The Command and Control of Convergence during Joint All-Domain Operations

A Monograph

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Militaries throughout the world have sought to improve organizational synchronization and integration since at least Napoleon's establishment of the Corps d'Armée in 1805. Convergence, from this perspective, is no different. Achieving it on the battlefield, however, depends on the development of an informed, collaborative, and purposeful Joint Force C2 system. Setting conditions to develop a C2 system with these characteristics starts by reconceptualizing the organization of the Joint Force, how it trains, and how it develops leaders. Through these efforts, the Joint Force can achieve an all-domain unity of effort—enabled by an informed, collaborative, and purposeful C2 system—that will allow it to effectively compete, deter, and win in the complex operating environments of today and tomorrow.

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Abstract

The Command and Control of Convergence during Joint All-Domain Operations, by MAJ Franklin G. Peachey, 60 pages.

Militaries throughout the world have sought to improve organizational synchronization and integration since at least Napoleon's establishment of the Corps d'Armée in 1805. Convergence, from this perspective, is no different. Achieving it on the battlefield, however, depends on the development of an informed, collaborative, and purposeful Joint Force C2 system. Setting conditions to develop a C2 system with these characteristics starts by reconceptualizing the organization of the Joint Force, how it trains, and how it develops leaders. Through these efforts, the Joint Force can achieve an all-domain unity of effort—enabled by an informed, collaborative, and purposeful C2 system—that will allow it to effectively compete, deter, and win in the complex operating environments of today and tomorrow.

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Abbreviations

A2/AD	Anti-Access and Area Denial
ABMS	Advanced Battle Management System
AFFOC	Air Force Future Operating Concept
C2	Command and Control
CCJO	Capstone Concept for Joint Operations
CJADC2	Combined Joint All-Domain Command and Control
CVBG	Carrier Battle Group
DMO	Distributed Maritime Operations
EMS	Electromagnetic Spectrum
GIO	Globally Integrated Operations
ITO	Integrated Tasking Order
JADC2	Joint All-Domain Command and Control
JADO	Joint All-Domain Operations
JADTF	Joint All-Domain Task Force
JCEO	Joint Concept for Entry Operations
JOAC	Joint Operational Access Concept
JPME	Joint Professional Military Education
JTF	Joint Task Force
JTFPM	Joint Task Force Panama
JTFSO	Joint Task Force South
MDB	Multi-Domain Battle
MDC2	Multi-Domain Command and Control
MDO	Multi-Domain Operations
MDOC	Multi-Domain Operations Center
MDSC	Multi-Domain Synchronization Cycle

MDTF	Multi-Domain Task Force
MMDO	Concept for Maneuver in Multi-Domain Operations
MOC	Marine Corps Operating Concept
NDS	National Defense Strategy
OE	Operating Environment
ROE	Rules of Engagement
SOUTHCOM	US Southern Command

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Introduction

> Joint and Service concepts are built on the foundational idea that the Joint Force requires synchronized all-domain operations to win in a contested operating environment.
>
> —Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3030.01

In this era of great power competition, US adversaries seek to achieve their ends while staying below the threshold of war. However, if armed conflict with a near-peer adversary does occur, they will seek to contest Joint Force operations in all-domains—land, sea, air, space, and cyberspace—and the electromagnetic spectrum (EMS) of the operating environment (OE), to set conditions to achieve a *fait accompli* attack.[1] A contested OE will include multiple stand-off layers, enabled by numerous enemy anti-access and area denial (A2/AD) capabilities. These capabilities, designed to inflict unacceptable losses, will also seek to separate the "elements of the Joint Force in time, space, and function," thereby preventing unity of effort and forcing an episodic commitment of its capabilities.[2]

To overcome these challenges, the Joint Force is developing the joint warfighting concept of Joint All-Domain Operations (JADO), which seeks to rapidly employ kinetic and non-kinetic effects in decisive spaces by converging capabilities from across the Services and their mission partners.[3] These converging effects will penetrate layers of enemy stand-off and dis-integrate their A2/AD capabilities, enabling Joint Force exploitation (see figure 1). However, achieving convergence requires effective command and control (C2) that spans all domains and is capable

[1] US Army Training and Doctrine Command (TRADOC), TRADOC Pamphlet 525-3-1, *The US Army in Multi-Domain Operations 2028* (Fort Eustis, VA: TRADOC, 2018), 7.

[2] Ibid., vii.

[3] US Department of the Air Force, Air Force Doctrine Note 1-20, *USAF Role in Joint All-Domain Operations* (Maxwell Air Force Base, AL: LeMay Center for Doctrine Development and Education, 2020), 2. Joint All-Domain Operations are "comprised of air, land, maritime, cyberspace, and space domains, plus the EMS. Actions by the joint force in all domains that are integrated in planning and synchronized in execution, at speed and scale needed to gain advantage and accomplish the mission."

of gaining unity of effort across the Services and their mission partners. This study addresses those characteristics necessary for C2 to meet this requirement.

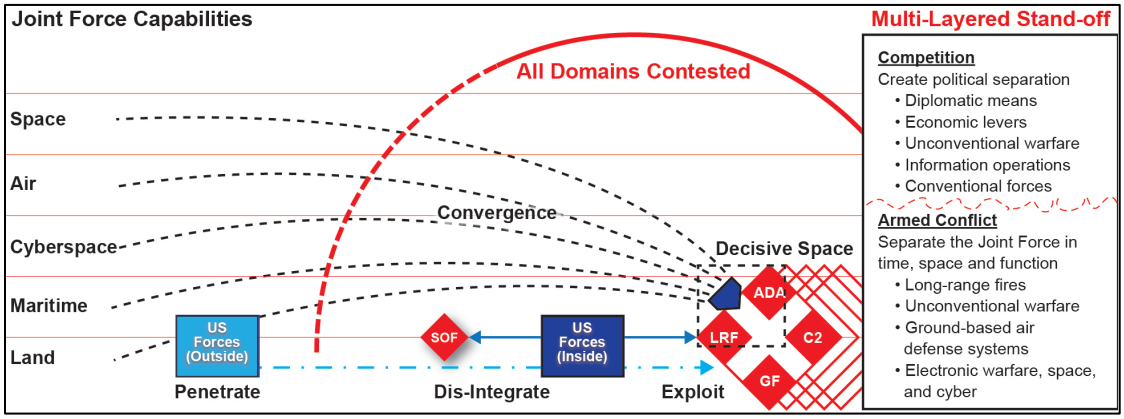

Figure 1. MDO Solutions. Adapted from US Army Training and Doctrine Command (TRADOC), TRADOC Pamphlet 525-3-1, *The US Army in Multi-Domain Operations 2028* (Fort Eustis, VA: TRADOC, 2018), 26.

Since the publishing of the *Capstone Concept for Joint Operations*: *Joint Force 2020* (CCJO 2020) in 2012, the Joint Force has progressively transitioned toward the concept of JADO. While the idea of "jointness" has existed for decades, the Department of Defense (DoD) and the individual Services have only recently looked beyond episodic cross-domain synchronization and capabilities integration. Since 2012, each Service, with varying degrees of collaboration with others, developed conceptual warfighting approaches to operate through cross-domain capabilities. However, as Lieutenant General Eric Wesley, former director of the US Army Futures and Concepts Center, stated, "you just can't have different services have their own MDO [Multi-Domain Operation] concepts and federate them together…this has to be a top-down effort."[4] To this point, one inextricable and urgent problem presents itself: how to effectively C2 the convergence of capabilities across domains and echelons to ensure Joint Force dominance in a contested OE.

[4] Kimberly Underwood, "The Army Shapes Joint All-Domain Operations," *SIGNAL Magazine*, AFCEA International, last modified July 28, 2020. Accessed 4 October 2020, https://www.afcea.org/content/army-shapes-joint-all-domain-operations.

Methodology

Although the Joint Force's Service-oriented approach to C2 successfully synchronized and integrated capabilities for decades, a Joint approach to C2 covering all domains is necessary to enable the convergence of cross-domain capabilities. This study assesses the characteristics of effective Joint Force C2 that enable convergence during JADO. This assessment begins by reviewing the conceptual frameworks leading to the JADO concept. It then outlines two historical case studies—the 1982 British Falklands Campaign and Operation Just Cause, executed by US forces in 1989—where C2 effectively enabled the employment of capabilities across domains and echelons. This study then assesses these case studies through a systems theory lens to answer the research question and draw organizational, training, and leader development implications for the Joint Force as it refines its ability to C2 convergence during JADO.

The systems theory lens employed in this monograph's analysis section uses Jamshid Gharajedaghi's iterative inquiry process outlined in his work, *Systems Thinking*. Gharajedaghi argues that this process enables a "satisfactory vision of the whole" when attempting to understand the complex interactions within a system, like those that enable C2 during combat operations.[5] Central to this theory is the argument that an "understanding of the whole [is] possible" by assessing the structure, function, and process within a system and the context within which it exists.[6] Each case study, along with information outlined in the literature review, covers these areas, providing a holistic lens to assess characteristics of C2.

The research necessary to conduct an adequate assessment in this monograph comes predominantly from digital sources due to ongoing travel and archival access restrictions. However, close and routine coordination with Army Futures Command (AFC) and the Combined

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[5] Jamshid Gharajedaghi, *Systems Thinking: Managing Chaos and Complexity – A Platform for Designing Business Architecture* (Burlington, MA: Morgan Kaufmann, 2011), 90.

[6] Ibid. "Structure defines components and their relationships, function defines the outcomes or results produced, process explicitly defines the sequence of activities and the know-how required to produce the outcome, and context defines the unique environment in which the system is situated."

Arms Doctrine Directorate (CADD) facilitated primary and secondary source research on C2 doctrine and future operating concepts. Also, the Combined Arms Research Library (CARL) provided access to the historiography and theory-based research essential to the execution of both case studies. To focus research, this study sets parameters by defining a research question that addresses the previously identified problem.

The Research Question

As the Joint Force develops supporting concepts and systems for JADO, it is important to address the following question: What are the characteristics of effective C2 that enable the convergence of capabilities across multiple domains and echelons during the penetration and dis-integration of an enemy's A2/AD array? As outlined in each Service's future operating concepts, the current literature provides a foundational understanding from each Service's perspective, but a historical analysis of C2 enabling past cross-domain operations supplements this. This historical analysis, conducted through two complementary case studies, will answer the subsidiary question of: What C2 characteristics historically enabled or hindered the synchronization and integration of capabilities across domains and echelons during the penetration and dis-integration of an enemy's A2/AD array? The research addresses a gap in the current literature about what characteristics of effective C2 enable convergence during JADO by answering these questions. Before proceeding, however, it is important to address the definitions of terms discussed in detail during the literature review, which are crucial to this study.

Key Definitions

The first term to outline, and most essential to this study, is C2. According to JP 3-0, *Operations*, "C2 encompasses the exercise of authority and direction by a commander over assigned and attached forces to accomplish the mission."[7] Inherent to this definition is a

[7] US Department of Defense, Joint Staff, Joint Publication (JP) 3-0, *Joint Operations* (Washington, DC: Government Publishing Office, 2018), III-2.

command concept for the operation, a system capable of refining and transmitting this concept, and an approach for operationalizing that transmission process, mission command being one example. The current concept for C2 within JADO, discussed further in the literature review, is the concept of Joint All-Domain Command and Control (JADC2).[8]

A second term crucial to this study is C2 system. Joint doctrine currently describes the C2 function as "commander-centric and network-enabled," meaning that while C2 revolves around the commander, it requires a C2 system to operate effectively.[9] According to JP 3-0, *Operations*, a C2 system consists of "facilities; equipment; communications; staff functions and procedures; and personnel essential for planning, preparing for, monitoring, and assessing operations."[10] It is important to note that C2 is a combination of commander and system.

Another term, specifically important to the findings section of this monograph, is collaboration. According to Army Techniques Publication 5-0.1, *Army Design Methodology*, collaboration is "two or more people or organizations working together toward common goals by sharing knowledge and building consensus."[11] Collaboration requires effective coordination, but coordination, by itself, is not sufficient to "identify and solve complex, ill-defined problems," which require the creation of solutions.[12]

To maximize the effect of all Services across all domains, the Joint Force employs convergence. While the term convergence means different things depending on the context in which it is used and is often phrased differently even within the same context, in this study, it refers to the "concerted employment of capabilities in multiple domains against combinations of

[8] US Air Force, Air Force Doctrine Note 1-20, 3. "JADC2 is conceptually equivalent to C2 of a single-Service component, while providing the framework, connectivity and infrastructure for C2 in all domains."

[9] US Joint Staff, JP 3-0 (2018), II-1.

[10] Ibid., III-10.

[11] US Department of the Army, Army Techniques Publication (ATP) 5-0.1, *Army Design Methodology* (Washington, DC: Government Publishing Office, 2015), 1-7.

