance unity of effort across the joint force to efficiently utilize JADC2 advances in a reciprocal trust relationship between command hierarchies. This trust will be further developed though joint common operating paradigms for the combined use of airpower, standardization in training and education programs focusing on dynamic problem solving and measured control responses, and through mutually understood preplanned responses that will enable tactical level commanders to direct strategic effects. Mission-type orders will necessitate increased risk acceptance which will contribute to trust and mission accomplishment in line with command intent. Through restructuring its doctrinal implementation of centralized control and decentralized execution by embracing mission-type orders, the Air Force will give maximum tactical initiative to the lowest echelon commanders when executing joint missions in a contested environment across all domains.

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Defining the Problem

Technological advances since the beginning of warfare have necessitated military adaptation to tactics and weaponry, and occasionally these advances opened into new warfare domains. Warfare in physical domains has evolved to include corporeal struggles on land, on and under the sea in the maritime domain, and super terrum in the aeronautical and space realms. Similarly, warfare in virtual domains has multiplied into electromagnetic realms, including information and intelligence, communication, and cyber warfare. Current technological capabilities have increased warfare domains to include almost every known physical and virtual realm. To be successful in warfare, nations must be adept at conducting battle in each of these domains, often simultaneously, both defensively and offensively. While military operations in these domains have remained relatively uncontested for the past thirty years, the 2018 United States National Defense Strategy Summary focuses the future combat operations environment on a peer or near-peer threat.[1] In facing a peer threat, operations in all domains will become increasingly interconnected, interdependent, and contested. USAF Annex 3-1 describes the problem, "Peer competition requires reframing integration and synchronization for sustained and dynamic combat operations... current decision-making processes employ linear planning and force synchronization to execute operations, [but] current processes are slow and predictable; peer competition requires process changes to facilitate rapid synchronization of effects to create adversary dilemmas. This requires continuous and iterative near-term tactical planning, longer-term operational-level planning, and campaign refinement as conditions change."[2] Facing a future peer threat means contestation in domains and in doctrine that have been relatively secure for a long period of time, including challenges to key Principles of War (primarily in mass, maneuver, offensive, security, and unity of command)[3] and Tenets of Airpower (specifically

centralized control and decentralized execution, flexibility and versatility, synergistic effects, and balance).[4]

To succeed against the future near-peer threat, the Department of Defense has identified Joint All-Domain Operations (JADO) as the next revolution in military affairs. JADO optimizes military action across the entire spectrum of conflict by synchronizing operations of the five military services within all warfighting domains in contested environments to neutralize an enemy's strengths. It does this by creating multiple dilemmas throughout each warfighting domain through the joint application of combat power.[5] JADO is the projected answer to the challenges of near-peer competition; specifically those in command and control; communication, computers, cyber, intelligence, surveillance, and reconnaissance (C5ISR) technological upgrades and synchronization; as well as joint lethality across all operating domains in contested environments.[6] To successfully contribute to JADO, however, the Air Force needs to address vulnerabilities in its ability to operate effectively in future contested warfare environments due to anti-access/area-denial (A2/AD) threats, reduced freedom of maneuver, degraded communications and command and control ability, and the rapid proliferation of advanced technologies.[7] Several technological advances are contributing to the advancement of JADO in areas of information management, command and control, and communications and are the capstone hardware evolutions necessary for the future war with a near-peer enemy.

These hardware capabilities, while vital, will have significantly reduced efficiency without a coincident change to the Air Force's command philosophy. Currently, each service has its own unique command tenet prescribing the optimal way to direct and lead independent forces in individual service doctrine. The way that United States services have directed forces in operations for the past fifty years will likely not work against the future peer threat and is not

necessarily compatible with integrating conventional forces into a joint fight. JADO will require the Air Force to re-examine its command doctrine to take advantage of the opportunities offered by these technologies and reduce response time to actions from a near-peer adversary. Through restructuring its doctrinal implementation of centralized control and decentralized execution by embracing mission-type orders, the Air Force will enable maximum tactical initiative to the lowest echelon commanders when executing missions in contested environments across all domains against a peer enemy. A qualitative secondary research analysis into how human factors, leadership, and command structures impact JADO will be presented by describing the nature of future war and joint operations and evaluating of all U.S. military service command tenets. This study will conclude with recommending command and control changes to optimize fighting the future war.

The Nature of the Future Contested Environment

Since the average time-in-service across the Air Force is 13.7 years,[8] few Air Force members have served in a time of severely contested air superiority; therefore, it is important to define what the future near-peer threat entails. For several decades, America has enjoyed a high level of relative freedom of action. Excluding several isolated incidents of sporadic aerial engagements (for instance the 2017 engagement of a Syrian Su-22, and before that the 1999 engagement with a Serbian MiG-29 over Bosnia),[9] America's shift is to using aircraft overwhelmingly for close air support engagements and ISR, especially with the advent of the war on terrorism.[10] America's Air Force has enjoyed air superiority and freedom of movement in the skies virtually unopposed since the 1991 Persian Gulf War.[11] In facing a near-peer threat, America will once again face opposition in all domains. The Chief of Staff of the Air Force, General Charles Q. Brown, Jr. explains in his 2020 document entitled *Accelerate Change or*

Lose, "Our competitors are posturing aggressively to first contest U.S. air superiority, reconnaissance, and strike capabilities, using advanced weapon systems to directly confront and deny U.S. Air Force combat power."[12] The joint force that faces tomorrow's wars will face acute time, distance, and A2/AD operational challenges, which will require cohesive lines of effort to rapidly plan and execute operations using the entire joint force in a synchronized, cooperative, and efficient manner.

A primary concern in facing a near-peer competitor resides in the rapidly closing gap of military dominance, tending towards peer nation military parity. This parity involves advanced capabilities designed to offset or surpass American technological advances and methods for waging war. These proliferated technologies will result in an electromagnetic spectrum that is increasingly saturated and contested, limiting C2 over traditional mediums.[13] For instance, The People's Liberation Army's growing array of A2/AD capabilities will make future conflicts in Asian regions more challenging through network degradation or denial, standoff weapon capabilities, advanced ISR technologies, and first-strike weapons capable of entering fleets' defensive bubbles.[14] Traditional methods of waging war will no longer be sufficient to meet this near-peer threat, and advancements in both technology and equipment are necessary to counter this new threat.

The primary concerns with Air Force operations against a peer threat are vast: skyrocketing combat attrition rates, denial of movement, opposition to aerial dominance, communications issues, bandwidth limitations, and increased demand for ISR information and intelligence are just some of the major issues today's Air Force faces in future war. Many of the technological advancements to conduct JADO are being integrated into programs such as the Air Force's Distributed Common Ground System (also referred to as the AN/GSQ-272 SENTINEL

weapon system), which provides near-real time Intelligence, Surveillance, and Reconnaissance (ISR) processing, exploitation, analysis, and dissemination,[15] and the Department of the Navy's parallel but separate effort named Project Overmatch.[16] These advancements are the result of hard-learned lessons over the course of World War II and the necessity of operating jointly in future warfare.

The Necessity of Operating Jointly

The focus on joint operations finds its origins from the 1958 unified command proposal in which President Eisenhower declared "Separate ground, sea, and air warfare is gone forever. If ever again we should be involved in war, we will fight it… with all services, as one single concentrated effort."[17] Eisenhower based this largely on his experience during Operation Husky in July 1943, dubbed "friendly fire's deadliest day," in which 318 Americans were killed or wounded and twenty-three transport planes failed to return.[18] Investigation into the incident revealed an inter-service disconnection of communication and information, resulting in a deadly barrage of Naval vessel friendly fire on Army aircraft making a run-in to Sicily. A subsequent and poignant example of the failure to integrate an operation across services is the 1980 Operation Eagle Claw where inadequacies in mission planning, command and control, and interservice operability resulted in a failed attempt to rescue American hostages in Iran, and the loss of eight U.S. servicemembers.[19] These failures demonstrate that training compartmentalization and stovepiping domain control are critical vulnerabilities to American warfighting capabilities. Case studies into near-peer adversaries China and Russia and their abilities to converge kinetic and non-kinetic effects in multiple domains on a single target[20] highlight the future importance of JADO.

To overcome the challenges associated with near-peer competition, the United States must be able to counter adversary effects while converging friendly force effects into an integrated result across all domains. This defines operating inside an adversary's Observe-Orient-Decide-Act (OODA) loop and consists of presenting the enemy with rapid dilemmas that negate timely responses. British Chief of the Defence Staff, General Sir Nick Carter emphasizes the future challenge, "What should be our response to this ever more complex and dynamic strategic context? My view is that more of the same will not be enough… Effective integration of maritime, land, air, space and cyber achieves a multi-domain effect that adds up to far more than simply the sum of the parts—recognizing—to paraphrase Omar Bradley—that the overall effect is only as powerful as the strength of the weakest Domain. We must fundamentally change our thinking if we are not to be overwhelmed."[21] In line with this perspective, current American JADO supporting capabilities are not adequately interoperable, and the subsequent control processes are not sufficiently agile to meet the needs of the anticipated future operating environment at the required scale and speed. The key to a paradigm shift against a near-peer adversary lies in command and control.