[12] US Joint Staff, JP 3-0 (2018), II-5.

objectives to create effects against a system, formation, or capability."[13] A crucial component of this process is the achievement of cross-domain synergy—"the complementary vice merely additive employment of capabilities in different domains such that each enhances the effectiveness and compensates for the vulnerabilities of the others"—as first outlined in the 2012 Joint Operational Access Concept (JOAC).[14]

The first important term to understand in confronting and dominating a near-peer A2/AD array is penetration. While doctrine and conceptual documents do not define this term, it was first outlined in the JOAC as being "designed to disrupt the integrity of the enemy defensive system…by striking at critical hostile elements, such as logistics and command and control nodes, long-range firing units, and strategic and operational reserves."[15] The Army further refined the term with the publishing of its MDO concept in 2018. In this concept, the critical components of penetration include "neutralizing enemy long-range systems, contesting enemy maneuver forces, and maneuvering from strategic and operational distances."[16]

The second essential term to know in the defeat of an enemy A2/AD array is Dis-integration. Dis-integration, according to TRADOC Pamphlet 525-3-1, *The US Army in Multi-Domain Operation 2028*, is defined as "break[ing] the coherence of the enemy's system by destroying or disrupting subcomponents…degrading its ability to conduct operations while leading to a rapid collapse of the enemy's capabilities or will to fight."[17] While penetration provides an opening, dis-integration rapidly capitalizes on this opportunity to set conditions for Joint Force exploitation.

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[13] Richard Creed, Director – Combined Arms Doctrine Directorate, email message to author, August 13, 2020.

[14] US Department of Defense, Joint Staff, *Joint Operational Access Concept* (Washington, DC: Government Publishing Office, 2012), 40.

[15] Ibid., 24.

[16] TRADOC, TRADOC Pamphlet 525-3-1, viii.

[17] Ibid., GL-4.

Assumptions

There are two underlying assumptions to this study. The first assumption is that convergence is necessary to effectively penetrate and dis-integrate an enemy's A2/AD array to allow exploitation by the Joint Force. This assumption is based on a future OE, where the Joint Force must operate in a contested OE, spanning multiple domains, and the EMS, requiring expanded options. Convergence, through cross-domain synergy, "creates overmatch and multiple forms of attack create layered options across domains to enhance friendly operations and impose complexity on the enemy."[18] This approach, versus its single-domain or episodic alternative, helps provide the necessary windows of relative advantage for the Joint Force to exploit.

The second assumption is that a Joint approach to C2 is necessary to achieve convergence. While the current approach of episodically integrating specific cross-domain capabilities at a specific echelon for a specific mission was effective against the Joint Force's adversaries over the last forty years, will likely be insufficient in a fight against a peer threat. As Admiral Philip Davidson, current commander of the US Indo-Pacific Command, stated at the 2020 WEST conference, "In the past, we could afford to integrate from time to time across a domain. Today, we must be fully interoperable across all domains—all the time."[19]

Scope and Limitations

This monograph's scope spans the contextual development of the JADO concept components while specifically focusing on those characteristics of C2 that would be effective in enabling convergence against an enemy's A2/AD array. There are two significant limitations to the development of this monograph—time and classification. Due to academic time requirements

[18] TRADOC, TRADOC Pamphlet 525-3-1, x.

[19] Philip Davidson, "Transforming the Joint Force: A Warfighting Concept for Great Power Competition" (Prepared remarks) 2020 WEST conference. Accessed 15 September 2020, https://www.pacom.mil/Media/Speeches-Testimony/Article/2193614/transforming-the-joint-force-a-warfighting-concept-for-great-power-competition/.

for completion, this study's research extends only until the end of October 2020. A second limitation is the classification of some documents, such as the *National Defense Strategy* (NDS) and CCJO 2020, which prevents a full literature review and a reliance, instead, on unclassified summations. In addition, as many aspects of the JADO concept are still under development by both the Joint Staff and the various Services, there is a restriction on the release of some conceptual material, which limits or prevents their referencing for this monograph.

Delimitations

This study has two significant delimitations. The first is that this study only assesses the characteristics of C2 to enable convergence during the penetration and dis-integration of an enemy's A2/AD array. This study and its associated case studies do not delve into what characteristics of C2 may be necessary to facilitate convergence during competition or the exploitation of the enemy by the Joint Force. A second delimitation of this study is that it focuses on the conceptual development of JADO, and while this study draws heavily on the Army's MDO concept, it does not seek to specifically address any of the Services' future operating concepts in detail. With the problem identified and the parameters of this study outlined, it is now important to review the current literature available that impacts a study on the C2 of convergence during JADO.

Literature review

> We need purple command and control. It takes too long for us to do air command and control, and ground command and control, and navy command and control, and then try to come back together and talk about what we are going to do.
>
> —General James M. Holmes, *Air Force Doctrine Annex 3-1*

Introduction

Through a review of the literature, this chapter of the monograph outlines concepts crucial to the C2 of convergence during JADO and details literature key to the case studies. This review unfolds in four sections: a discussion of the JOAC, the CCJO 2020, and the Joint Concept for Entry Operations (JCEO); an overview of the future operating concepts of each service; a review of the Air Force's concept of JADC2 and the US Army Concept for Maneuver in MDO; and finally, a brief detailing of the key literature involved in the research of each case study. By reviewing these key documents, this study builds a foundational understanding of current Joint and Service concepts for confronting an adversary's layered A2/AD array through the C2 of convergence. However, before getting to these concepts it is essential to start with the Joint Force's modern foundational document—the Goldwater-Nichols Act.

Confronting A2/AD

The passing of the Goldwater-Nichols Act in 1986 transformed how the Services worked to achieve unity of effort. Instead of focusing on inter-service rivalries, the new structure emphasized the concept of the Joint Force. The cementing of the concept of jointness occurred over the subsequent three decades through training, education, and shared battlefield experiences. For example, the Army and the Air Force, during the 1980s, developed the AirLand Battle concept and effectively operationalized it dramatically during Operation Desert Storm. However, despite these spectacular results against a non-near-peer adversary, the integration and synchronization of capabilities across domains and echelons remained episodic. The subsequent

collapse of the Soviet Union and the military's involvement in various asymmetrical wars limited its emphasis on further large-scale streamlining of Joint Force capabilities.

By the late 2000s, the Joint Force realized that, while it deemphasized the development of conventional joint warfighting capabilities and concepts, its near-peer adversaries had redoubled their efforts. Instead of accepting US military dominance as status quo, adversaries developed and acquired advanced stand-off capabilities, capitalized on a reduced forward defense posture by the US, and expanded the battlefield in both space and cyberspace.[20] Through the employment of layered stand-off across domains, these advances enabled potential adversaries to challenge the future operational access of the Joint Force. To address this challenge, the DoD published the JOAC in 2012, crafting a central idea around leveraging cross-domain synergy to "establish superiority in some combination of domains that will provide the freedom of action required by the mission."[21]

While cross-domain synergy is a fundamental component of convergence, the JOAC also proposed precepts that influenced the developing ideas of convergence, penetration, and dis-integration. The first influential precept was that of "seiz[ing] the initiative by deploying and operating on multiple, independent lines of operations," which sought to enhance the exploitation of opportunities and mitigate risk to the force.[22] While this precept's distributed nature improves the survivability of the Joint Force, it requires the effective convergence of capabilities across domains and echelons to simultaneously improve its lethality. This combination of dispersion and lethality is a central tenant of the Navy's concept of Distributed Lethality (DL), covered later as part of the maritime future operating concepts.

A second precept central to the future development of the ideas of penetration and dis-integration was to "attack enemy [A2/AD] defenses in depth[,] rather than rolling back those

[20] US Joint Staff, Joint Operational Access Concept (2012), ii.

[21] Ibid.

[22] Ibid., 20-1.

defenses from the perimeter."[23] From this precept, the initial definition of penetration—detailed in the key definitions section—is derived and subsequently refined through the Army's MDO concept. Also, this precept's specific focus on an attack in depth, while reminiscent of AirLand Battle's focus on attacking the second echelon, shapes the conceptual discussion toward achieving capability convergence in decisive spaces across the battlefield.[24]

Shortly after publishing the JOAC, DoD published the CCJO 2020, which incorporated the ideas and precepts outlined in the JOAC while developing a conceptual framework for future Joint operations. Central to this framework, developed to sustain US global leadership, was Globally Integrated Operations (GIO).[25] The GIO concept "requires a globally postured Joint Force to quickly combine capabilities with itself and mission partners across domains, echelons, geographic boundaries[,] and organizational affiliations."[26] According to the CCJO 2020, the C2 requirement underlying this concept has various implications for future Joint Force development, to include Joint Professional Military Education (JPME), "cloud-enabled" C2 technologies, operations in a degraded OE, internal and external interoperability, mutually supporting command relationships, and integration with special operations forces.[27]

One of the Joint Force's primary missions within the GIO concept is to maintain the ability to "project power despite [A2/AD] challenges."[28] To maintain power projection, the GIO concept refers to the JOAC and the JCEO published in 2014. The JCEO concept complements the JOAC by focusing on the maneuvering of the Joint Force after achieving operation access. While

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[23] US Joint Staff, Joint Operational Access Concept (2012), 24.

[24] TRADOC, TRADOC Pamphlet 525-3-1, GL-3. Decisive Spaces are "Conceptual geographic and temporal locations where the full optimization of the employment of cross-domain capabilities generates a marked advantage over an enemy and greatly influences the outcome of an operation."

[25] US Department of Defense, Joint Staff, *Capstone Concept for Joint Operations: Joint Force 2020* (Washington, DC: Government Publishing Office, 2012), 1.

[26] Ibid., 4.

[27] US Joint Staff, Capstone Concept for Joint Operations: Joint Force 2020 (2012), 8-10.

[28] Ibid.

focused mainly on actions after successful Joint Force penetration and dis-integration efforts, this concept is important in its outlining of C2 structural requirements. These C2 requirements—habitual relationships, authority, interoperability, and mission command—are visible throughout most Joint and Service requirements leading to JADO.[29] These Joint concepts were instrumental in realigning the Joint Force's focus toward better synchronization and integration of capabilities across the Services.

Service Future Operating Concepts

In parallel and after the development of these Joint concepts, the individual Services developed and published their future operating concepts. The Navy initially published the concept of DL in 2015, before expanding it through the emerging concept of Distributed Maritime Operations (DMO). The Marine Corps created complementing concepts and published the Marine Corps Operating Concept (MOC) in 2016. Meanwhile, the Air Force published the Air Force Future Operating Concept (AFFOC) in 2015, and the Army developed its Multi-Domain Battle (MDB) concept in 2017. Subsequently, in 2018, the Air Force and the Army collaborated to refine MDB, resulting in the publication of the MDO concept. Finally, in 2020, the Space Force published its initial Spacepower capstone document, which focuses mainly on the Space Force vision while maintaining the operational concepts outlined within the AFFOC.[30] This section briefly reviews these concepts before analyzing ideas within the MDO concept in more detail.

The Navy designed its concept of DL around the objective of reasserting sea control.[31] Its key tenets include increasing the lethality of all warships, distributing combat power to "hold targets at risk from multiple attack axes," and achieving the "right mix of resources to persist in a

[29] US Department of Defense, Joint Staff, *Joint Concept for Entry Operations* (Washington, DC: Government Publishing Office, 2014), 14-15.

[30] US Department of the Space Force, *Space Capstone Publication: Spacepower* (Washington, DC: Government Publishing Office, 2020), 31.

[31] US Department of the Navy, *Surface Force Strategy: Return to Sea Control* (Washington, DC: Government Publishing Office, 2015), 19.

fight" across multiple domains.[32] The Navy's expanded concept of DMO focuses on "fleet-centric fighting power, enabled by integration, distribution and maneuver, [which] allows simultaneous employment of synchronized kinetic and non-kinetic mission execution across multiple domains in order to fight, and win in complex contested environments."[33] In support of this concept, and toward a "coherent and fully integrated Naval Force," the MOC focuses on "maneuver warfare in every dimension" and "combined arms in all domains."[34] While not using the same terms as those used in the Joint concepts, there is a clear continuity of thought linking these maritime future operating concepts to the Joint ideas and precepts.

The central idea of the 2015 AFFOC is the achievement of operational agility through flexibility, speed, coordination, balance, and strength.[35] The facets of flexibility and coordination, specifically, are crucial to linking this central idea to the Joint concepts. The Air Force describes flexibility as manifesting itself as integrated operations across multiple domains, which "encompass full interoperability among air, space, and cyberspace capabilities so that the combined effect is greater than the sum of the contributing parts."[36] The idea of integrated multi-domain operations incorporates cross-domain synergy in three of the five domains and plays a central role in the initial development of multi-domain concept among the Services.

Just as important as flexibility, coordination manifests itself in a similar multi-domain fashion through dynamic C2. Dynamic C2, according to the AFFOC, "should exist across all components of the joint or combined task force, enabling any component to assume a supported

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[32] Ibid., 10.

[33] Lyla Englehorn, "Distributed Maritime Operations, Warfare Innovation Continuum, Workshop September 2017: After Action Report." (Monterey, CA: Consortium for Robotics and Unmanned Systems Education, Naval Postgraduate School, 2017) 12.

[34] US Department of the Navy, *Marine Corps Operating Concept: How and Expeditionary Force Operates in the 21st Century* (Washington, DC: Government Publishing Office, 2016), 4 and 8.