If JADO is the train to victory against a peer competitor, then Joint All-Domain Command and Control (JADC2) is the engine pulling the train. JADC2 is the future capability to connect sensors from the joint forces into a single network[22] to provide commanders increased tactical initiative and decision-making abilities. Optimally, this results in conducting impactful simultaneous and sequential operations across all domains to gain advantages, influence, and control over the operational environment.[23] JADC2 is the core of JADO, as it enables commanders to make better decisions by utilizing the 'every platform a sensor' concept, processing the conglomerate data using artificial intelligence algorithms to identify targets, then

recommending the optimal asset to engage the target. JADC2 synchronizes effects and adjusts weight of effort, allowing for greater situational awareness and tactical initiative in engaging the entire joint force's capabilities.[24] The Department of Defense is currently seeking multiple avenues for exploring JADC2, notably Air Force efforts in the Advanced Battle Management System (ABMS), which is intended to provide data to pass information across all domains, and the Army's Project Convergence intended to provide access to joint and coalition networks.[25] JADC2 will ultimately enable commanders to make faster and higher risk mitigating decisions through centralized and algorithmic data sensors to engage threats in a matter of minutes or seconds in comparison to the current multi-day process of taskings.[26]

While there is significant urgency in developing new technological offsets to combine joint force effects in all domains, the myopic focus on hardware alone will not optimize inter-service efficiencies and will cause functional rifts in the operational integration of forces across the services. Current joint force innovation focuses almost exclusively on physical capabilities and omits the human dimension (which is fundamentally each service's command tenet) in the doctrinal methodology to implement JADO within the construct of physical systems alone. Although new JADC2 hardware will lead to significant efficiencies in coordination between forces, the exclusion of reforming command philosophies to make efficient joint use of those technologies will at best marginalize the integration and employment of deployed forces. Current research into how the joint forces would more efficiently become organizationally interoperable trends more towards artificial intelligence,[27] data and intelligence collection and dissemination,[28] and command and control structure[29] than it does reshaping command doctrine against a near-peer threat. One area significantly lacking is a holistic evaluation of how the current Air Force command tenet will perform within this new JADC2 hardware structure.

Individual service command philosophies do not reflect optimal methods for command and control practices in joint operational environments utilizing JADC2 advancements, and the Air Force is not an exception. While the Air Force currently participates in JADO exercises and is spearheading JADC2 upgrades, such operations are primarily conducted in permissive environments and are not subject to the stresses likely to exist in a contested operating environment across the competition continuum. Requirements to conduct JADO in contested environments have necessitated revisiting the universal applicability of the Air Force command tenet of *centralized control and decentralized execution*.

The Air Force Command and Control Tenet of Airpower

The United States Air Force's cornerstone command tenet is "centralized control and decentralized execution,"[30] and it establishes control of Air Force assets under a central Air Force commander to direct those assets to best accomplish mission unity through mass and flexibility. This single air component commander can best balance long-term strategic requirements with urgent mission needs. The ability to collate prioritized air taskings at a single level is the cornerstone of centralized control. Similarly, the ability to balance air component command missions with the necessity to conduct short-notice urgent missions is the bedrock of decentralized execution.[31] The architecture of centralized control and decentralized execution is the actualization of historical experience; that airpower effects, as from a high demand yet low density asset, should be commanded by a single Airman, and that aerial assets should not be permanently assigned to singular units as they were prior to 1943. The continuing justification for employing this tenet is stated in USAF Doctrine 1: "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 the use

of a powerful, highly desired yet limited force."[32] The efficient use of airpower is concretely tied to the independence of the branch as elucidated by senior Allied air commander in North Africa, Air Marshal Sir Arthur W. Tedder, who argued "If your organization is such that your air power is divided up into separate packets and there is no overall unity of command at the top, once again you will lose your powers of concentration. Airpower in penny packets is worse than useless. It fritters away and achieves nothing... Its strength lies in unity."[33] This hard-earned reality is the acceptance that a single Airman is not capable of making every decision alone and therefore should empower subordinates to act in accordance with command intent.

Although the Air Force command tenet has worked well in the historical frame of singular air campaigns, as the United States faces rising threats from peer and near-peer adversaries for the first time in several decades, A2/AD areas and multi-domain contested environments require increased dependence on a unified command response across the entire spectrum of conflict. The impacts of the dichotomy between centralized command and tactical initiative contain the largest implications for operational tempo and qualitative tactical initiative. The current implementation of command doctrine lacks the flexibility required to conduct missions across multiple domains simultaneously in contested environments, and therefore the Air Force must re-evaluate its Tenet of Airpower, centralized control and decentralized operation, to meet the requirement to operate synchronously with the other services in all domains of warfare. In anticipation of a near-peer enemy, this revision must account for the challenges of degraded communications ability and intelligence retrieval, allow the distributed coordination of air assets for joint force operations, increase tactical initiative, and accelerate decision-making in contested environments.

Challenges to Air Force Command and Control Structure

Aside from some of the long-standing challenges to the concept of centralized control and decentralized execution, this tenet becomes even more challenged when considering the future contested nature of warfare, specifically with the increased communications and ISR requirements, in addition to the accompanying high likelihood of significant network degradation and the limited bandwidth during high-end operations. Current Air Force command and control is centered around deliberate planning and increasing battlefield awareness; future Air Force command and control must be focused more on the changing command relationships between tactical and operational leaders in a dynamic give-and-take relationship, possibly without communications.[34] Thus, fielding new technologies alone will not be enough for JADC2 advances to succeed; changes in concepts of operation, authorities, and organizational constructs will also be needed.[35]

This will be a major paradigm shift for the Air Force to embrace as uncontested operations have become the operational norm. Rapid technological advances in bandwidth and ISR over the previous several decades have been eagerly employed under the paradigm in which the command and control of air operations is concentrated in the Air Operations Center (AOC) under the Joint Forces Air Component Commander (JFACC), and execution of tasking is accomplished across subordinate nodes.[36] The AOC commander is responsible for managing operations, establishing battle rhythms, and planning, coordinating, executing, and assessing air operations based on JFACC or Combined Forces Air Component Commander guidance.[37] Based on the decades of permissive operations, as well as the possibility of increased battlespace awareness that comes with technological JADC2 advances, it will be easy for the operational-level JFACC to assume tactical-level involvement in operations, even so far as directing

individual aircraft.[38] This highly detrimental practice in wars against near-peer enemies where the pace of operations and the degradation to command and control structures will be an ever-present reality would significantly degrade tactical initiative. Two challenges of the current AOC construct of great concern and worth special mention are the speed of the current planning process and the focus on deliberate planning. The AOC works through a continuous and cyclical 72-hour deliberate planning cycle, which works well in stable steady-state operations such as when the Air Force is executing strictly Air Force missions, in uncontested environments, and when portions of joint operations missions are distributed across participating services. This three-day planning cycle, however, will have increased difficulty in matching a near-peer adversary's dynamic operations, resulting in challenges in keeping tactical initiative over an enemy. Mitigations to the challenges of the rigid planning cycle are capitalized through the previously mentioned JADC2 technological advances.

An additional concern is the command mentality of the JFACC and subordinate commanders. For years, these commanders have enjoyed a relatively high level of freedom of information, the ability to reach from the operational to strategic levels, and the assumption that the transmission and receipt of air tasking orders was assured. Most critically, this sliding command spectrum through command levels will not be possible in the future contested environment and communications will not always be guaranteed; this will be a difficult transition mentally for many commanders to make. Currently, the implemented degree and level of centralization and decentralization depends more on the political or strategic consequences of tactical actions than it does on the action itself;[39] however, future decision-makers will not have this luxury.

Another one of the challenges to JADC2 identified by The MITRE Center for Technology and National Security is that of service-based authorities and operations. Simply put, each service has historically shown an aversion to sharing capabilities and assets between branches, which will prove incompatible with JADO requirements. Not only is handing assets from one service-based commander to another an unfamiliar way of waging war, but the current service organizational structures and incongruent command methodologies would also make it an ineffective way of fighting.[40] One such area of authorities that needs evaluation is at what level, and by which service, future airpower assets will be apportioned (distribution-based) and allocated (numbers-based). None of these issues can be fully solved without evaluation of and revisions to service command philosophies.

Evaluation of Military Service Command Philosophies

To optimize JADO and fully exploit the advantages of joint interoperability, the Air Force needs to examine how well its current command doctrine integrates operations with other services and evaluate the practices of other services that would be beneficial for the Air Force to adopt in integrating command principles throughout JADO. Each military branch has a unique doctrinal command tenet to maximize service-specific force employment and unity of effort across the dominant domains of influence. The Air Force's *Air Force Doctrine 1, Basic Doctrine* utilizes "centralized control and decentralized execution,"[41] the Department of the Army's *Army Doctrine Publication 6.0, Mission Command: Command and Control of the Army Forces* applies "mission command,"[42] The Navy Service's *Navy Warfare Publication 3-56* employs "composite warfare command,"[43] and the Marine Corps Service's *Marine Corps Warfighting Publication 3-20* uses "centralized command and decentralized execution."[44] These publications proclaim each

service's core command tenet with explanations regarding service intent in implementation, delegation authorities, and command responsibilities.

While both the Marine Corps' and the Air Force's philosophies support the idea of a centralized command authority, the methods for achieving this are vastly different. The Air Force philosophy focuses central control of assets and planning under a single JFACC commander. Conversely, the Marine Corps emphasizes blending of positive and procedural control under the Marine Air Command and Control system with an emphasis on the means to control assets at the Aviation Combat Element level.[45] This employment of decentralized execution is performed to achieve a more effective integrated span of control, responsiveness, and tactical flexibility than the Air Force's positive control and deliberate planning methods.[46] However, in consideration of JADO, the Marine Air-Ground Task Force does not have the capabilities to support all joint air operations in its area of operations, so future warfare under this construct would continue to limit command and control methods, including continued separate service areas of operations, and this command construct is incompatible in JADC2.