[35] US Department of the Air Force, *Air Force Future Operating Concept: A View of the Air Force in 2035* (Washington, DC: Government Publishing Office, 2015), 7.

[36] Ibid., 8.

or supporting role[,] depending on the circumstances."[37] The idea of dynamic C2 closely aligns with the C2 structural requirements outlined in the JCEO and played a significant role in the refinement of the Army's MDB concept into the MDO concept.

To address a contested OE and achieve synergy across domains, the Army initially published the concept of MDB, and the central idea included the effective calibration of force posture, the employment of resilient and cross-domain capable formations, and the converging of capabilities across domains.[38] While the MDB concept did not establish a specific operating concept for addressing an adversary's A2/AD array, the idea of capability convergence was an evolutionary step in employing cross-domain synergy. Capability convergence, as outlined in the MDB concept, "produces physical, virtual, and/or cognitive windows of advantage that provide the freedom of maneuver required for forces to defeat adversary systems and ultimately achieve friendly objectives" (see figure 2). The ability to converge capabilities across domains and echelons became a central feature of the Army's MDO concept.

[37] US Air Force, Air Force Future Operating Concept, 9-10.

[38] US Army Training and Doctrine Command (TRADOC), TRADOC Pamphlet 525-4-1, *Multi-Domain Battle: Evolution of Combined Arms for the 21st Century* (Fort Eustis, VA: TRADOC, 2017), 21.

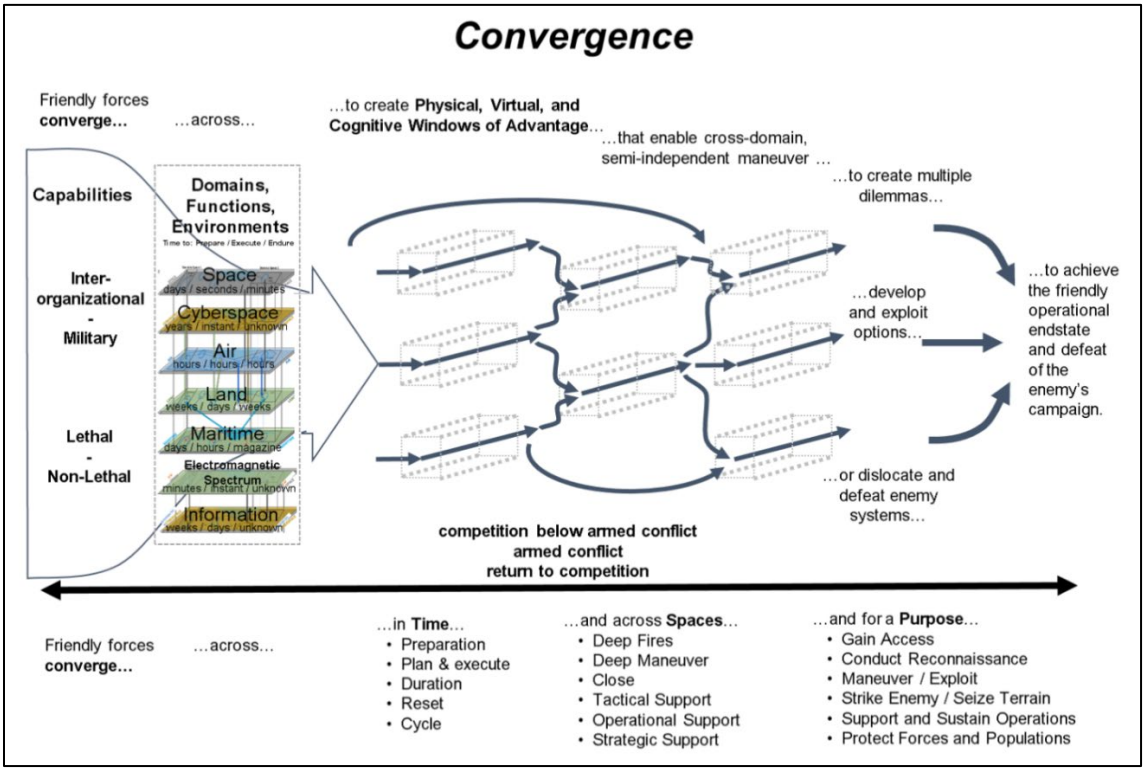

Figure 2. Convergence. US Army Training and Doctrine Command (TRADOC), TRADOC Pamphlet 525-4-1, *Multi-Domain Battle: Evolution of Combined Arms for the 21st Century* (Fort Eustis, VA: TRADOC, 2017), 27.

Through collaboration with the Air Force, the Army refined its MDB concept to specifically address an adversary's ability to establish layered standoff. The central idea of the MDO concept is to confront this problem through "rapid and continuous integration of all domains of warfare," and if necessary, to "penetrate and dis-integrate enemy [A2/AD] systems" to allow Joint Force exploitation.[39] The MDO concept envisions this process through tenets similar to those outlined in the MDB concept: calibrated force posture, multi-domain formations, and convergence.[40] It refines the tenet of convergence specifically to leverage two advantages over single-domain alternatives—the creation of overmatch through cross-domain synergy and the creation of layered options across domains through multiple forms of attack (see figure 3).[41]

[39] TRADOC, TRADOC Pamphlet 525-3-1, iii.

[40] Ibid.

[41] Ibid., x.

These multiple forms of attack, enabled by convergence, consist of stimulate-see-strike or see-strike combinations executed through cross-domain fires and maneuver.[42] The MDO concept then outlines how these advantages are employed to defeat an adversary's layered standoff.

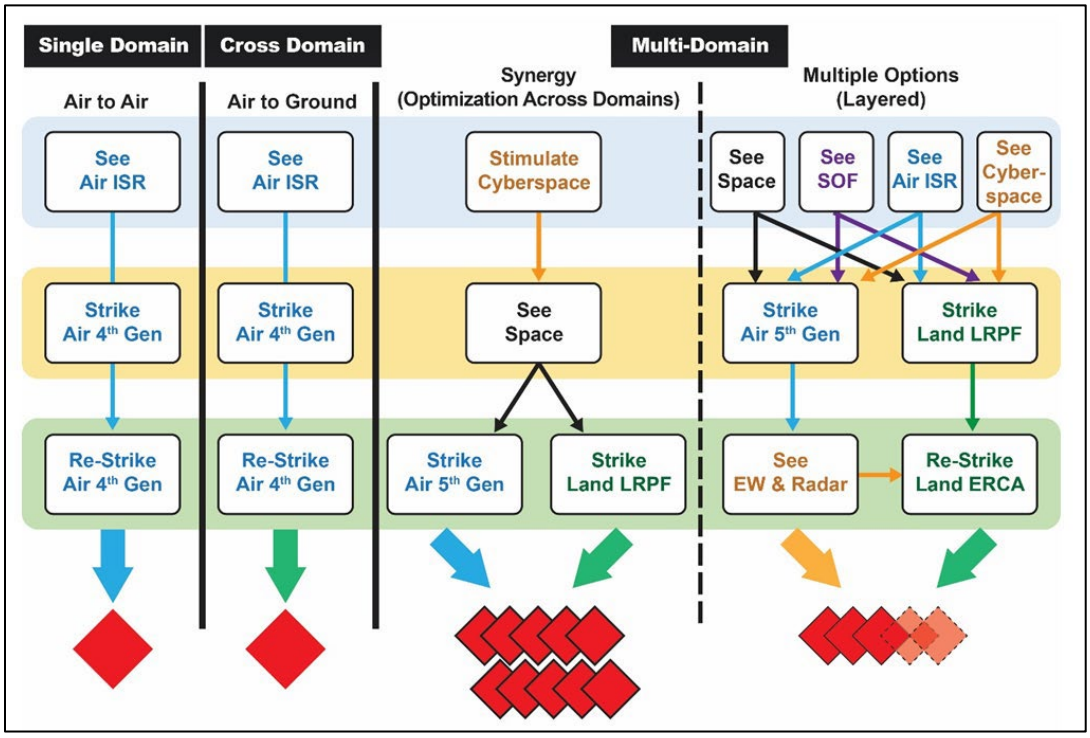

Figure 3. Converging capabilities to generate cross-domain synergy and layered options. US Army Training and Doctrine Command (TRADOC), TRADOC Pamphlet 535-3-1, *The US Army in Multi-Domain Operations 2028* (Fort Eustis, VA: TRADOC, 2018), 21.

The first premise of the MDO concept is that US forces and their mission partners do not start from zero; instead, they compete outside of armed conflict to expand the competitive space and gain positions of advantage. If armed conflict does occur, the Joint Force will penetrate the adversary's strategic and operational standoff by converging joint fires and "neutralizing the enemy's long-range systems[;] contesting enemy maneuver forces in all domains, the EMS, and

[42] TRADOC, TRADOC Pamphlet 525-3-1, 20 and GL-3. Cross-domain fires is defined as: "The integration and delivery of lethal and nonlethal fires across all five domains (land, maritime, air, space[,] and cyberspace), the electromagnetic spectrum, and the information environment." Cross-domain maneuver is defined as: "The employment of mutually supporting lethal and nonlethal capabilities of multiple domains to create conditions designed to generate overmatch, present multiple dilemmas to the enemy, and enable Joint Force freedom of movement and action."

the information environment[;] and conducting strategic and operational maneuver."[43] When windows of opportunity open during the penetration of the enemy's standoff, the Joint Force begins the dis-integration of the enemy's A2/AD systems by converging capabilities throughout decisive spaces.[44] This process extends into the start of the exploitation phase and involves defeating the enemy's long-range systems and the execution of operational maneuver to neutralize the enemy's mid-range systems (see figure 4).[45]

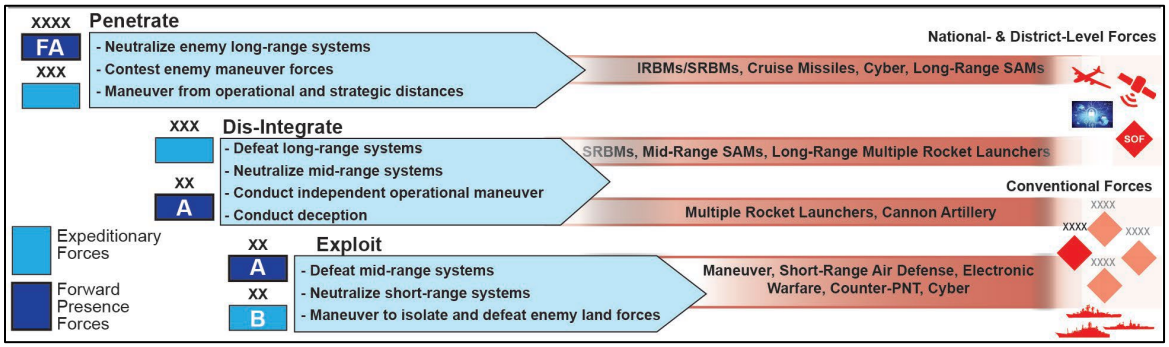

Figure 4. Penetrate and dis-integrate A2/AD systems, exploit freedom of maneuver. Adapted from US Army Training and Doctrine Command (TRADOC), TRADOC Pamphlet 535-3-1, *The US Army in Multi-Domain Operations 2028* (Fort Eustis, VA: TRADOC, 2018), 32.

Once sufficient windows of relative advantage open, the Joint Force exploits these opportunities and decisively closes with the enemy. However, this entire construct relies on the Joint Force converging capabilities to achieve overmatch, and this ability is dependent on effective C2. Specifically, the MDO concept calls for resilient multi-domain C2 (MDC2)—a concept similar to that outlined in the JCEO and the AFFOC—composed of "redundant means of communications, flexible command relationships, and multi-domain control measures designed to withstand degraded communications."[46] The following section reviews the literature developed thus far on achieving effective C2 to enable the necessary convergence of capabilities.

[43] TRADOC, TRADOC Pamphlet 525-3-1, 32-35.

[44] Ibid., 42.

[45] Ibid., 38.

[46] Ibid., 34-35.

C2 Across All-Domains

In 2018, the NDS provided the DoD with strategic guidance outlining its role in great power competition. On July 7, 2020, former Secretary of Defense, Mark T. Esper, gave a speech about the DoD's implementation of the 2018 NDS and its realignment to compete in an era of great power competition. One of the DoD's ten goals in its realignment was to develop a "modern joint warfighting concept, and ultimately, doctrine to enable our transition to All-Domain Operations."[47] This emphasis from DoD leadership has driven an effort to unify the Services' future operating concepts through the development of "the JADO concept by November [2020]."[48]

As part of this effort, the Air Force is refining and operationalizing its JADC2 concept to serve as the DoD's concept for C2 within JADO.[49] This process includes conducting exercises in collaboration with the other Services and publishing emerging doctrine, such as USAF Doctrine Annex 3-1, *Department of the Air Force Role in JADO*. Simultaneously, the Army is assessing how to operationalize convergence within JADO through JADC2. Like the Air Force, the Army uses collaborative exercises and is refining its *Concept for Maneuver in MDO* (MMDO).[50] This section reviews both Services' current C2 and convergence efforts, but starts by briefly reviewing the current C2 structure and approaches employed within a Joint Task Force (JTF).

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[47] Mark T. Esper, "Secretary of Defense Mark T. Esper Message to the Force on Accomplishments in Implementation of the National Defense Strategy," (Prepared remarks) July 7, 2020. Accessed 15 August 2020, https://www.defense.gov/Newsroom/Transcripts/Transcript/Article/2266872/secretary-of-defense-mark-t-esper-message-to-the-force-on-accomplishments-in-im/.

[48] Kimberly Underwood, "The Army Shapes Joint All-Domain Operations," *SIGNAL Magazine*, AFCEA International, last modified July 28, 2020. Accessed 4 October 2020, https://www.afcea.org/content/army-shapes-joint-all-domain-operations. It is not clear at this point, from publicly available sources, as to whether this timeline was met.

[49] Theresa Hitchens and Sydney J. Freedberg, "Milley Assigns Service Roles In All-Domain Ops Concept," *Breaking Defense*, last modified July 22, 2020. Accessed 14 September 2020, https://breakingdefense.com/2020/07/milley-assigns-service-roles-in-all-domain-ops-concept/.

[50] The Joint Staff is also developing the Joint Concept for Command and Control, while the Army, in parallel, is developing the Army Concept for Command and Control. Neither are reviewed here as they are currently in development and not releasable for referencing.

Since the development of the JTF concept, the Services' resources and capabilities have been episodically integrated at the JTF's echelon, requiring minimal synchronization and integration of its operations across echelons.[51] The convergence of "globally tasked space assets and highly controlled cyber effects at speed, scale, and scope will, [however], require convergence of capabilities at multiple echelons."[52] Currently, a JTF depends on combat support teams and a space coordinating authority to facilitate the integration of cyberspace and space capabilities, respectively.[53] This C2 structure, while facilitating episodic integration sufficient for the wars of the last thirty years, is insufficient to achieve the penetration and dis-integration of an adversary's modern A2/AD array.

Another C2 factor of note within JADO is the differences in each Service's approach to C2. While the Joint definition of C2, as outlined in Chapter 1, is consistent across the Services, each Service takes a slightly different approach in executing it through their C2 functions. The Army's approach to C2 is mission command; the Air Force and Marine Corps both employ versions of centralized control and decentralized execution, while the Navy uses command by negation. Joint doctrine does not prescribe a single approach; instead, it outlines the approach taken by each Service and employs mission command—"decentralized execution based on mission-type orders"—as a philosophy to describe how Joint operations will continue despite periods of unreliable communications.[54] With this contextual understanding of the current execution of C2 across the Joint Force, the developing concept of JADC2 can be better assessed.

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[51] US Army Futures Command (AFC), AFC Pamphlet, *The US Army Concept for Maneuver in Multi-Domain Operations, 2028-2040* (Austin, TX: AFC, Draft version 1.0, 2020), 24.

[52] Ibid.

[53] US Department of Defense, Joint Staff, JP 3-12, *Cyberspace Operations* (Washington, DC: Government Publishing Office, 2018), I-9; and US Department of Defense, Joint Staff, JP 3-14, *Space Operations* (Washington, DC: Government Publishing Office, 2020), III-6.

[54] US Joint Staff, JP 3-0 (2018), II-2.

As outlined in the review of the AFFOC, the Air Force began its focus on future operations through a lens of multi-domain operations occurring across air, cyberspace, and space. To effectively C2 these operations, the Air Force, in addition to the idea of dynamic C2, also outlined concepts for the development of a Multi-Domain Operations Center (MDOC) to replace the Air Operations Center and the employment of Adaptive Domain Control.[55] These ideas served as building blocks for the Air Force's development of the JADC2 concept and its application as the vision for C2 within JADO.[56] In March 2020, the Air Force published Doctrine Note 1-20, *USAF Role in Joint All-Domain Operations*, which defined JADC2 as "the art and science of decision making to rapidly translate decisions into action, leveraging capabilities across all domains and with mission partners to achieve operational and information advantage in both competition and conflict."[57]

From this definition, the Air Force further refined the concept when it published Annex 3-1 in June 2020. In this document, the Air Force's vision for JADC2 includes "connecting distributed sensors, shooters, and data from all domains to joint forces, enabling coordinated exercise of authority to integrate planning and synchronize convergence in time, space, and purpose."[58] The Air Force believes that to achieve this vision, JADC2 requires a process that "directs assigned, attached, and supporting forces and capabilities" across the Joint Force and "information access at all echelons" through a network of robust and resilient communications structures.[59] To operationalize these requirements, the Air Force outlined the idea of an integrated

[55] US Air Force, Air Force Future Operating Concept, 18. Adaptive Domain Control is the "ability to operate in and across air, space, and cyberspace to achieve varying levels of domain superiority over adversaries seeking to exploit all means to disrupt friendly operations."

[56] US Department of the Air Force, Air Force Doctrine Annex 3-1, *Department of the Air Force Role in Joint All Domain Operations (JADO)* (Maxwell Air Force Base, AL: LeMay Center for Doctrine Development and Education, 2020), 6.

[57] US Air Force, Air Force Doctrine Note 1-20, 2.

[58] US Air Force, Air Force Doctrine Annex 3-1, 6.

[59] Ibid., 6-8.

tasking order (ITO) process and is developing the Advanced Battle Management System (ABMS) in conjunction with the Space Force.

The Air Force argues that an ITO process would enable a better understanding of Joint Force capabilities and provide a common lexicon.[60] A September 2020 research project, conducted at the US Army War College and published as the *Mission Command of Multi-Domain Operations*, concurred with the need for a standardized process. In this document, the authors conclude that MDO requires a cross-domain process to standardize Joint Force capabilities effectively. Instead of an ITO, they develop the concept of a multi-domain synchronization cycle (MDSC), modeled off the joint air tasking cycle. A MDSC would enable the "effective and efficient employment of available cross-domain capabilities for synergistic effects toward achieving the Joint Force commander (JFC) and component commander's operational objectives."[61] Whether it is an ITO or the MDSC, it is clear that current concept developers believe that collaborative process standardization is an essential characteristic in the C2 of convergence by the Joint Force.

The ABMS is the second tool envisioned by the Air Force to operationalize JADC2. The developing ABMS is "a network intended to provide data to pass information across all domains."[62] Simultaneously, the Army is conducting exercises through its Project Convergence program to test its ability to integrate within JADC2.[63] On October 2, 2020, the Army and Air Force agreed to collaborate and link their efforts and established Combined Joint All-Domain

[60] US Air Force, Air Force Doctrine Annex 3-1, 8.

[61] Mark Balboni et al., "Mission Command of Multi-Domain Operations" (Carlisle Barracks, PA: US Army War College Press, 2020), 50.

[62] John R. Hoehn, "Joint All-Domain Command and Control," US Congressional Research Service, last modified 28 September 2020, 2. Accessed 29 November 2020, https://crsreports.congress.gov/product/pdf/IF/IF11493/6

[63] Andrew Feickert, "The Army's Project Convergence," US Congressional Research Service, last modified 8 October 2020, 1. Accessed 20 January 2021, https://fas.org/sgp/crs/weapons/IF11654.pdf

Command and Control (CJADC2).[64] In addition to shaping how it will interact with the Joint Force in a future network, the Army is focusing on its C2 concept for maneuvering within MDO.

The Army's MMDO concept operationalizes the MDO concept through the convergence of "joint, inter-organizational, and multinational (JIM) capabilities to open decisive spaces enabling the Joint Force to conduct echeloned maneuver to penetrate and dis-integrate adversary A2/AD systems."[65] The concept of converging capabilities across echelons in this way is a clear break from how the integration and synchronization of capabilities occurred in the past (see figure 5). For C2 to enable this convergence, the MMDO concept seeks to leverage operational JADC2 through the exercise of mission command and the employment of "unified, secure, and resilient communications and computer systems to integrate capabilities across echelons and domains."[66] Within the JTF, these JADC2 capabilities would exist within an Army Corps, which "serves as a forward tactical integration element for joint capabilities, paralleling the capabilities of US Air Force [MDOC]."[67] From an Army perspective, JADC2 is the C2 system that allows the seamless sharing of information across domains and echelons to enable convergence.[68]

[64] Joe Lacdan, "Army, Air Force Form Partnership, Lay Foundation for Interoperability," Army News Service, last modified October 2, 2020. Accessed 29 November 2020, https://www.defense.gov/Explore/News/Article/Article/2370177/army-air-force-form-partnership-lay-foundation-for-interoperability/.

[65] AFC, The US Army Concept for Maneuver in Multi-Domain Operations, 2028-2040, 10.

[66] Ibid., 28.

[67] Ibid., 37-8.

[68] Ibid., 41-2.

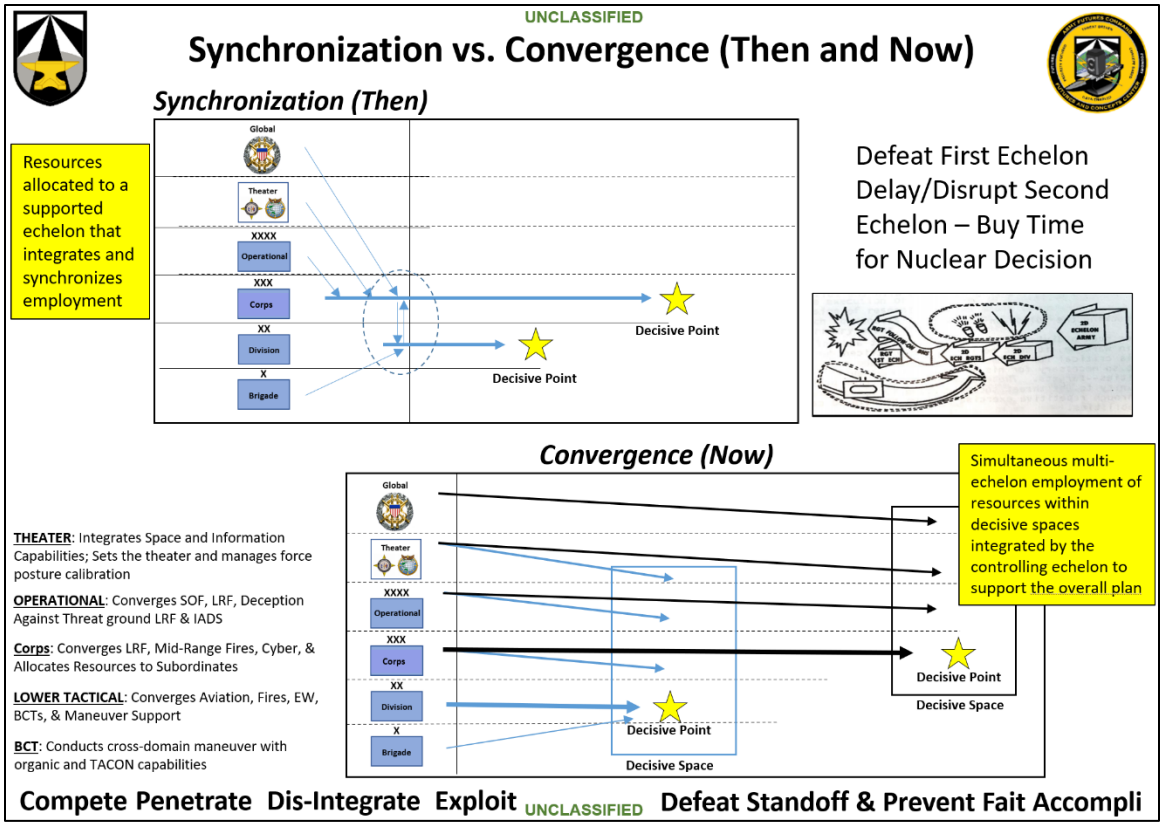

Figure 5. Synchronization vs. Convergence (Then and Now). Adapted from Christopher P. Stolz "US Army Concepts, 2028-2040" Presentation dated 24 August 2020, received digitally on 26 August 2020 (Austin, TX: AFC, 2020), Slide 8.

Case Study Literature

The first case study, focusing on the 1982 British campaign to retake the Falkland Islands seized by Argentina after a long-running diplomatic dispute, has a diverse and substantial set of authoritative sources available for research. These sources, written from a British perspective, include *Operation Corporate: The Falklands War, 1982* by Martin Middlebrook, *The Official History of the Falklands Campaign* by Sir Lawrence Freedman, and *The Battle for the Falklands* by Max Hastings and Simon Jenkins. An additional source of great use explicitly focused on C2 is *British Command and Control in the Falklands Campaign* by Stephen Prince.

The second case study reviews Operation Just Cause, executed in Panama by JTF South (JTFSO) in 1989 to counter the destabilizing acts of Manuel Noriega and his Panamanian Defense Forces (PDF). This campaign has an equally diverse set of sources to include *Operation*

Just Cause: Panama by Ronald Cole, *Battle for Panama: Inside Operation Just Cause* by Edward Flanagan, and detailed monographs titled *Operation JUST CAUSE: An Application of Operational Art?* by Timothy Bloechl and *From Port Salines to Panama City: The Evolution of Command and Control in Contingency Operations* by Steven Senkovich. The sources for these case studies provide a historical perspective of the necessary C2 characteristics required by each force to enable the synchronization and integration of capabilities across domains and echelons.