Similarly, the Army's axiom of mission command aims to empower subordinate decision-making appropriate to the situation and in line with command intent. This is based on the premise of the primacy of proximity, whereas tactical-level commanders very often have better battlefield situational awareness in dynamic situations and are therefore more likely to capitalize on instances inviting tactical initiative if allowed to make decisions and act based on commander's intent.[47] Conversely, the Air Force's focus on deliberate planning and higher-level real-time control of forces contrasts with the Army's linear, functionally oriented command structure. Mission command of this sort requires several qualifications to be successful, including robust command intent down the chain, the authority and responsibility for subordinate

commanders to act with disciplined initiative, and mutual trust. Since the Army is structurally organized as a self-similar organization, whereas subordinate commands are smaller versions of higher echelons, mission command works well when operating within its own organizational structure but would have difficulty integrating joint assets with individual service forces.[48]

The Navy has arguably come the furthest in adapting its command tenet, Composite Warfare Commander (CWC), to the future joint fight. With its traditional role of power projection in over-the-horizon operations with limited or no mainland communications, the Navy has historically operated under the tradition of UNODIR (Unless Otherwise Directed), which is the first example of mission-type orders and is an example of how future warfare may be waged again in non-permissive physical and electromagnetic environments. The modern CWC doctrine utilizes the philosophy of decentralized execution through authoritative subordinate warfare commanders who are focused on separate air, strike, sea, and surface information environments.[49] Through a decentralized command with centralized authority scheme, the Navy organizes at the tactical level by focus, command function, and responsibility for combat operations against multiple targets and threats simultaneously. Much like mission command, the Navy's method of planning, control, and execution empowers subordinate commanders with not only the flexibility and initiative but also the authority and responsibility to execute the CWC's intent by framing the desired outcomes from each respective warfare area to overall mission success without directing the subordinate warfare commander's actions or methods. The recent modifications to CWC doctrine demonstrate a shift in naval perspective of its command and control requirements to fit within a joint force operational environment. In cases of asset distribution or allocation conflicts, authority lies with the CWC for final deconfliction based on urgency and overall mission priorities. Contrary to the Air Force's distribution and allocation

scheme, with ultimate air tasking occurring at higher headquarters, the CWC structure gives authority of individual ships and aircraft to the warfare commanders, and these warfare commanders may be given broad authority by the CWC to diverge from previously established plans if they believe circumstances require deviation.[50] The CWC concept still has incongruencies with a parallel Air Force command structure model, however, as the CWC doctrine is designed for macro-level operations. Operations on a smaller level doctrinally become more convoluted as these may necessitate an additional Officer in Tactical Command to independently fulfill all sea control functions. Ultimately, scale of operations and individual mission parameters still determine the degree to which the CWC doctrine is employed.

Despite the nuances of each tenet, there are several useful analogous themes throughout the collective doctrines. For example, each tenet advocates empowering the lowest echelon commander with authority to seize effective tactical initiative,[51] and essentially, each doctrine leans towards advocating for enacting mission-type orders through deliberate and resilient commander's intent statements for contingency situations.[52] Each doctrine, however, focuses on establishing individual service unity of command and unity of effort,[53] with a focus on the notional organization of assets and personnel only under each service's own command structure.[54]

Although many of the service command tenets utilize similar-sounding language to describe command relationships, there are several incompatibilities in areas related to organizational hierarchical structures, methods for employing supporting and supported assets, and employing flexibility to gain tactical initiative between these doctrinal concepts. First, the differing perspectives of command and control in each service reflect biases. While the Marine Corps, Army, and Navy doctrine each focus aviation assets towards a supporting role to their

respective forces, Air Force doctrine focuses on six key independent capabilities: air and space superiority, global presence, rapid global mobility, precision engagement, information superiority, and agile combat support.[55] While the Marine Corps, Army, and Navy independently distribute and allocate their aviation forces in relation to the missions of the other service component forces, the Air Force uses its force to singularly affect mission elements independently. This doctrinal difference is one of the reasons why the human factors of integrating all services into JADO under a common JADC2 function will prove difficult.

Recent scholarly articles have questioned whether the service command tenets will permit optimal interservice cooperation. For instance, pushback against the Air Force's command tenet focuses on problems of the distribution of scarce assets in the face of increasing demand for utilization.[56] The Air Force tenet does not overtly address operations in contested operations and the need for increased tactical initiative, and what this means for asset allocation or command hierarchy.[57] Similarly, Army mission command is not universally applicable to all mission sets and functional force areas, and in some cases it may be counterproductive to success either due to function or poor application practices.[58] As an example, the allowance mission command makes for innovation and risk, and the consequent potential for mistakes makes it an improbable candidate for nuclear security units where consistency and uniformity are desirable traits.

While examining the current literature regarding these command tenets, several theoretical holes are evident. First, insufficient literature describes how the Air Force's command doctrine will integrate asset distribution and control between services participating in JADO. Furthermore, command doctrine does not address employing command principles in a contested environment where the tendency is for higher echelon commanders to retain substantial

command authority despite a high likelihood of an inability to communicate and an overwhelming requirement for quick decision-making. Additionally, there is a conspicuous lack of practical direction towards proper employment of these principles in dynamic situations, resigning the totality of implementation to an individual commander's preference and personality.

Finally, service command philosophies in general lack a unifying response to operations in contested environments. Incorporating considerations of contested domain warfare into analysis of command doctrine is critical as services integrate more completely into JADO. Although there is considerable emphasis on considering contested domain warfare in other aspects of joint operations (such as in communication integration, intelligence collection and dissemination, and in hardening of software defenses), there is little correlation or consideration for redefining command doctrine to cope with the contested nature of future warfare in all domains. Significantly lacking from culminating research is a reevaluation of these command tenets to increase efficiencies, drive tactical initiative, and coordinate inter-service integration in contested domain warfare—the central element of which is command and control through mission-type orders.

The Way Forward: Mission-Type Orders

The common theme of mission-type orders surfaces in various forms when comparing each service's command and control doctrine. Traditional mission orders focus attention on the communication of senior commander's intent down to subordinate commanders, which remains a critical aspect of centralized command. However, mission-type orders seek to enhance the reciprocal command relationship by emphasizing feedback up from subordinate commanders that increases senior leaders' situational awareness to help better define their guidance for

successive efforts.[59] Additionally, mission-type orders may be the unifying concept that could act both as a ladder and a bridge to connect every service in JADO. The ladder is the concept that all services, after waging uncontested aerial warfare for so long, need a catalyst out of the pit of commander overreach. The bridge is the effect that each service is independently recognizing that in a new contested environment, the freedom of communications and bandwidth enjoyed for several decades will likely not be a reality in future war against a peer threat. Swiss General Baron Antoine-Henri Jomini foresaw this modern difficulty when he stated: "A general whose genius and hands are tied by an Aulic council five hundred miles distant cannot be a match for one who has liberty of action, other things being equal."[60] Mission-type orders are the solution to the issue of direct strategic command described by General Jomini, yet the concept is significantly lacking in Air Force application.

The fact that this concept has not been instilled in Air Force doctrine is demonstrated poignantly in its marginal inclusion of mission-type orders, whereas the term only appears in command annex publications.[61] Perhaps this is deference to joint publications, which speak on joint command and control, like the Air Force doctrine update to Joint Publication 3-30, which states that mission-type orders is the joint approach to centralized control and decentralized execution.[62] If true, this has driven an ignorance of mission-type orders until serving in a joint capacity, or until mentorship of a joint nature has matured, or without independent research on higher leadership forms.

Mission-type orders provide a possible new avenue for encouraging service interoperability and overcoming the challenges associated with command and control in contested domain warfare. The associated concepts of mission-type orders (clearly defined authority, roles, and responsibilities; timely communication, decision making, and coordination

mechanisms; and mutual trust, understanding, and intent) demand conscious development as an appropriate progression towards more agile, flexible command and control in an era of increasing threats and accelerating information velocity. This additional aspect of Air Force command doctrine should apply the three predominant command and control concepts as proposed by the Joint Staff J7 including simplicity, span of control, and interoperability to verify its effectiveness.[63]

No service doctrine except mission-type orders fits the unique mission requirements of the Air Force, and no other doctrine can account for mission success in future warfare. In evaluating each service's command philosophy and its applicability to utilization of airpower, the answer to Air Force operations in the future environment of degraded communications and broadband denial is through mission-type orders. Although not a panacea, executing mission-type orders under a construct of centralized control and decentralized execution has several benefits that break the current framework of performance perfection and extreme risk aversion. Mission-type orders empower decentralized leaders with decision authority to pursue tactical advantages in accordance with commander's intent in an environment with likely degraded communications. Mission-type orders focus on dutiful (versus disciplined) initiative, taking advantage of the primacy of proximity, allowing for increased risk acceptance based on stated desired outcomes, increasing decision discernment through pattern recognition and preplanned responses, and increasing trust and mutual understanding. It promotes coherence of action among decentralized decision makers, even in degraded communications environments, by identifying operational purpose.[64] Successful execution of mission-type orders depends on the quality of commander's intent, trust between command echelons, and a command and control architecture that rewards risk acceptance within commander's intent. Within these factors, the Air Force will

maintain a high operational tempo and tactical initiative in the future contested environments of JADO.

Commander's Intent

Commander's intent is one of the critical aspects of mission-type orders that enables shared understanding of desired strategic outcomes for the application of airpower to achieve the desired end state. Understanding equips decision makers at all levels with insight and foresight required to make effective decisions, to manage associated risks, and to consider second and subsequent order effects. It provides for a shared context which is a critical enabler to conveying intent.[65] Through a robust understanding of commander's intent, mission-type orders emphasize timely decision-making through a distributed command structure of dutiful initiative. This dutiful initiative is a key distinction above disciplined initiative; whereas dutiful initiative inherently is the responsibility to proactively pursue objectives within commander's intent, disciplined initiative is rather a passive approach to risk aversion in operations. Dutiful initiative obliges subordinate commanders to capitalize on tactical advantages and is beneficial for quickly directing actions in response to emerging conditions in warfare. Commander's intent will become even more critical in the future nature of warfare in contested domains with denial or degradation of communications and intelligence where collaboration with higher commands may not be prompt, or even possible. By not only allowing, but requiring, commanders to respond proactively, tactical level units will be able to take advantage of enemy mistakes and capitalize on fleeting opportunities to ultimately provide operational-level unity of effort.