Conclusion

The literature reviewed in this section spanned the Joint concepts outlined in 2012, the future operating concepts as developed by each Service, and the current development of C2 for JADO, before briefly reviewing the key literature employed in researching each case study. This review of the concepts and literature provides an understanding of the conceptual approach toward JADO by the Joint Force and establishes the existing context for assessing the characteristics necessary to enable effective C2 of convergence within JADO. The following section is a historical analysis of the Falklands Campaign and Operation Just Cause that answers the subsidiary research question of how, historically, a force integrated and synchronized capabilities across domains and echelons through effective C2.

Case Studies

Introduction

The previous sections of this monograph built a contextual understanding of the Joint Force's developing concept of JADO, its approach to countering layered standoff, and its evolving concept for C2. This section expands that contextual understanding through a historical analysis of the Falklands Campaign and Just Cause. Each case study begins with a brief review of the campaign's strategic context before outlining the pertinent facts and events of each study. Finally, each case study ends with an assessment of the command concepts, C2 systems, and C2 approach employed by British and US forces. In doing so, this assessment will answer the following subsidiary question: What C2 characteristics historically enabled or hindered the synchronization and integration of capabilities across domains and echelons during the penetration and dis-integration of an enemies A2/AD array?

Strategic Context of the Falklands Campaign

On April 2, 1982, Argentina—in an effort to change the narrative of civil unrest and economic crisis at home[69]—seized the British Falkland Islands in the South Atlantic after perceiving a lack of British resolve to defend them.[70] Argentina, cognizant of Britain's recent budget cuts to its armed forces and Britain's sizable obligations to the North Atlantic Treaty Organization (NATO) in Europe, believed it could achieve a *fait accompli,* as Britain would not possess the will or capability to unilaterally respond. Instead, despite limited prior planning and the ad hoc nature of the forces available to respond, the British government outlined an unequivocal political objective to "bring about the withdrawal of Argentine forces from the

[69] Max Hastings and Simon Jenkins, *The Battle for the Falklands* (New York, NY: W. W. Norton & Company, 1984), 65.

[70] Stephen Prince, "British Command and Control during the Falklands Campaign." *Defense & Security Analysis* 18, no. 4 (2002), 335.

Falkland Islands and dependencies."[71] With the political aim established, the military formed a combined task force (CTF), outlined key aspects of Operation Corporate, and had all of its naval forces sailing toward Ascension Island by April 9.[72]

Command and Control Structure

The British Defence Staff began developing the C2 structure for the Falklands Campaign simultaneously with the outlining of objectives. The Commander-in-Chief Fleet, Admiral Sir John Fieldhouse, assumed command of the CTF and outlined a unique command structure that placed him and his Northwood headquarters—not a commander in the South Atlantic—as the central authority (see figure 6).[73] This purposeful decision to have the carrier, landing, and amphibious task groups report directly to him at Northwood inserted both ambiguity and tension into the C2 structure.[74] Despite these drawbacks, Admiral Fieldhouse believed that only from Northwood could "strategic requirements, assets and information be fully integrated into the prosecution of the campaign," and that limited communications networks prevented effective control from elsewhere.[75] A second and equally important consideration, was that the predominance of war experience within the Navy was consolidated at Admiral Fieldhouse's level.[76]

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[71] Lawrence Freedman, *The Official History of the Falklands, Vol 2: The 1982 Falklands War and Its Aftermath* (New York, NY: Routledge, Taylor & Francis Group, 2005), 193.

[72] Operation Corporate was the name of the operation to project British joint combat power to the Falkland Islands and return it. Ascension Island was a British Dependency in the South Atlantic that was crucial to Britain's ability to project combat power throughout the South Atlantic.

[73] Northwood was the headquarters for the Commander-in-Chief Fleet, enabling Admiral Fieldhouse to leverage his existing staff.

[74] Prince, "British Command and Control in the Falklands Campaign," 340.

[75] Ibid.

[76] Ibid., 341.

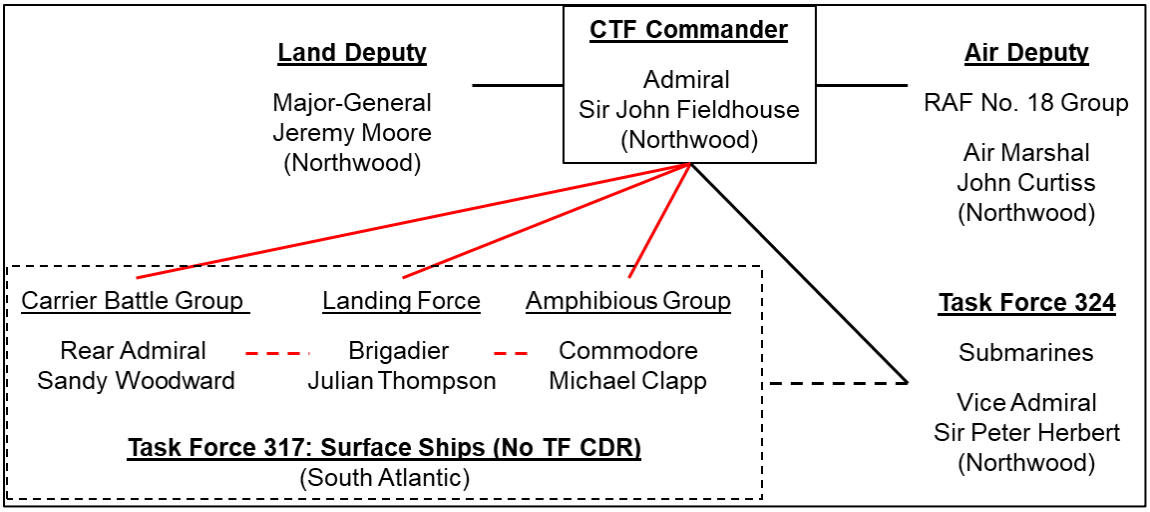

Figure 6: C2 Structure for the Falklands Campaign. Created by the author from information contained within Stephen Prince, "British Command and Control in the Falklands Campaign." Defense & Security Analysis 18, no. 4 (2002), 339-340.

Setting Conditions

As components of the CTF moved toward the South Atlantic, Northwood staff and those embarked aboard TF 317 began planning Operation Sutton—the operation to physically repossess the Falklands.[77] A few crucial assumptions were foundational to this planning, including that "an effective sea/air exclusion zone had been established around the Falkland Islands and that adequate intelligence would be available."[78] Unfortunately, achieving the objectives inherent in these assumptions proved harder than expected. The CTF would spend the rest of April and much of May attempting to gain sea-control and air supremacy, while gaining enough intelligence to enable the projection of combat power onto the Falkland Islands.

Central to gaining sea-control and air supremacy around the Falkland Islands was the establishment and enforcement of a total exclusion zone (TEZ). In essence, an effectively enforced TEZ would both isolate Argentine forces on the Falklands and prevent intervention by external Argentine A2/AD capabilities. This process began on April 12, with the establishment of a maritime exclusion zone (MEZ) enforced by British submarines to deter Argentine or neutral

[77] Hastings and Jenkins, *The Battle for the Falklands*, 194.

[78] Ibid.

vessels from operating within a 200-nautical-mile radius of the Falkland Islands.[79] This marked the start of British efforts to penetrate forces within Argentina's sphere of layered standoff capabilities. These same British submarines would later play a crucial role in dis-integrating Argentine air and sea A2/AD capabilities, but to the frustration of Rear Admiral Woodward, would remain under the direct control of Northwood.

Up to this point, Argentina employed limited A2/AD capabilities on the Falkland Islands themselves, consisting of mostly medium-range surface-to-air missiles to defend the airfield at Stanley, [80] which could support modern Argentine aircraft launching attacks against CTF naval forces.[81] In addition, they reinforced the islands with ground forces; eventually totaling 13,000 men and numerous ground-attack aircraft, focusing on a future ground campaign.[82] The greater A2/AD threat to the CTF, however, emanated from the Argentine mainland and included Boeing 707 aircraft used for reconnaissance, submarines, surface ships, and modern high-performance jets armed with the Exocet anti-ship missile—a cornerstone of Argentina's layer standoff capability.[83] For Operation Sutton to have a chance at success, these A2/AD threats required mitigation.

On April 21, British forces encountered the first of these threats when an Argentine 707 identified Woodward's Carrier Battle Group (CVBG).[84] Unfortunately, due to the tense political nature of the conflict and rules of engagement (ROE) that centralized engagement decisions at Northwood, the CTF was limited in its means to effectively respond. A few days later, on April 25, as British forces were moving to seize the island of South Georgia, they encountered their

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[79] Freedman, *The Official History of the Falklands*, 88.

[80] Stanley is the capital and main port of the Falkland Islands.

[81] Freedman, *The Official History of the Falklands*, 296-297.

[82] Martin Middlebrook, *Operation Corporate: The Falklands War, 1982* (London, UK: Viking, 1987), 86.

[83] Hastings and Jenkins, *The Battle for the Falklands*, 115.

[84] Freedman, *The Official History of the Falklands*, 215.

second threat in the form of the Argentine submarine *Santa Fe*. British forces quickly seized the initiative by neutralizing the *Santa Fe*, effectively removing a crucial Argentine A2/AD capability, which enabled the rapid capture of the island later that day.[85]

Achieving Penetration and Dis-integration

On April 30, the British implemented a TEZ—reflecting the same dimensions as the MEZ—that regarded "any ship and any aircraft whether military or civil which is found within this Zone without due authority from the Ministry of Defence in London…as hostile and liable to be attacked."[86] The Argentine government responded with a similar declaration, setting conditions for the confrontation of the two countries' forces. The same day, Woodward's CVBG moved to enforce the TEZ and enable the landing of Special Operating Forces (SOF) on the Falkland Islands to begin crucial intelligence gathering. In opposition, it faced the combined A2/AD threats of three Argentine naval task groups, two modern Argentine submarines, and sorties of land and sea-based aircraft (see figure 7).

[85] Freedman, *The Official History of the Falklands*, 246-247.

[86] Ibid., 257.

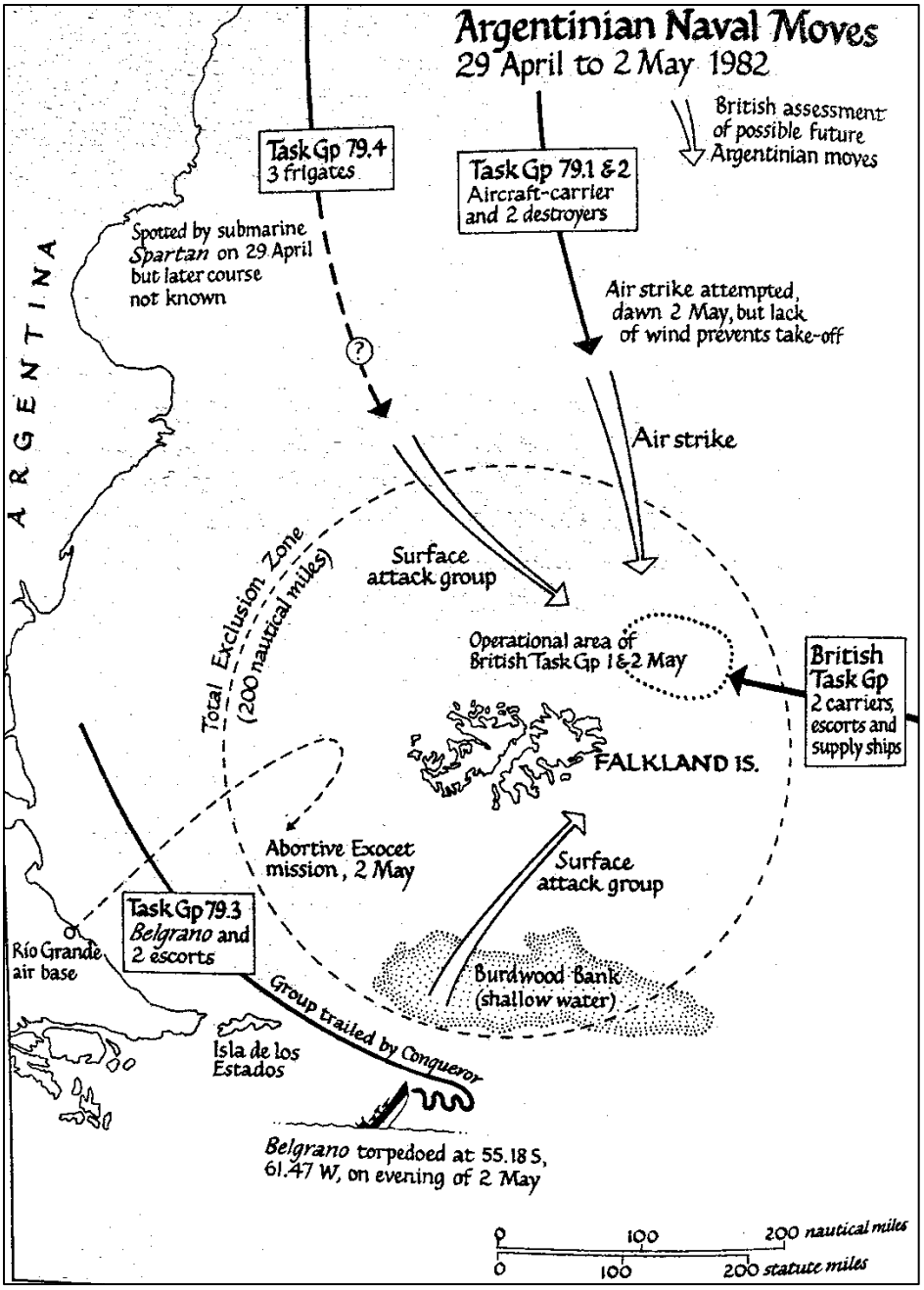

Figure 7: Argentinian Naval Moves April 29 to May 2, 1982. Martin Middlebrook, *Operation Corporate: The Falklands War, 1982* (London, UK: Viking, 1987), 144.