Navy Warfare Publication 3-56 *Composite Warfare* sums up the goal of commander's intent within mission-type orders, "This type of order and execution provides the tactical commander the freedom to execute his preplanned actions and orders, not dependent on direction

from leadership or having to seek additional approvals. The approval to execute is implicit in the preplanned response actions and orders that enable leadership the ability to negate or modify if required by circumstances dictated within the situation [and] rules of engagement."[66] Ultimately, higher echelon commanders who are unwilling to distribute command responsibility through mission-type orders to the lowest echelons with the greatest ability for tactical initiative will limit the strategic capability of airpower to execute a coherent, purposeful plan.[67] The tendency of higher-echelon leaders to make decisions several levels down the command chain due to a high confidence of intelligence fidelity can have a detrimental effect on tactical initiative, especially during periods of rapidly changing information. As then-General James Mattis stated, "Digital technologies do not dissipate confusion; the fog of war can actually thicken when misinformation is loudly amplified."[68] One method to empower decentralized execution through concurrent changes to the battlespace is through Commander Action Messaging that updates specific responsibilities and expectations for all subordinate commanders; in this way tactical-level component commanders are empowered to make operational decisions.[69] Commander's intent is worthless without trust, however, when tactical commander decisions may have strategic-level ramifications in the political, informational, economic, and military domains of statecraft.

Trust Between Commanders

Whereas command intent provides a clear and concise expression of the purpose of the operation and the desired military end state, intent fuses understanding, assigned mission, and direction to subordinates, which breeds the trust that is required at every echelon of the force. Another quote from General Mattis is that "Operations occur at the speed of trust."[70] Coupled with shared understanding and intent, trust is the moral sinew that binds the distributed force,

enabling the many to act as one in the cross-domain application of the appropriate amount of cumulative combat power at the right place and time.[71]

Without the trust from higher-echelon commanders that subordinate commanders will act within command intent, will consider the larger operational and strategic environment prior to issuing orders, and will maintain dutiful initiative to consider the impacts of utilizing a low-density asset, those higher commanders will not be apt to distribute command authority through command intent. Much has been written on the value of trust in leadership; however, the military question remains: how is trust built when higher commanders may not have met or worked with their subordinate commanders previously? Trust without acquaintance can be forged in three distinct ways: through common operating paradigms, through similar training and education, and through preplanned crisis responses. All of these will need to converge for trust, and for the mission-type orders construct to succeed in warfare.

Common operating paradigms. Common operating paradigms help to manage and communicate operational and strategic-level commander expectations, while providing stability to the tactical-level commanders when employing airpower in a joint force. Common operating paradigms include both interservice methods of integrating airpower effects and intra-service doctrinal paradigms of airpower tactical employment. Common operating paradigms increase trust between command echelons through creating a common foundation of understanding and intent. It is important, but not solely sufficient, to have an education in strategy; the actions of a leader must incorporate shared joint paradigms to increase interservice predictability, especially when operating in a communications-denied environment. Paradigm drift between services, which is the differing views of how and why airpower is employed in modern warfare, causes dissidence between strategic goals even though many interservice capabilities and missions

intersect in common domains. To fully attain a trust relationship between command levels, a single joint airpower operating paradigm in JADO is crucial. Parts of a common operating paradigm are encapsulated in shared professional military education outcomes and in widely understood and practiced preplanned responses, both of which vastly increase trust between command echelons.[72]

Similar training and education. As mentioned previously, similar training and education is part of what creates a common operating paradigm through commonalities in planning, utilization, and structure. Military training and education, when conducted in alignment with joint strategic outlooks, develops the habits of mind central to the profession.[73] Robust training and education programs develop wider expertise, an operationally relevant strategic outlook, and flexibility across a range of areas. The intangible benefits also include the instilling of intellectual proclivities that enable commanders to collectively anticipate and adapt to emerging changes.[74] Similar military education across all services helps leaders develop skills to quickly comprehend new and challenging situations, to rapidly build relationships and trust with mission partners, and to demonstrate competence and confidence in applying the innovative and adaptive solutions required to operate in contested environments.[75] Education and training is not just about head knowledge, but it is about the iterative process of evaluating common problems and amalgamating similar solutions to future problems that build pattern recognition and strengthen synaptic bridges. Robust synaptic bridges enable commanders to rapidly solve iterative problems correspondingly to those possessing similar education and training, which builds trust. In parallel with common training and education, preplanned responses also help create unity of effort, shorten decision-making processes, and increase maneuverability.

Preplanned responses. Another area key to the success of mission-type orders is the development of preplanned responses. Preplanned responses provide a known solution to likely and dangerous contingency situations in case of degraded communications ability. Preplanned responses provide criteria for triggered responses based on mutually understood higher-level command intent. Preplanned responses by design initiate autonomous action from tactical commanders without necessitating further communication with higher echelon commanders. Because preplanned responses provide clear understanding of the commander's intent, they facilitate common understanding, reduce the possibility of confusion, and increase the effectiveness of operations, especially when operating in potentially denied or degraded environments.[76] Although preplanned responses cannot answer every instance of command by negation (for example, in nuclear operations), these can help codify objectives within command intent. Preplanned responses find intrinsically high value when aimed at strategic results; effective preplanned responses allow tactical efforts for strategic effects in regulated ways in line with command intent. In the case of tactical decisions, which may have national-level impact that require an immediate response, or those without higher echelon commander communications, preplanned responses will assure that lower echelon command orders are in line with ultimate command intent. In deliberate and crisis planning, command and control should be a part of preplanned contingency responses, both in branches and sequels. Concrete command and control constructs and methods dependent on likely scenarios and outcomes with associated transitions of responsibility and accountability should be planned to avoid lagging progressive developments.[77] Additionally, preplanned responses should account for a lack of information or communication; a poignant illustration of this necessity is the critical vulnerability of collocating AOC systems and personnel in a forward-deployed and centralized facility.[78] Preplanned

responses rely on the robust processes of deliberate planning and wargaming vulnerabilities in non-contested environments to mitigate the thrash associated with lower echelon commanders having to make every decision unaided in a crisis environment. Similar to a quick reaction checklist for aviators, these preplanned responses will widely communicate command intent on a variety of most likely and most dangerous situations, will increase trust between command echelons, and will enable greater risk acceptance through dutiful initiative.

Risk Acceptance

For mission-type orders to be effective, commanders must exercise dutiful initiative and accept prudent risk in accordance with command intent. The Air Force culture, like other services, remains risk averse and focused on creating a zero-defect environment. The current construct of the AOC with its central JFACC has enjoyed decades of uncontested operations, which has bred an outmoded culture of commander-centric processes and hierarchical power structures discouraging risk acceptance at lower echelons. Air Force leaders continue to default to detailed command due to the relative freedom of communications currently enjoyed. The combined effect of these cultures and mentalities will destabilize mission-type orders in contested environments.[79] Enacting mission-type order requires not only an allowance for risk, but moreover a dutiful risk acceptance in appropriate situations (as outlined in preplanned responses or in Commander Action Messaging). By distributing control through mission-type orders, the overall threat level is reduced, limiting vulnerabilities and establishing common supporting relationships across all domains of contested warfare.[80] While higher risk acceptance would not be appropriate for all situations (such as the previously discussed nuclear operations, or missions with declared objective strategic impact), by mandating tactical initiative through mission-type orders, joint services will be more able to work collaboratively in JADO.

Conclusion

The fundamental command tenet of centralized control and decentralized execution has been the command and control structure of Air Force air operations since prior to the service activating in 1947. Although that command tenet remains viable, the current construct of command and control will be insufficient to take advantage of tactical initiative in environments of degraded communications and limited bandwidth. The technological advances in JADC2 and the future operating requirements in JADO necessitate evolving distributed command authorities through a mission-type orders construct. This focus will enable a flexible command and control construct in an era of increasing threats, accelerating information velocity, and increasing denial of traditional command and control methods and structures. Mission-type orders, a doctrinal evolution deeper into the current centralized control and decentralized execution construct, will enhance unity of effort across the joint force to efficiently utilize JADC2 advances in a reciprocal trust relationship between command hierarchies. This trust will be further developed though joint common operating paradigms for the combined use of airpower, standardization in training and education programs focusing on dynamic problem solving and measured control responses, and through mutually understood preplanned responses that will enable tactical level commanders to direct strategic effects. Mission-type orders additionally will necessitate increased risk acceptance through the previously mentioned control methods, which will all contribute to trust and mission accomplishment in line with command intent. Through restructuring its doctrinal implementation of centralized control and decentralized execution by embracing mission-type orders in a similar paradigm to other services, the Air Force will give maximum tactical initiative to the lowest echelon commanders when executing joint missions in a contested environment across all domains.

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MASTER OF MILITARY STUDIES

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Air Force Command Tenet: Framing Mission-Type Orders in Future Conflict for Air Force Leaders

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DISCLAIMER

Executive Summary

Title: Air Force Command Tenet: Framing Mission-Type Orders in Future Conflict for Air Force Leaders

Author: Daniel L.T. Garrison, Major, United States Air Force

Thesis: Through restructuring its doctrinal implementation of centralized control and decentralized execution by embracing mission-type orders, the Air Force will enable maximum tactical initiative to the lowest echelon commanders when executing missions in contested environments across all domains against a peer enemy.