Over the next two days, in addition to constraining weather conditions, two British actions drastically changed Argentina's calculus in the employment of its A2/AD capabilities. On May 1, Northwood launched Operation Black Buck consisting of the long-range bombing of the Stanley airfield by a British Vulcan bomber, rendering the airstrip unserviceable for Argentine

high-performance aircraft capable of employing the Exocet missile.[87] Additional follow-on strikes by Harrier aircraft and British surface ships throughout the Falkland Islands further reduced the limited Argentine A2/AD capacity on the islands. These attacks not only precluded Argentina's ability to use the airstrip for more capable aircraft, but most importantly, "drew Argentine attention to the vulnerability of their mainland bases," resulting in the reduction of A2/AD capabilities forward deployed to the Falkland Islands in order to protect the mainland.[88]

In response to these attacks, the Argentines launched numerous ineffective air sorties and continued to position their naval groups to confront Woodward's CVBG. However, on May 2, as deteriorating weather prevented the execution of planned Argentine air operations, the British submarine *Conqueror* engaged and sank the Argentine light cruiser, *General Belgrano,* south of the TEZ. While Woodward attempted to order this attack earlier in the morning, his lack of authority and the restricted ROE outside of the TEZ prevented the *Conqueror* from engaging.[89] Official approval for the attack—the Prime Minister herself being involved in deciding the issue—did not come for another nine hours.[90] In response to the sinking of the *Belgrano*, the "Argentinian Navy effectively withdrew its forces, except land-based air, from the war."[91] However, just as the A2/AD threat from the Argentine surface fleet faded, the A2/AD threat from Argentine-based aircraft manifested itself through the sinking of the British destroyer *Sheffield* by an Exocet anti-ship missile on May 4.

With the physical realization of this A2/AD threat and the continued concern about Argentine submarines, it became clear that total sea-control or air superiority may not be possible

[87] A similar follow-up attack would occur on 4 May. Freedman, *The Official History of the Falklands*, 279-280.

[88] Ibid., 280-281.

[89] Ibid., 287.

[90] Ibid., 287-288.

[91] Prince, "British Command and Control during the Falklands Campaign," 344.

across the entire TEZ.[92] Without the willingness to expand the war by overtly attacking air bases on the Argentine mainland, weather and numerical inferiority prevented the British from gaining air superiority.[93] By mid-May, Admiral Fieldhouse accepted more risk by seeking only to achieve "local sea control/air superiority" for the landing force by leveraging submarines for early warning, naval air defense systems, and the force's Harrier aircraft in an anti-air role.[94] On the Falkland Islands, SOF units further dis-integrated Argentine A2/AD capabilities as they were employed, to "destroy key enemy assets…cause dispersion of forces and reduce morale; and deceive the enemy as to the location of the main landing."[95]

On May 21, as SOF ground elements in coordination with air and naval forces conducted deception and disruption operations throughout the Falkland Islands, the main force successfully landed unopposed at San Carlos. Through an effective employment of forces across the air, land, and sea domain—all dependent on space assets for communications with Northwood—the CTF effectively penetrated and dis-integrated Argentine A2/AD capabilities to enable the effective projection of ground forces onto the Falkland Islands. While the CTF would continue to face very real A2/AD threats from the mainland, the sinking of the *Atlantic Conveyor* on May 24 by an Exocet attack being a prime example, the employment of capabilities across the domains enabled the CTF to seize opportunities while protecting the force. On 14 June, after an arduous ground campaign in harsh weather conditions, the Argentine forces on the Falkland Islands surrendered.

Assessing the C2 of the Falklands Campaign

Two key characteristics of the British C2 stand out when assessing the Falklands Campaign and seeking to answer the subsidiary question—what C2 characteristics historically enabled or hindered the synchronization and integration of capabilities across domains and

[92] Freedman, *The Official History of the Falklands*, 302.

[93] Ibid., 427-428.

[94] Ibid., 446.

[95] Ibid., 450.

echelons during the penetration and dis-integration of an enemies A2/AD array? First, the C2 structure established for the Falklands Campaign was, like many other aspects of the campaign, improvised, leading to difficulty in establishing an informed understanding across the CTF. Second, the decision to maintain centralized control and authority in Northwood—due largely to technical capabilities, political sensitivities, and available experience—had drawbacks that could be disastrous in a campaign against a peer adversary capable of competing across all domains.

The ad hoc nature of the CTF's C2 structure was driven by a need for an immediate response and at least partially determined by the technical capabilities and the level of experience immediately available for employment.[96] While this contributed to Admiral Fieldhouse's decision to centralize control at Northwood, it caused tension among various leaders executing operations in the South Atlantic when he chose not to designate a JTF commander forward in the area of operations. The subsequent ambiguity of authority and limited cross-force communication capabilities caused periods of limited "lateral understanding" among the commanders.[97] Fortunately, collaboration was sufficient between Rear Admiral Woodward, Brigadier Thompson, and Commodore Clapp, despite the shocks of losing various capabilities to Argentine A2/AD capabilities, to allow the force to achieve its objectives.

Another area of significant concern for C2 of the CTF was the centralization of authority and decision making at Northwood. While Admiral Fieldhouse provided a broad intent, such as his guidance on April 17 that the CVBG "would proceed south to enforce the blockade [TEZ]; begin the sea and air battle; and launch the reconnaissance operations essential before a landing," it was accompanied with restrictive ROE, which often limited initiative.[98] This concentration of authority and the application of a restrictive ROE were likely essential due to the politically sensitive nature of the conflict, but they were also dependent on assured communication between

[96] Stephen Prince, "British Command and Control during the Falklands Campaign," 341.

[97] Ibid., 345.

[98] Ibid., 122.

the CTF and Northwood. A Joint Force attempting to employ a similar C2 structure against a peer adversary capable of purposefully degrading or denying operational and strategic communication may find itself in a position of indecision.

Strategic Context of Operation Just Cause

Before the end of the decade, another conflict erupted in the Americas, this time in Panama, precipitating a US invasion. A unique relationship between Panama and the US existed since Panama's founding and the establishment of a canal across the isthmus. By the mid-1980s, this unique relationship was under significant strain as Manuel Noriega seized dictatorial control of Panama and infringed upon US interests. At the same time, the US DoD was undergoing a significant transformation in response to the Goldwater-Nichols Act, which sought to rectify Joint Force shortfalls made apparent during operations in Grenada and Beirut.[99] By 1988, Noriega became openly defiant of the US and actively courted support from Cuba and Libya.[100] In response to the growing threat, the US outlined four strategic aims of any military action in Panama: protect US lives, protect the Canal, restore democracy, and apprehend Noriega.[101] Over the next two years, significant contingency planning occurred to link these aims to operational objectives and develop a C2 structure capable of achieving them.

Command and Control Structure

General Frederick Woerner, Jr.—commander of US Southern Command (SOUTHCOM) in 1988—and his staff, first developed Operation Blue Spoon,[102] a contingency plan for offensive operations in Panama. Blue Spoon, while employing components from across the other Services

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[99] Ronald H. Cole, *Operation Just Cause: Panama* (Washington, DC: Joint History Office, Office of the Chairman of the Joint Chiefs of Staff, 1995), 1.

[100] Ibid., 6.

[101] Steven W. Senkovich, *From Port Salines to Panama City: The Evolution of C2 in Contingency Operations* (Masters Monograph, School of Advanced Military Studies, US Army Command and General Staff College, Ft. Leavenworth, KS, 1990), 35.

[102] Cole, *Operation Just Cause*, 32. The name Operation Blue Spoon was adjusted to Operation Just Cause only two days before its execution on December 20, 1989.

and augmented later by forces projected from the US, would focus primarily on an eight-day operation by the 12,000 US forces already in Panama.[103] This operational approach was to be executed by an "incremental and disjointed" C2 structure, where Joint Task Force Panama (JTFPM)—a division-level headquarters responsible for forces currently in Panama—was to C2 the offensive stage of operations before being replaced by the headquarters of XVIII Airborne Corps from the US (see figure 8).[104] Debates over the disadvantages of this structure—specifically, its lack of unity between conventional and special operations forces and the limited span of control of JTFPM—continued until the summer of 1989.

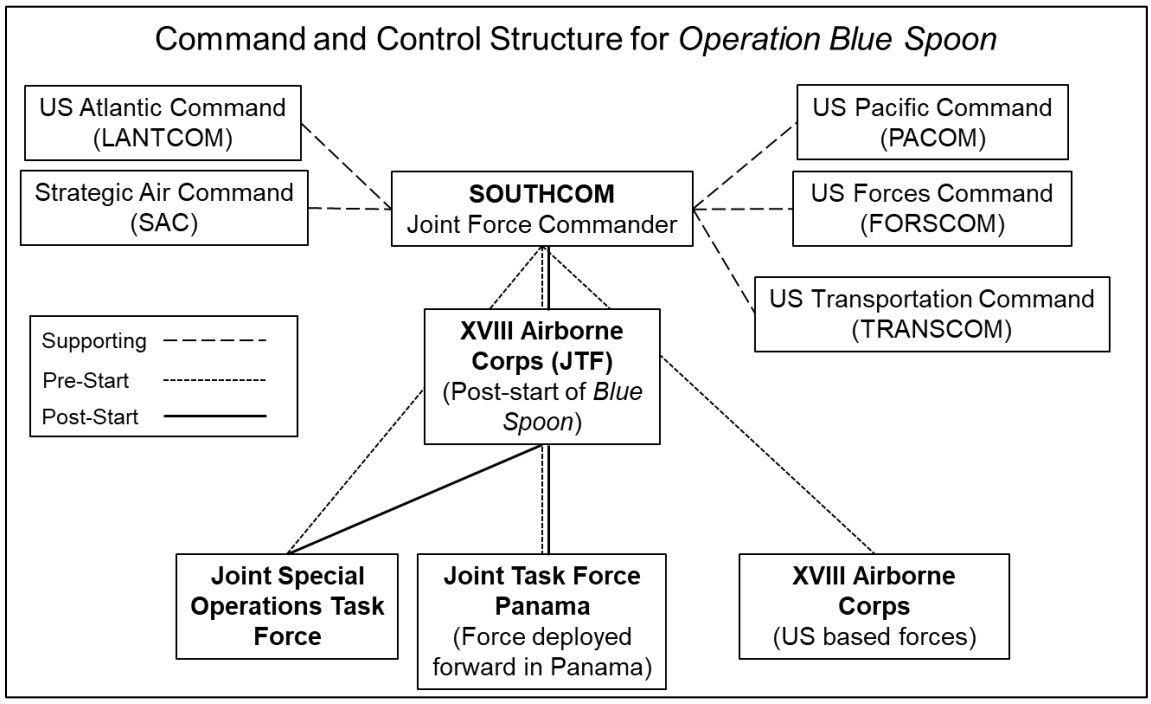

Figure 8: C2 Structure for Operation Blue Spoon. Created by the author from information contained within Ronald H. Cole, *Operation Just Cause: Panama* (Washington, DC: Joint History Office, Office of the Chairman of the Joint Chiefs of Staff, 1995), 8-10.

By that time, the US administration's patience with Noriega was running out as he nullified the outcome of democratic elections and became openly hostile. In response, the US administration deployed an additional 1,900 troops to Panama, determined to take a tough stance

[103] Cole, *Operation Just Cause*, 8.