Discussion: Mission-type orders provide a new avenue for encouraging service interoperability, and overcoming the challenges associated with command and control in contested domain warfare. In an era of increasing threats and accelerating information velocity, the associated concepts of mission-type orders (clearly defined authority, roles, and responsibilities; timely communication, decision making, and coordination mechanisms; and mutual trust, understanding, and intent) demand conscious development as an appropriate progression towards more agile, flexible command and control. Mission-type orders focuses on dutiful (versus disciplined) initiative, takes advantage of the primacy of proximity, allows for increased risk acceptance based on stated desired outcomes, increases decision discernment through pattern recognition and preplanned responses, and increases trust and mutual understanding. It promotes coherence of action among decentralized decision makers, even in degraded communications environments, by identifying operational purpose. Successful execution of mission-type orders depend on the quality of commander's intent, trust between command echelons, and a command and control architecture that rewards risk acceptance within commander's intent. These advantages will permit the Air Force to maintain a high operational tempo and tactical initiative in the future contested environments of JADO.

Conclusion: Mission-type orders will enhance unity of effort across the joint force to efficiently utilize JADC2 advances in a reciprocal trust relationship between command hierarchies. This trust will be further developed though joint common operating paradigms for the combined use of airpower, standardization in training and education programs focusing on dynamic problem solving and measured control responses, and through mutually understood preplanned responses that will enable tactical level commanders to direct strategic effects. Mission-type orders will necessitate increased risk acceptance which will contribute to trust and mission accomplishment in line with command intent. Through restructuring its doctrinal implementation of centralized control and decentralized execution by embracing mission-type orders, the Air Force will give maximum tactical initiative to the lowest echelon commanders when executing joint missions in a contested environment across all domains.

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Defining the Problem

Technological advances since the beginning of warfare have necessitated military adaptation to tactics and weaponry, and occasionally these advances opened into new warfare domains. Warfare in physical domains has evolved to include corporeal struggles on land, on and under the sea in the maritime domain, and super terrum in the aeronautical and space realms. Similarly, warfare in virtual domains has multiplied into electromagnetic realms, including information and intelligence, communication, and cyber warfare. Current technological capabilities have increased warfare domains to include almost every known physical and virtual realm. To be successful in warfare, nations must be adept at conducting battle in each of these domains, often simultaneously, both defensively and offensively. While military operations in these domains have remained relatively uncontested for the past thirty years, the 2018 United States National Defense Strategy Summary focuses the future combat operations environment on a peer or near-peer threat.[1] In facing a peer threat, operations in all domains will become increasingly interconnected, interdependent, and contested. USAF Annex 3-1 describes the problem, "Peer competition requires reframing integration and synchronization for sustained and dynamic combat operations... current decision-making processes employ linear planning and force synchronization to execute operations, [but] current processes are slow and predictable; peer competition requires process changes to facilitate rapid synchronization of effects to create adversary dilemmas. This requires continuous and iterative near-term tactical planning, longer-term operational-level planning, and campaign refinement as conditions change."[2] Facing a future peer threat means contestation in domains and in doctrine that have been relatively secure for a long period of time, including challenges to key Principles of War (primarily in mass, maneuver, offensive, security, and unity of command)[3] and Tenets of Airpower (specifically

centralized control and decentralized execution, flexibility and versatility, synergistic effects, and balance).[4]

To succeed against the future near-peer threat, the Department of Defense has identified Joint All-Domain Operations (JADO) as the next revolution in military affairs. JADO optimizes military action across the entire spectrum of conflict by synchronizing operations of the five military services within all warfighting domains in contested environments to neutralize an enemy's strengths. It does this by creating multiple dilemmas throughout each warfighting domain through the joint application of combat power.[5] JADO is the projected answer to the challenges of near-peer competition; specifically those in command and control; communication, computers, cyber, intelligence, surveillance, and reconnaissance (C5ISR) technological upgrades and synchronization; as well as joint lethality across all operating domains in contested environments.[6] To successfully contribute to JADO, however, the Air Force needs to address vulnerabilities in its ability to operate effectively in future contested warfare environments due to anti-access/area-denial (A2/AD) threats, reduced freedom of maneuver, degraded communications and command and control ability, and the rapid proliferation of advanced technologies.[7] Several technological advances are contributing to the advancement of JADO in areas of information management, command and control, and communications and are the capstone hardware evolutions necessary for the future war with a near-peer enemy.

These hardware capabilities, while vital, will have significantly reduced efficiency without a coincident change to the Air Force's command philosophy. Currently, each service has its own unique command tenet prescribing the optimal way to direct and lead independent forces in individual service doctrine. The way that United States services have directed forces in operations for the past fifty years will likely not work against the future peer threat and is not

necessarily compatible with integrating conventional forces into a joint fight. JADO will require the Air Force to re-examine its command doctrine to take advantage of the opportunities offered by these technologies and reduce response time to actions from a near-peer adversary. Through restructuring its doctrinal implementation of centralized control and decentralized execution by embracing mission-type orders, the Air Force will enable maximum tactical initiative to the lowest echelon commanders when executing missions in contested environments across all domains against a peer enemy. A qualitative secondary research analysis into how human factors, leadership, and command structures impact JADO will be presented by describing the nature of future war and joint operations and evaluating of all U.S. military service command tenets. This study will conclude with recommending command and control changes to optimize fighting the future war.

The Nature of the Future Contested Environment

Since the average time-in-service across the Air Force is 13.7 years,[8] few Air Force members have served in a time of severely contested air superiority; therefore, it is important to define what the future near-peer threat entails. For several decades, America has enjoyed a high level of relative freedom of action. Excluding several isolated incidents of sporadic aerial engagements (for instance the 2017 engagement of a Syrian Su-22, and before that the 1999 engagement with a Serbian MiG-29 over Bosnia),[9] America's shift is to using aircraft overwhelmingly for close air support engagements and ISR, especially with the advent of the war on terrorism.[10] America's Air Force has enjoyed air superiority and freedom of movement in the skies virtually unopposed since the 1991 Persian Gulf War.[11] In facing a near-peer threat, America will once again face opposition in all domains. The Chief of Staff of the Air Force, General Charles Q. Brown, Jr. explains in his 2020 document entitled *Accelerate Change or*

Lose, "Our competitors are posturing aggressively to first contest U.S. air superiority, reconnaissance, and strike capabilities, using advanced weapon systems to directly confront and deny U.S. Air Force combat power."[12] The joint force that faces tomorrow's wars will face acute time, distance, and A2/AD operational challenges, which will require cohesive lines of effort to rapidly plan and execute operations using the entire joint force in a synchronized, cooperative, and efficient manner.

A primary concern in facing a near-peer competitor resides in the rapidly closing gap of military dominance, tending towards peer nation military parity. This parity involves advanced capabilities designed to offset or surpass American technological advances and methods for waging war. These proliferated technologies will result in an electromagnetic spectrum that is increasingly saturated and contested, limiting C2 over traditional mediums.[13] For instance, The People's Liberation Army's growing array of A2/AD capabilities will make future conflicts in Asian regions more challenging through network degradation or denial, standoff weapon capabilities, advanced ISR technologies, and first-strike weapons capable of entering fleets' defensive bubbles.[14] Traditional methods of waging war will no longer be sufficient to meet this near-peer threat, and advancements in both technology and equipment are necessary to counter this new threat.

The primary concerns with Air Force operations against a peer threat are vast: skyrocketing combat attrition rates, denial of movement, opposition to aerial dominance, communications issues, bandwidth limitations, and increased demand for ISR information and intelligence are just some of the major issues today's Air Force faces in future war. Many of the technological advancements to conduct JADO are being integrated into programs such as the Air Force's Distributed Common Ground System (also referred to as the AN/GSQ-272 SENTINEL

weapon system), which provides near-real time Intelligence, Surveillance, and Reconnaissance (ISR) processing, exploitation, analysis, and dissemination,[15] and the Department of the Navy's parallel but separate effort named Project Overmatch.[16] These advancements are the result of hard-learned lessons over the course of World War II and the necessity of operating jointly in future warfare.

The Necessity of Operating Jointly

The focus on joint operations finds its origins from the 1958 unified command proposal in which President Eisenhower declared "Separate ground, sea, and air warfare is gone forever. If ever again we should be involved in war, we will fight it… with all services, as one single concentrated effort."[17] Eisenhower based this largely on his experience during Operation Husky in July 1943, dubbed "friendly fire's deadliest day," in which 318 Americans were killed or wounded and twenty-three transport planes failed to return.[18] Investigation into the incident revealed an inter-service disconnection of communication and information, resulting in a deadly barrage of Naval vessel friendly fire on Army aircraft making a run-in to Sicily. A subsequent and poignant example of the failure to integrate an operation across services is the 1980 Operation Eagle Claw where inadequacies in mission planning, command and control, and interservice operability resulted in a failed attempt to rescue American hostages in Iran, and the loss of eight U.S. servicemembers.[19] These failures demonstrate that training compartmentalization and stovepiping domain control are critical vulnerabilities to American warfighting capabilities. Case studies into near-peer adversaries China and Russia and their abilities to converge kinetic and non-kinetic effects in multiple domains on a single target[20] highlight the future importance of JADO.

To overcome the challenges associated with near-peer competition, the United States must be able to counter adversary effects while converging friendly force effects into an integrated result across all domains. This defines operating inside an adversary's Observe-Orient-Decide-Act (OODA) loop and consists of presenting the enemy with rapid dilemmas that negate timely responses. British Chief of the Defence Staff, General Sir Nick Carter emphasizes the future challenge, "What should be our response to this ever more complex and dynamic strategic context? My view is that more of the same will not be enough… Effective integration of maritime, land, air, space and cyber achieves a multi-domain effect that adds up to far more than simply the sum of the parts—recognizing—to paraphrase Omar Bradley—that the overall effect is only as powerful as the strength of the weakest Domain. We must fundamentally change our thinking if we are not to be overwhelmed."[21] In line with this perspective, current American JADO supporting capabilities are not adequately interoperable, and the subsequent control processes are not sufficiently agile to meet the needs of the anticipated future operating environment at the required scale and speed. The key to a paradigm shift against a near-peer adversary lies in command and control.

If JADO is the train to victory against a peer competitor, then Joint All-Domain Command and Control (JADC2) is the engine pulling the train. JADC2 is the future capability to connect sensors from the joint forces into a single network[22] to provide commanders increased tactical initiative and decision-making abilities. Optimally, this results in conducting impactful simultaneous and sequential operations across all domains to gain advantages, influence, and control over the operational environment.[23] JADC2 is the core of JADO, as it enables commanders to make better decisions by utilizing the 'every platform a sensor' concept, processing the conglomerate data using artificial intelligence algorithms to identify targets, then

recommending the optimal asset to engage the target. JADC2 synchronizes effects and adjusts weight of effort, allowing for greater situational awareness and tactical initiative in engaging the entire joint force's capabilities.[24] The Department of Defense is currently seeking multiple avenues for exploring JADC2, notably Air Force efforts in the Advanced Battle Management System (ABMS), which is intended to provide data to pass information across all domains, and the Army's Project Convergence intended to provide access to joint and coalition networks.[25] JADC2 will ultimately enable commanders to make faster and higher risk mitigating decisions through centralized and algorithmic data sensors to engage threats in a matter of minutes or seconds in comparison to the current multi-day process of taskings.[26]

While there is significant urgency in developing new technological offsets to combine joint force effects in all domains, the myopic focus on hardware alone will not optimize inter-service efficiencies and will cause functional rifts in the operational integration of forces across the services. Current joint force innovation focuses almost exclusively on physical capabilities and omits the human dimension (which is fundamentally each service's command tenet) in the doctrinal methodology to implement JADO within the construct of physical systems alone. Although new JADC2 hardware will lead to significant efficiencies in coordination between forces, the exclusion of reforming command philosophies to make efficient joint use of those technologies will at best marginalize the integration and employment of deployed forces. Current research into how the joint forces would more efficiently become organizationally interoperable trends more towards artificial intelligence,[27] data and intelligence collection and dissemination,[28] and command and control structure[29] than it does reshaping command doctrine against a near-peer threat. One area significantly lacking is a holistic evaluation of how the current Air Force command tenet will perform within this new JADC2 hardware structure.

Individual service command philosophies do not reflect optimal methods for command and control practices in joint operational environments utilizing JADC2 advancements, and the Air Force is not an exception. While the Air Force currently participates in JADO exercises and is spearheading JADC2 upgrades, such operations are primarily conducted in permissive environments and are not subject to the stresses likely to exist in a contested operating environment across the competition continuum. Requirements to conduct JADO in contested environments have necessitated revisiting the universal applicability of the Air Force command tenet of *centralized control and decentralized execution*.

The Air Force Command and Control Tenet of Airpower

The United States Air Force's cornerstone command tenet is "centralized control and decentralized execution,"[30] and it establishes control of Air Force assets under a central Air Force commander to direct those assets to best accomplish mission unity through mass and flexibility. This single air component commander can best balance long-term strategic requirements with urgent mission needs. The ability to collate prioritized air taskings at a single level is the cornerstone of centralized control. Similarly, the ability to balance air component command missions with the necessity to conduct short-notice urgent missions is the bedrock of decentralized execution.[31] The architecture of centralized control and decentralized execution is the actualization of historical experience; that airpower effects, as from a high demand yet low density asset, should be commanded by a single Airman, and that aerial assets should not be permanently assigned to singular units as they were prior to 1943. The continuing justification for employing this tenet is stated in USAF Doctrine 1: "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 the use

of a powerful, highly desired yet limited force."[32] The efficient use of airpower is concretely tied to the independence of the branch as elucidated by senior Allied air commander in North Africa, Air Marshal Sir Arthur W. Tedder, who argued "If your organization is such that your air power is divided up into separate packets and there is no overall unity of command at the top, once again you will lose your powers of concentration. Airpower in penny packets is worse than useless. It fritters away and achieves nothing... Its strength lies in unity."[33] This hard-earned reality is the acceptance that a single Airman is not capable of making every decision alone and therefore should empower subordinates to act in accordance with command intent.

Although the Air Force command tenet has worked well in the historical frame of singular air campaigns, as the United States faces rising threats from peer and near-peer adversaries for the first time in several decades, A2/AD areas and multi-domain contested environments require increased dependence on a unified command response across the entire spectrum of conflict. The impacts of the dichotomy between centralized command and tactical initiative contain the largest implications for operational tempo and qualitative tactical initiative. The current implementation of command doctrine lacks the flexibility required to conduct missions across multiple domains simultaneously in contested environments, and therefore the Air Force must re-evaluate its Tenet of Airpower, centralized control and decentralized operation, to meet the requirement to operate synchronously with the other services in all domains of warfare. In anticipation of a near-peer enemy, this revision must account for the challenges of degraded communications ability and intelligence retrieval, allow the distributed coordination of air assets for joint force operations, increase tactical initiative, and accelerate decision-making in contested environments.

Challenges to Air Force Command and Control Structure

Aside from some of the long-standing challenges to the concept of centralized control and decentralized execution, this tenet becomes even more challenged when considering the future contested nature of warfare, specifically with the increased communications and ISR requirements, in addition to the accompanying high likelihood of significant network degradation and the limited bandwidth during high-end operations. Current Air Force command and control is centered around deliberate planning and increasing battlefield awareness; future Air Force command and control must be focused more on the changing command relationships between tactical and operational leaders in a dynamic give-and-take relationship, possibly without communications.[34] Thus, fielding new technologies alone will not be enough for JADC2 advances to succeed; changes in concepts of operation, authorities, and organizational constructs will also be needed.[35]

This will be a major paradigm shift for the Air Force to embrace as uncontested operations have become the operational norm. Rapid technological advances in bandwidth and ISR over the previous several decades have been eagerly employed under the paradigm in which the command and control of air operations is concentrated in the Air Operations Center (AOC) under the Joint Forces Air Component Commander (JFACC), and execution of tasking is accomplished across subordinate nodes.[36] The AOC commander is responsible for managing operations, establishing battle rhythms, and planning, coordinating, executing, and assessing air operations based on JFACC or Combined Forces Air Component Commander guidance.[37] Based on the decades of permissive operations, as well as the possibility of increased battlespace awareness that comes with technological JADC2 advances, it will be easy for the operational-level JFACC to assume tactical-level involvement in operations, even so far as directing

individual aircraft.[38] This highly detrimental practice in wars against near-peer enemies where the pace of operations and the degradation to command and control structures will be an ever-present reality would significantly degrade tactical initiative. Two challenges of the current AOC construct of great concern and worth special mention are the speed of the current planning process and the focus on deliberate planning. The AOC works through a continuous and cyclical 72-hour deliberate planning cycle, which works well in stable steady-state operations such as when the Air Force is executing strictly Air Force missions, in uncontested environments, and when portions of joint operations missions are distributed across participating services. This three-day planning cycle, however, will have increased difficulty in matching a near-peer adversary's dynamic operations, resulting in challenges in keeping tactical initiative over an enemy. Mitigations to the challenges of the rigid planning cycle are capitalized through the previously mentioned JADC2 technological advances.

An additional concern is the command mentality of the JFACC and subordinate commanders. For years, these commanders have enjoyed a relatively high level of freedom of information, the ability to reach from the operational to strategic levels, and the assumption that the transmission and receipt of air tasking orders was assured. Most critically, this sliding command spectrum through command levels will not be possible in the future contested environment and communications will not always be guaranteed; this will be a difficult transition mentally for many commanders to make. Currently, the implemented degree and level of centralization and decentralization depends more on the political or strategic consequences of tactical actions than it does on the action itself;[39] however, future decision-makers will not have this luxury.

Another one of the challenges to JADC2 identified by The MITRE Center for Technology and National Security is that of service-based authorities and operations. Simply put, each service has historically shown an aversion to sharing capabilities and assets between branches, which will prove incompatible with JADO requirements. Not only is handing assets from one service-based commander to another an unfamiliar way of waging war, but the current service organizational structures and incongruent command methodologies would also make it an ineffective way of fighting.[40] One such area of authorities that needs evaluation is at what level, and by which service, future airpower assets will be apportioned (distribution-based) and allocated (numbers-based). None of these issues can be fully solved without evaluation of and revisions to service command philosophies.

Evaluation of Military Service Command Philosophies

To optimize JADO and fully exploit the advantages of joint interoperability, the Air Force needs to examine how well its current command doctrine integrates operations with other services and evaluate the practices of other services that would be beneficial for the Air Force to adopt in integrating command principles throughout JADO. Each military branch has a unique doctrinal command tenet to maximize service-specific force employment and unity of effort across the dominant domains of influence. The Air Force's *Air Force Doctrine 1, Basic Doctrine* utilizes "centralized control and decentralized execution,"[41] the Department of the Army's *Army Doctrine Publication 6.0, Mission Command: Command and Control of the Army Forces* applies "mission command,"[42] The Navy Service's *Navy Warfare Publication 3-56* employs "composite warfare command,"[43] and the Marine Corps Service's *Marine Corps Warfighting Publication 3-20* uses "centralized command and decentralized execution."[44] These publications proclaim each

service's core command tenet with explanations regarding service intent in implementation, delegation authorities, and command responsibilities.