[104] Ibid., 10.

against Noriega's actions.[105] In addition, it decided that the original strategy underpinning Blue Spoon, one of massive buildup over time, should be replaced by a strategy of surprise.[106] In pursuit of this new strategy, the administration replaced General Woerner with General Maxwell Thurman, who promptly took decisive steps to revise both Blue Spoon and its C2 structure. By August 1989, General Thurman determined that the XVIII Airborne Corps would serve as "SOUTHCOM's primary planning and operational headquarters," becoming known as JTFSO.[107] Also by late September, the newly appointed Chairman of the Joint Chiefs of Staff—General Colin Powell—agreed that the execution of Blue Spoon should occur as rapidly and simultaneously as possible, and that JTFSO's "primary military objective [should be] the disarming and dismantling of the Panama Defense Force."[108]

On October 10, General Thurman designated Lieutenant General Carl Stiner—commander of the XVIII Airborne Corps—as the commander of JTFSO. General Stiner immediately initiated intensive planning and outlined a revised C2 structure that concentrated "tactical command of all forces in Panama and all conventional and special operations forces to be deployed there" under his command.[109] In addition to establishing a unity of command, both General Thurman and General Stiner purposefully collaborated with all supporting mission partners, both across the Joint Force and US agencies, to build a unity of effort (see figure 9). Throughout October and November of 1989, JTFSO's commander and planning team worked tirelessly to set conditions for the execution of a synchronized and integrated operation by the Joint Force. This process started, however, with a unique opportunity to learn about the adversary.

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[105] Cole, *Operation Just Cause*, 11.

[106] Ibid., 12-13.

[107] Ibid., 14.

[108] Ibid.

[109] Ibid., 17.

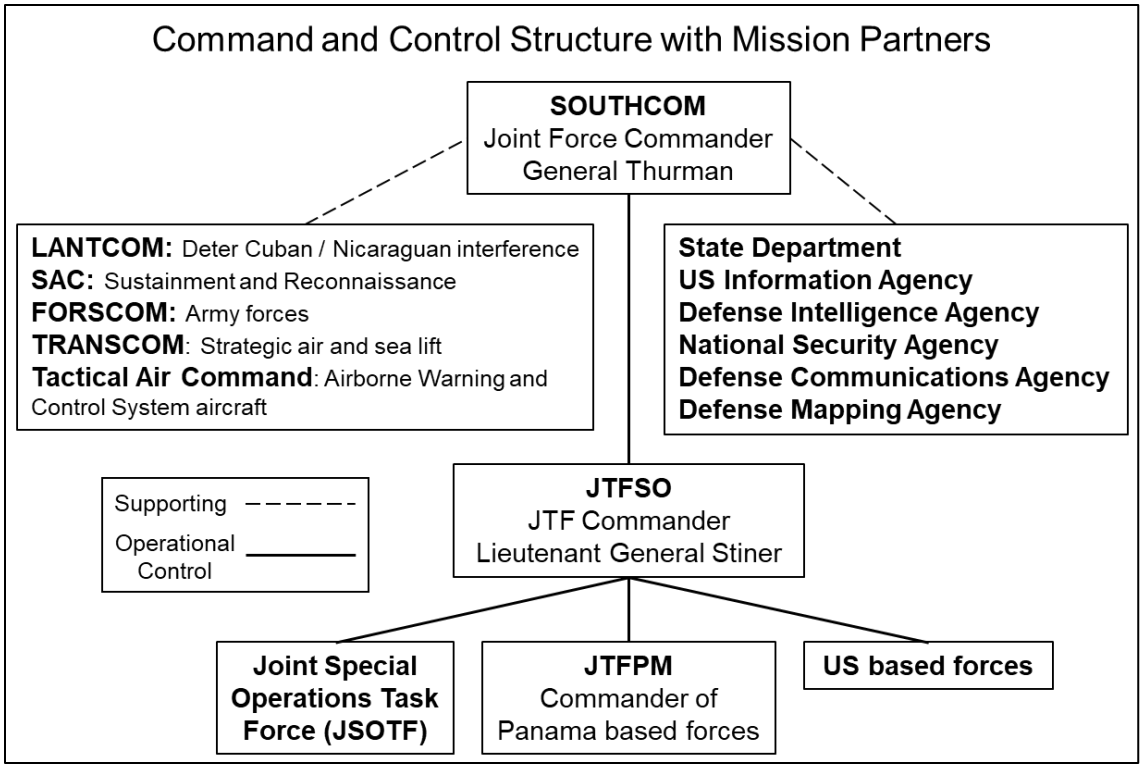

Figure 9: Revised C2 Structure with Mission Partners. Created by the author from information contained within Ronald H. Cole, *Operation Just Cause: Panama* (Washington, DC: Joint History Office, Office of the Chairman of the Joint Chiefs of Staff, 1995), 19-20.

Setting Conditions

On October 3, an officer within the PDF led a failed coup attempt against Noriega. The US forces had forewarning of this attempt, and while not authorized to support it, they "'watched Noriega move his forces around' and learned of [their] loyalty and strength."[110] In addition to gaining invaluable tactical information, the ambiguity that accompanied the coup attempt convinced many that a trigger for the execution of any operation should be a US decision and not a reaction to actions within Panama. To prepare for both eventualities, General Thurman approved a "staggered interval concept," which resulted in the development of branch plans for both "reactive execution" and a "deliberate execution," depending on the nature of the triggering event.[111] Simultaneously, he mandated that JTFPM units begin an intensive period of training to

[110] Edward M. Flannagan, *Battle for Panama* (New York: Brassey's Inc., 1993), 31.

[111] Cole, *Operation Just Cause*, 18-20.

both enhance their readiness and desensitize the PDF to US maneuvers.[112] By November 3, the Joint Chiefs of Staff approved the major revision of Blue Spoon, and JTFSO components began detailed tactical planning and conducted rehearsals.

General Thurman, seeking to ensure shared understanding and unity of effort across JTFSO, brought senior commanders together in Panama during mid-November to review their role in Blue Spoon's branch plans.[113] General Stiner, in addition to collaborating at the senior commander level, personally participated in and drove collaboration across JTFSO's mission partners through routine communication and personal presence. General Stiner's active involvement convinced him of the importance of C2 to the effective execution of the operation, leading him to deploy to Panama a "six-man planning staff cell as a command and control advance element."[114] Through these deliberate efforts by senior leaders, JTFSO prepared to employ capabilities from across the Services to "neutralize or protect some twenty-seven major targets simultaneously," while also deterring any intervention from outside forces.[115]

The PDF elements arrayed against JTFSO in response were not impressive and did not have any A2/AD capabilities to deny the Joint Force's strategic and operational freedom of movement. Instead, the PDF consisted of approximately 4,000 combat troops dispersed throughout Panama, with anticipated strong resistance from about a dozen different company-sized elements.[116] The main challenge facing JTFSO during the penetration portion of the operation was not the destroying of long-range fires capabilities, but the synchronization of 13,000 forward presence forces in Panama with the strategically projected capabilities of an

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[112] Cole, *Operation Just Cause*, 24-25.

[113] Edward M. Flannagan, *Battle for Panama*, 36. This meeting also served as an opportunity for JTFSO to forward position six Apache Attack helicopters, three Kiowa Scout helicopters, and four Sheridan light tanks.

[114] Ibid.

[115] Ibid., 34.

[116] Cole, *Operation Just Cause*, 37.

additional 14,000 forces from across the US and the Joint Force.[117] Similarly, during the dis-integration of the PDF, JTFSO did not have to focus on the destruction of medium-range fires capabilities, but on the effective execution of twenty seven separate but simultaneous operations executed by components from across the Joint Force. In mid-November, SOUTHCOM activated JTFSO for nine days in response to the threat of potential terrorist attacks planned against US forces in Panama.[118]

JTFSO's activation, and its use of the C2 structure and process it employed during Just Cause (see figure 10), provided priceless command post training for the JTFSO headquarters. In addition, it also served to reemphasize the necessity of an effective communication infrastructure, which would eventually grow to "700 networks linked to satellites and voice-scrambling telephone" in support of Just Cause.[119] Simultaneous to this activation, and into early December, all of the task force components—conventional and special operations forces—repeatedly rehearsed their portions of the operation under the guise of routine training operations.[120] By the time the situation in Panama became critical in mid-December, General Thurman and General Stiner were confident in saying that JTFSO was both postured and prepared to execute Blue Spoon.

[117] Cole, *Operation Just Cause*, 37.

[118] Flannagan, *Battle for Panama*, 37.

[119] Senkovich, *From Port Salines to Panama City*, 44.

[120] Flannagan, *Battle for Panama*, 37.

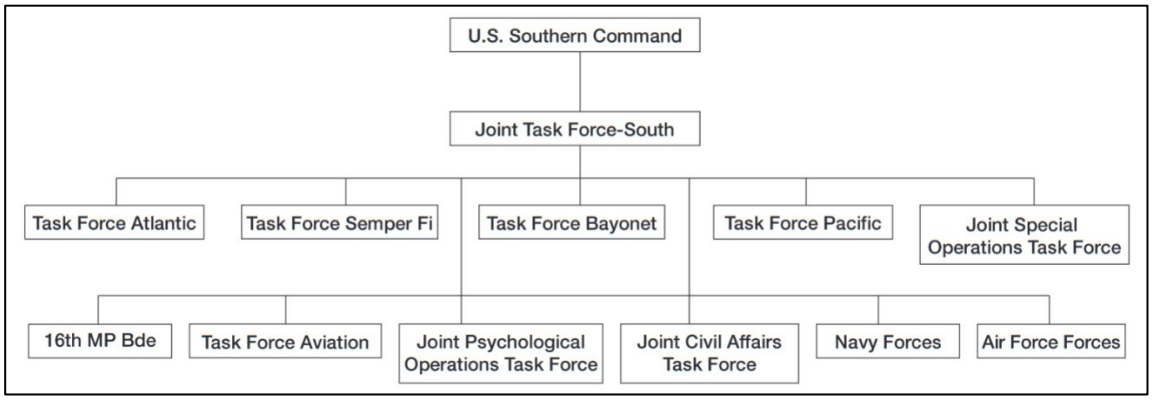


Figure 10: C2 Structure on the Eve of Operation Just Cause. Lawrence A. Yates, *The U.S. Military Intervention in Panama: Origins, Planning, and Crisis Management June 1987 – December 1989* (Washington, DC: Center of Military History US Army, 2008), 267.

Achieving Penetration and Dis-integration

The level of preparedness of JTFSO could not have come at a more opportune moment. On December 15, the Noriega-controlled National Assembly declared that a state of war existed between Panama and the US, and shortly after, Noriega proclaimed himself "Maximum Leader."[121] The next day, PDF personnel shot three US officers at a checkpoint, killing one of them. As the US administration discussed options with DoD leaders, General Stiner "requested and received permission to deploy a small element of the Corps assault [command post]," which was in place by December 17, as the decision was made to execute Just Cause on December 20.[122] The following day, General Stiner and key elements of his Corps staff deployed to Panama and integrated with the JTFPM components to activate the JTFSO headquarters. By December 19, the remaining supporting staff arrived to enable the tactical C2 of operations in Panama.

As JTFSO's subordinate task forces prepared and postured for execution, General Thurman and all of SOUTHCOM's supporting components went into action to support the near simultaneous penetration and dis-integration of the PDF across Panama. The Air Force finalized configuration and load out preparations, while also refining their target list and flying interdiction

[121] Cole, *Operation Just Cause*, 27.

[122] Flannagan, *Battle for Panama*, 58.

missions to prevent either Cuba or Nicaragua from interfering with or attacking the airlift.[123] The Navy largely remained in a supporting role to facilitate search and rescue of downed pilots but also committed their special operations forces during the opening phases of the operation. The Marine Corps, meanwhile, was committed as a subordinate task force, TF Semper Fi, under JTFSO.

At 0045 on December 20, components under the Joint Special Operations Task Force began executing surgical operations to neutralize, disable, and deny key elements within the PDF C2 structure.[124] Within an hour, 4,000 Rangers and paratroopers, combining as TF Pacific from bases in the US, conducted a vertical envelopment to isolate and neutralize key elements of the PDF throughout Panama (see figure 11).[125] Simultaneously, components from TF Atlantic, TF Semper Fi, and TF Bayonet conducted additional operations throughout Panama to occupy, block, seize, and secure key infrastructure essential for Noriega to remain in control. By 1800 on December 20, the *Comandancia* compound—a central C2 node of the PDF—was under US control, ensuring that the "PDF could no longer exercise centralized command and control of its forces."[126] Over the next few days, JTFSO began to transition to stabilization operations and the capturing of Noriega, which ultimately occurred in early January 1990 after his eleven-day-long isolation in a Vatican compound.[127]

[123] Cole, *Operation Just Cause*, 31-33.

[124] Ibid., 38-39.

[125] Ibid., 39.

[126] Ibid., 41.

[127] Ibid., 51.