While both the Marine Corps' and the Air Force's philosophies support the idea of a centralized command authority, the methods for achieving this are vastly different. The Air Force philosophy focuses central control of assets and planning under a single JFACC commander. Conversely, the Marine Corps emphasizes blending of positive and procedural control under the Marine Air Command and Control system with an emphasis on the means to control assets at the Aviation Combat Element level.[45] This employment of decentralized execution is performed to achieve a more effective integrated span of control, responsiveness, and tactical flexibility than the Air Force's positive control and deliberate planning methods.[46] However, in consideration of JADO, the Marine Air-Ground Task Force does not have the capabilities to support all joint air operations in its area of operations, so future warfare under this construct would continue to limit command and control methods, including continued separate service areas of operations, and this command construct is incompatible in JADC2.

Similarly, the Army's axiom of mission command aims to empower subordinate decision-making appropriate to the situation and in line with command intent. This is based on the premise of the primacy of proximity, whereas tactical-level commanders very often have better battlefield situational awareness in dynamic situations and are therefore more likely to capitalize on instances inviting tactical initiative if allowed to make decisions and act based on commander's intent.[47] Conversely, the Air Force's focus on deliberate planning and higher-level real-time control of forces contrasts with the Army's linear, functionally oriented command structure. Mission command of this sort requires several qualifications to be successful, including robust command intent down the chain, the authority and responsibility for subordinate

commanders to act with disciplined initiative, and mutual trust. Since the Army is structurally organized as a self-similar organization, whereas subordinate commands are smaller versions of higher echelons, mission command works well when operating within its own organizational structure but would have difficulty integrating joint assets with individual service forces.[48]

The Navy has arguably come the furthest in adapting its command tenet, Composite Warfare Commander (CWC), to the future joint fight. With its traditional role of power projection in over-the-horizon operations with limited or no mainland communications, the Navy has historically operated under the tradition of UNODIR (Unless Otherwise Directed), which is the first example of mission-type orders and is an example of how future warfare may be waged again in non-permissive physical and electromagnetic environments. The modern CWC doctrine utilizes the philosophy of decentralized execution through authoritative subordinate warfare commanders who are focused on separate air, strike, sea, and surface information environments.[49] Through a decentralized command with centralized authority scheme, the Navy organizes at the tactical level by focus, command function, and responsibility for combat operations against multiple targets and threats simultaneously. Much like mission command, the Navy's method of planning, control, and execution empowers subordinate commanders with not only the flexibility and initiative but also the authority and responsibility to execute the CWC's intent by framing the desired outcomes from each respective warfare area to overall mission success without directing the subordinate warfare commander's actions or methods. The recent modifications to CWC doctrine demonstrate a shift in naval perspective of its command and control requirements to fit within a joint force operational environment. In cases of asset distribution or allocation conflicts, authority lies with the CWC for final deconfliction based on urgency and overall mission priorities. Contrary to the Air Force's distribution and allocation

scheme, with ultimate air tasking occurring at higher headquarters, the CWC structure gives authority of individual ships and aircraft to the warfare commanders, and these warfare commanders may be given broad authority by the CWC to diverge from previously established plans if they believe circumstances require deviation.[50] The CWC concept still has incongruencies with a parallel Air Force command structure model, however, as the CWC doctrine is designed for macro-level operations. Operations on a smaller level doctrinally become more convoluted as these may necessitate an additional Officer in Tactical Command to independently fulfill all sea control functions. Ultimately, scale of operations and individual mission parameters still determine the degree to which the CWC doctrine is employed.

Despite the nuances of each tenet, there are several useful analogous themes throughout the collective doctrines. For example, each tenet advocates empowering the lowest echelon commander with authority to seize effective tactical initiative,[51] and essentially, each doctrine leans towards advocating for enacting mission-type orders through deliberate and resilient commander's intent statements for contingency situations.[52] Each doctrine, however, focuses on establishing individual service unity of command and unity of effort,[53] with a focus on the notional organization of assets and personnel only under each service's own command structure.[54]

Although many of the service command tenets utilize similar-sounding language to describe command relationships, there are several incompatibilities in areas related to organizational hierarchical structures, methods for employing supporting and supported assets, and employing flexibility to gain tactical initiative between these doctrinal concepts. First, the differing perspectives of command and control in each service reflect biases. While the Marine Corps, Army, and Navy doctrine each focus aviation assets towards a supporting role to their

respective forces, Air Force doctrine focuses on six key independent capabilities: air and space superiority, global presence, rapid global mobility, precision engagement, information superiority, and agile combat support.[55] While the Marine Corps, Army, and Navy independently distribute and allocate their aviation forces in relation to the missions of the other service component forces, the Air Force uses its force to singularly affect mission elements independently. This doctrinal difference is one of the reasons why the human factors of integrating all services into JADO under a common JADC2 function will prove difficult.

Recent scholarly articles have questioned whether the service command tenets will permit optimal interservice cooperation. For instance, pushback against the Air Force's command tenet focuses on problems of the distribution of scarce assets in the face of increasing demand for utilization.[56] The Air Force tenet does not overtly address operations in contested operations and the need for increased tactical initiative, and what this means for asset allocation or command hierarchy.[57] Similarly, Army mission command is not universally applicable to all mission sets and functional force areas, and in some cases it may be counterproductive to success either due to function or poor application practices.[58] As an example, the allowance mission command makes for innovation and risk, and the consequent potential for mistakes makes it an improbable candidate for nuclear security units where consistency and uniformity are desirable traits.

While examining the current literature regarding these command tenets, several theoretical holes are evident. First, insufficient literature describes how the Air Force's command doctrine will integrate asset distribution and control between services participating in JADO. Furthermore, command doctrine does not address employing command principles in a contested environment where the tendency is for higher echelon commanders to retain substantial

command authority despite a high likelihood of an inability to communicate and an overwhelming requirement for quick decision-making. Additionally, there is a conspicuous lack of practical direction towards proper employment of these principles in dynamic situations, resigning the totality of implementation to an individual commander's preference and personality.

Finally, service command philosophies in general lack a unifying response to operations in contested environments. Incorporating considerations of contested domain warfare into analysis of command doctrine is critical as services integrate more completely into JADO. Although there is considerable emphasis on considering contested domain warfare in other aspects of joint operations (such as in communication integration, intelligence collection and dissemination, and in hardening of software defenses), there is little correlation or consideration for redefining command doctrine to cope with the contested nature of future warfare in all domains. Significantly lacking from culminating research is a reevaluation of these command tenets to increase efficiencies, drive tactical initiative, and coordinate inter-service integration in contested domain warfare—the central element of which is command and control through mission-type orders.

The Way Forward: Mission-Type Orders

The common theme of mission-type orders surfaces in various forms when comparing each service's command and control doctrine. Traditional mission orders focus attention on the communication of senior commander's intent down to subordinate commanders, which remains a critical aspect of centralized command. However, mission-type orders seek to enhance the reciprocal command relationship by emphasizing feedback up from subordinate commanders that increases senior leaders' situational awareness to help better define their guidance for

successive efforts.[59] Additionally, mission-type orders may be the unifying concept that could act both as a ladder and a bridge to connect every service in JADO. The ladder is the concept that all services, after waging uncontested aerial warfare for so long, need a catalyst out of the pit of commander overreach. The bridge is the effect that each service is independently recognizing that in a new contested environment, the freedom of communications and bandwidth enjoyed for several decades will likely not be a reality in future war against a peer threat. Swiss General Baron Antoine-Henri Jomini foresaw this modern difficulty when he stated: "A general whose genius and hands are tied by an Aulic council five hundred miles distant cannot be a match for one who has liberty of action, other things being equal."[60] Mission-type orders are the solution to the issue of direct strategic command described by General Jomini, yet the concept is significantly lacking in Air Force application.

The fact that this concept has not been instilled in Air Force doctrine is demonstrated poignantly in its marginal inclusion of mission-type orders, whereas the term only appears in command annex publications.[61] Perhaps this is deference to joint publications, which speak on joint command and control, like the Air Force doctrine update to Joint Publication 3-30, which states that mission-type orders is the joint approach to centralized control and decentralized execution.[62] If true, this has driven an ignorance of mission-type orders until serving in a joint capacity, or until mentorship of a joint nature has matured, or without independent research on higher leadership forms.

Mission-type orders provide a possible new avenue for encouraging service interoperability and overcoming the challenges associated with command and control in contested domain warfare. The associated concepts of mission-type orders (clearly defined authority, roles, and responsibilities; timely communication, decision making, and coordination

mechanisms; and mutual trust, understanding, and intent) demand conscious development as an appropriate progression towards more agile, flexible command and control in an era of increasing threats and accelerating information velocity. This additional aspect of Air Force command doctrine should apply the three predominant command and control concepts as proposed by the Joint Staff J7 including simplicity, span of control, and interoperability to verify its effectiveness.[63]

No service doctrine except mission-type orders fits the unique mission requirements of the Air Force, and no other doctrine can account for mission success in future warfare. In evaluating each service's command philosophy and its applicability to utilization of airpower, the answer to Air Force operations in the future environment of degraded communications and broadband denial is through mission-type orders. Although not a panacea, executing mission-type orders under a construct of centralized control and decentralized execution has several benefits that break the current framework of performance perfection and extreme risk aversion. Mission-type orders empower decentralized leaders with decision authority to pursue tactical advantages in accordance with commander's intent in an environment with likely degraded communications. Mission-type orders focus on dutiful (versus disciplined) initiative, taking advantage of the primacy of proximity, allowing for increased risk acceptance based on stated desired outcomes, increasing decision discernment through pattern recognition and preplanned responses, and increasing trust and mutual understanding. It promotes coherence of action among decentralized decision makers, even in degraded communications environments, by identifying operational purpose.[64] Successful execution of mission-type orders depends on the quality of commander's intent, trust between command echelons, and a command and control architecture that rewards risk acceptance within commander's intent. Within these factors, the Air Force will

maintain a high operational tempo and tactical initiative in the future contested environments of JADO.

Commander's Intent

Commander's intent is one of the critical aspects of mission-type orders that enables shared understanding of desired strategic outcomes for the application of airpower to achieve the desired end state. Understanding equips decision makers at all levels with insight and foresight required to make effective decisions, to manage associated risks, and to consider second and subsequent order effects. It provides for a shared context which is a critical enabler to conveying intent.[65] Through a robust understanding of commander's intent, mission-type orders emphasize timely decision-making through a distributed command structure of dutiful initiative. This dutiful initiative is a key distinction above disciplined initiative; whereas dutiful initiative inherently is the responsibility to proactively pursue objectives within commander's intent, disciplined initiative is rather a passive approach to risk aversion in operations. Dutiful initiative obliges subordinate commanders to capitalize on tactical advantages and is beneficial for quickly directing actions in response to emerging conditions in warfare. Commander's intent will become even more critical in the future nature of warfare in contested domains with denial or degradation of communications and intelligence where collaboration with higher commands may not be prompt, or even possible. By not only allowing, but requiring, commanders to respond proactively, tactical level units will be able to take advantage of enemy mistakes and capitalize on fleeting opportunities to ultimately provide operational-level unity of effort.

Navy Warfare Publication 3-56 *Composite Warfare* sums up the goal of commander's intent within mission-type orders, "This type of order and execution provides the tactical commander the freedom to execute his preplanned actions and orders, not dependent on direction

from leadership or having to seek additional approvals. The approval to execute is implicit in the preplanned response actions and orders that enable leadership the ability to negate or modify if required by circumstances dictated within the situation [and] rules of engagement."[66] Ultimately, higher echelon commanders who are unwilling to distribute command responsibility through mission-type orders to the lowest echelons with the greatest ability for tactical initiative will limit the strategic capability of airpower to execute a coherent, purposeful plan.[67] The tendency of higher-echelon leaders to make decisions several levels down the command chain due to a high confidence of intelligence fidelity can have a detrimental effect on tactical initiative, especially during periods of rapidly changing information. As then-General James Mattis stated, "Digital technologies do not dissipate confusion; the fog of war can actually thicken when misinformation is loudly amplified."[68] One method to empower decentralized execution through concurrent changes to the battlespace is through Commander Action Messaging that updates specific responsibilities and expectations for all subordinate commanders; in this way tactical-level component commanders are empowered to make operational decisions.[69] Commander's intent is worthless without trust, however, when tactical commander decisions may have strategic-level ramifications in the political, informational, economic, and military domains of statecraft.

Trust Between Commanders

Whereas command intent provides a clear and concise expression of the purpose of the operation and the desired military end state, intent fuses understanding, assigned mission, and direction to subordinates, which breeds the trust that is required at every echelon of the force. Another quote from General Mattis is that "Operations occur at the speed of trust."[70] Coupled with shared understanding and intent, trust is the moral sinew that binds the distributed force,

enabling the many to act as one in the cross-domain application of the appropriate amount of cumulative combat power at the right place and time.[71]

Without the trust from higher-echelon commanders that subordinate commanders will act within command intent, will consider the larger operational and strategic environment prior to issuing orders, and will maintain dutiful initiative to consider the impacts of utilizing a low-density asset, those higher commanders will not be apt to distribute command authority through command intent. Much has been written on the value of trust in leadership; however, the military question remains: how is trust built when higher commanders may not have met or worked with their subordinate commanders previously? Trust without acquaintance can be forged in three distinct ways: through common operating paradigms, through similar training and education, and through preplanned crisis responses. All of these will need to converge for trust, and for the mission-type orders construct to succeed in warfare.

Common operating paradigms. Common operating paradigms help to manage and communicate operational and strategic-level commander expectations, while providing stability to the tactical-level commanders when employing airpower in a joint force. Common operating paradigms include both interservice methods of integrating airpower effects and intra-service doctrinal paradigms of airpower tactical employment. Common operating paradigms increase trust between command echelons through creating a common foundation of understanding and intent. It is important, but not solely sufficient, to have an education in strategy; the actions of a leader must incorporate shared joint paradigms to increase interservice predictability, especially when operating in a communications-denied environment. Paradigm drift between services, which is the differing views of how and why airpower is employed in modern warfare, causes dissidence between strategic goals even though many interservice capabilities and missions

intersect in common domains. To fully attain a trust relationship between command levels, a single joint airpower operating paradigm in JADO is crucial. Parts of a common operating paradigm are encapsulated in shared professional military education outcomes and in widely understood and practiced preplanned responses, both of which vastly increase trust between command echelons.[72]

Similar training and education. As mentioned previously, similar training and education is part of what creates a common operating paradigm through commonalities in planning, utilization, and structure. Military training and education, when conducted in alignment with joint strategic outlooks, develops the habits of mind central to the profession.[73] Robust training and education programs develop wider expertise, an operationally relevant strategic outlook, and flexibility across a range of areas. The intangible benefits also include the instilling of intellectual proclivities that enable commanders to collectively anticipate and adapt to emerging changes.[74] Similar military education across all services helps leaders develop skills to quickly comprehend new and challenging situations, to rapidly build relationships and trust with mission partners, and to demonstrate competence and confidence in applying the innovative and adaptive solutions required to operate in contested environments.[75] Education and training is not just about head knowledge, but it is about the iterative process of evaluating common problems and amalgamating similar solutions to future problems that build pattern recognition and strengthen synaptic bridges. Robust synaptic bridges enable commanders to rapidly solve iterative problems correspondingly to those possessing similar education and training, which builds trust. In parallel with common training and education, preplanned responses also help create unity of effort, shorten decision-making processes, and increase maneuverability.

Preplanned responses. Another area key to the success of mission-type orders is the development of preplanned responses. Preplanned responses provide a known solution to likely and dangerous contingency situations in case of degraded communications ability. Preplanned responses provide criteria for triggered responses based on mutually understood higher-level command intent. Preplanned responses by design initiate autonomous action from tactical commanders without necessitating further communication with higher echelon commanders. Because preplanned responses provide clear understanding of the commander's intent, they facilitate common understanding, reduce the possibility of confusion, and increase the effectiveness of operations, especially when operating in potentially denied or degraded environments.[76] Although preplanned responses cannot answer every instance of command by negation (for example, in nuclear operations), these can help codify objectives within command intent. Preplanned responses find intrinsically high value when aimed at strategic results; effective preplanned responses allow tactical efforts for strategic effects in regulated ways in line with command intent. In the case of tactical decisions, which may have national-level impact that require an immediate response, or those without higher echelon commander communications, preplanned responses will assure that lower echelon command orders are in line with ultimate command intent. In deliberate and crisis planning, command and control should be a part of preplanned contingency responses, both in branches and sequels. Concrete command and control constructs and methods dependent on likely scenarios and outcomes with associated transitions of responsibility and accountability should be planned to avoid lagging progressive developments.[77] Additionally, preplanned responses should account for a lack of information or communication; a poignant illustration of this necessity is the critical vulnerability of collocating AOC systems and personnel in a forward-deployed and centralized facility.[78] Preplanned

responses rely on the robust processes of deliberate planning and wargaming vulnerabilities in non-contested environments to mitigate the thrash associated with lower echelon commanders having to make every decision unaided in a crisis environment. Similar to a quick reaction checklist for aviators, these preplanned responses will widely communicate command intent on a variety of most likely and most dangerous situations, will increase trust between command echelons, and will enable greater risk acceptance through dutiful initiative.

Risk Acceptance

For mission-type orders to be effective, commanders must exercise dutiful initiative and accept prudent risk in accordance with command intent. The Air Force culture, like other services, remains risk averse and focused on creating a zero-defect environment. The current construct of the AOC with its central JFACC has enjoyed decades of uncontested operations, which has bred an outmoded culture of commander-centric processes and hierarchical power structures discouraging risk acceptance at lower echelons. Air Force leaders continue to default to detailed command due to the relative freedom of communications currently enjoyed. The combined effect of these cultures and mentalities will destabilize mission-type orders in contested environments.[79] Enacting mission-type order requires not only an allowance for risk, but moreover a dutiful risk acceptance in appropriate situations (as outlined in preplanned responses or in Commander Action Messaging). By distributing control through mission-type orders, the overall threat level is reduced, limiting vulnerabilities and establishing common supporting relationships across all domains of contested warfare.[80] While higher risk acceptance would not be appropriate for all situations (such as the previously discussed nuclear operations, or missions with declared objective strategic impact), by mandating tactical initiative through mission-type orders, joint services will be more able to work collaboratively in JADO.

Conclusion

The fundamental command tenet of centralized control and decentralized execution has been the command and control structure of Air Force air operations since prior to the service activating in 1947. Although that command tenet remains viable, the current construct of command and control will be insufficient to take advantage of tactical initiative in environments of degraded communications and limited bandwidth. The technological advances in JADC2 and the future operating requirements in JADO necessitate evolving distributed command authorities through a mission-type orders construct. This focus will enable a flexible command and control construct in an era of increasing threats, accelerating information velocity, and increasing denial of traditional command and control methods and structures. Mission-type orders, a doctrinal evolution deeper into the current centralized control and decentralized execution construct, will enhance unity of effort across the joint force to efficiently utilize JADC2 advances in a reciprocal trust relationship between command hierarchies. This trust will be further developed though joint common operating paradigms for the combined use of airpower, standardization in training and education programs focusing on dynamic problem solving and measured control responses, and through mutually understood preplanned responses that will enable tactical level commanders to direct strategic effects. Mission-type orders additionally will necessitate increased risk acceptance through the previously mentioned control methods, which will all contribute to trust and mission accomplishment in line with command intent. Through restructuring its doctrinal implementation of centralized control and decentralized execution by embracing mission-type orders in a similar paradigm to other services, the Air Force will give maximum tactical initiative to the lowest echelon commanders when executing joint missions in a contested environment across all domains.

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