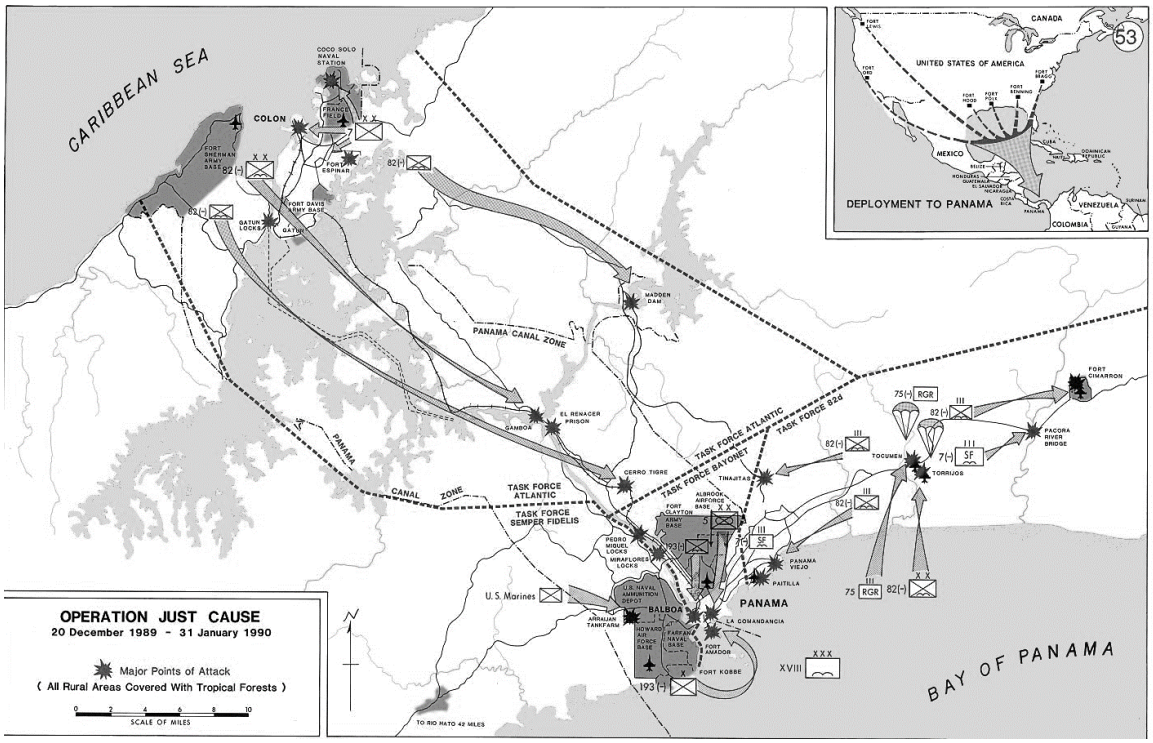


Figure 11: Operational summary sketch of Operation Just Cause. US Military Academy, *History Atlas: Panama, 1990*. Accessed 20 January 2021, https://www.westpoint.edu/sites/default/files/inline-images/academics/academic_departments/history/Since%201958/wars%2520conflicts%2520west%2520map%252053.jpg

Assessing the C2 of Operation Just Cause

Two characteristics of US C2 during the planning and execution of Just Cause that greatly enabled the synchronization and integration of capabilities across domains and echelons during the penetration and dis-integration of the PDF were personal command involvement and continuous plan refinement. The personal involvement of General Thurman as the JFC greatly facilitated the effective collaboration of mission partners in support of JTFSO. In addition, by being personally invested, General Thurman stayed informed on the status and requirements of JTFSO, as well as the OE within Panama, which not only allowed him to better enable JTFSO, but also allowed him to give General Stiner more flexibility in his planning and execution.

As General Thurman was building shared understanding and mutual trust up to the administration, General Stiner was actively involved in driving the collaborative process within JTFSO. As the JTF commander, General Stiner employed his personal involvement to emphasize

collaboration across the Joint Force in plans, rehearsals, and execution. The clarity that he provided in outlining the ROE and command authority removed ambiguity and enabled tactical flexibility within the JTFSO. Ultimately, the two-level involvement on behalf of both generals was complementary and instrumental in synchronizing and integrating capabilities from across the Joint Force to execute simultaneous operations across land, sea, and air.

While the planners of Just Cause initially had the benefit of time, what was crucial to the operations success, was that they effectively employed the time they had to continuously refine the plan and its C2 structure. This refinement is clearly evident in the drastic adjustment of the plan from one of force build up to simultaneous execution to achieve surprise. A significant strategic adjustment like this was successful because of the personal involvement of leaders and the willingness of the organization to learn from actions within the OE, like the October 3 coup attempt. While this learning enabled the adaption and creation of a refined plan, the deliberate training and rehearsing that enabled its execution allowed for JTFSO components to continually learn and adapt with each other.

Analysis

From a historical perspective, the previous chapter outlined characteristics of C2—within the context of each case study—that enabled or hindered the synchronization and integration of capabilities across domains and echelons. Through the employment of Gharajedaghi's iterative inquiry process, this chapter seeks to analyze both case studies while keeping in mind the context provided by the Services' future operating concepts. This analysis will culminate in finding that, for C2 to effectively enable convergence during JADO, it must be informed, collaborative, and purposeful.[128] To start this analysis, it is appropriate to first turn to the context that C2 of combat operations has and will likely exist within.

Context

To effectively understand interactions within a system, especially one as complex as the C2 of combat operations, it is first essential to understand the "unique environment in which the system is situated."[129] The context between the two case studies was quite different in two important ways. First, unlike the PDF, the Argentines had access to significant A2/AD capabilities in the form of air defense systems, anti-ship missiles, and submarines, to name a few. The second significant difference was that JTFSO had significantly more time to plan, prepare, and posture its components, while the British started without a contingency plan and executed largely from a position of ambiguity.

Despite these differences, one crucial contextual similarity underlies both case studies—in each operation, both British and US forces had to project combat power over strategic distances and employ capabilities from across domains and echelons to achieve decisive effects. The context of a future conflict is unknown, but the context for armed conflict in the future

[128] Gharajedaghi, *Systems Thinking*, 37. "A purposeful system is one that can produce not only the same outcomes in different ways in the same environment but also different outcomes in both the same and different environments."

[129] Ibid., 90.

postulated across the Services' future operating concepts is a blend of the context that both Just Cause and the Falklands Campaign occurred within. The Joint Force anticipates an ongoing need to project combat power over strategic distances, while opposed by a deliberate enemy A2/AD array; however, what is most unclear is the expected nature of the trigger that will cause Joint Force involvement. This is crucial because the answer to this contextual question—will the trigger to action be deliberate or ad hoc?—will determine how prepared the Joint Force needs to be to respond.

Structure

Within the context of each case study, the British and US forces both developed C2 structures, consisting of various components and interdependent relationships, to effectively leverage combat power across domains and echelons.[130] Britain's C2 structure, leading up to the landing of forces on the Falklands, was, like many things in the campaign, defined by the ad hoc nature of the operation. The availability of resources, experienced talent, and the limits of the communications infrastructure largely drove Admiral Fieldhouse's decision to centralize command at his level and not appoint a JTF commander. While this centralized decision making may have facilitated control of the tense political narrative, it also caused significant ambiguity in the task groups' relationships.

The C2 structure employed by JTFSO was anything but ad hoc. While the initial structure developed for Blue Spoon was both disjointed and ambiguous, both General Thurman and General Stiner's deliberate refinements were decisive. Both generals defined a clear unity of command across all Service components and facilitated the structure's effectiveness by focusing their involvement. While General Thurman diligently worked to ensure a shared understanding across mission partners, General Stiner relentlessly drove collaborative planning, training, and rehearsing across JTFSO. Through this structure, JTFSO and its mission partners forged a unity

[130] Gharajedaghi, *Systems Thinking*, 90.

of effort that enabled capabilities from across domains and echelons to converge simultaneously throughout Panama.

While all operations can benefit from the predictability provided by a C2 structure specifically refined for that operation, the Services' future operating concepts make it clear that the Joint Force likely will not have the luxury of such time in a future conflict. Instead, what is necessary is an initial C2 structure that facilitates a unity of effort through clear relationships, while remaining adaptive to the ambiguous circumstances in which it may have to operate. To achieve these aims, a JTF must rigorously cultivate shared understanding and mutual trust across its components and its mission partners. To that end, a C2 structure that encourages a unity of effort while remaining adaptable should encourage informed and collaborative relationships among its components and mission partners, while having a purposeful component in place to leverage learning.

Process

With the C2 structures analyzed, it is now important to assess how the British and US forces employed their C2 processes to leverage organizational know-how through a "sequence of activities" to achieve their strategic aims.[131] As the British did not have a set plan going into the Falklands Campaign, they had to develop and adapt the campaign execution as they went. Due to the limited communications infrastructure and assessed limited know-how inherent to the forces sent to the South Atlantic, Admiral Fieldhouse retained strict control of the C2 process from his headquarters at Northwood. While this strict control of the C2 process created ambiguity and limited initiative at the tactical level, it also ensured the effective sequencing of actions at the highest level. Thus, while a more distributed C2 process may have enabled more flexibility, the centralized process enabled predictability and the effective sequencing of support for the TEZ's enforcement and the landing of forces on the Falkland Islands.

[131] Gharajedaghi, *Systems Thinking*, 90.

Centralization was also a characteristic of the C2 process employed by SOUTHCOM and JTFSO. Both General Thurman and General Stiner played an active role in shaping the plans and execution of the operation. However, a crucial difference from the C2 process employed during the Falklands Campaign was that both commanders simultaneously drove collaboration across JTFSO and its mission partners. This collaboration—developed through Joint planning, training, and rehearsing—fostered organizational know-how and reinforced it laterally across the organization. By effectively pairing centralized control, which facilitated force projection synchronization, with decentralized know-how and execution, JTFSO's C2 process enabled shared understanding and mutual trust within the organization.

Control is necessary within any C2 process; however, each of the Services acknowledges in its future operating concepts that an organization's approach to C2 should be a variable balance between centralization and decentralization. Whether it is the Navy's command by negation or the Army's mission command approach, each emphasizes a synchronized and responsive process. A future C2 process that enables the convergence of capabilities across domains and echelons requires centralized synchronization and decentralized execution. To achieve both requires the concerted involvement of leaders within the process to ensure shared understanding, but just as importantly, to drive collaboration.

Function

The results produced from the C2 structures and processes employed by the British and US forces achieved their respective aims. JTFSO and its mission partners were decisive in synchronizing cross-domain capabilities to rapidly penetrate and dis-integrate PDF resistance. However, the British force, while effective in both penetrating and dis-integrating the Argentine A2/AD array, was not capable of fully enforcing the TEZ to gain air supremacy. Despite this risk, the task force seized a window of advantage and landed a force on the Falkland Islands capable of exploiting the initial penetration and dis-integration of the Argentine forces. Similar to JTFSO

achievements, a future Joint Force C2 structure and process must achieve convergence to enable the penetration and dis-integration of an enemy's A2/AD array.

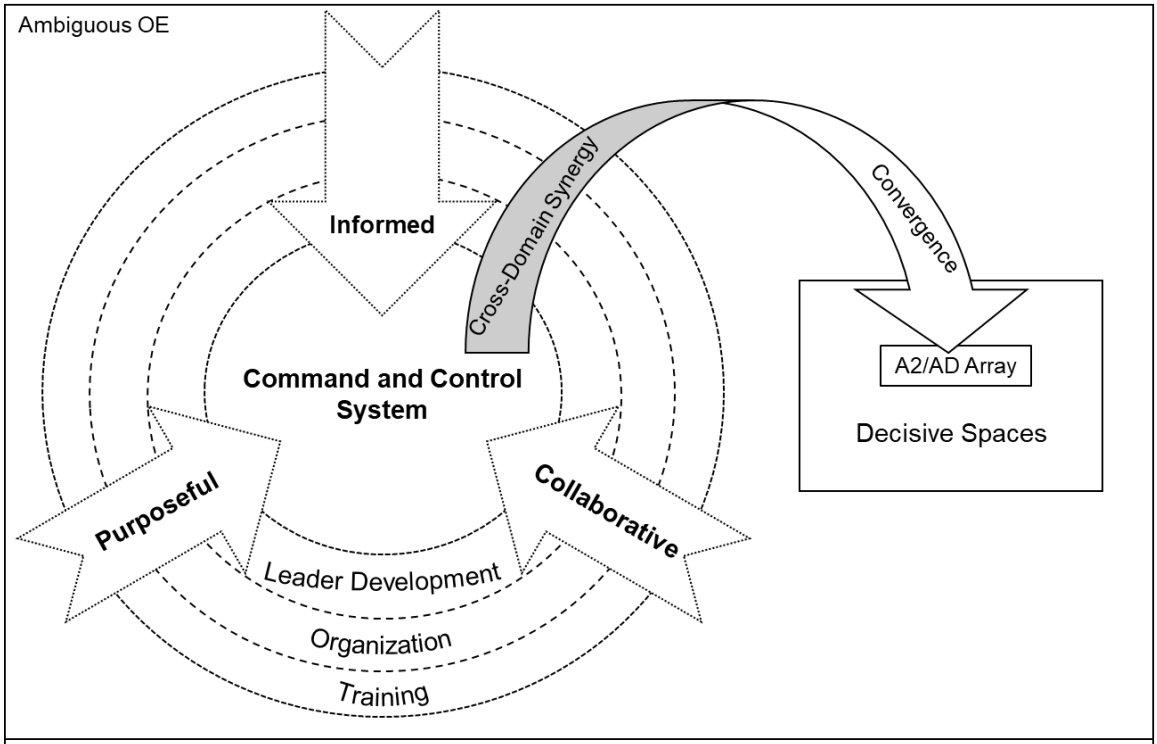
Findings

After reviewing Joint and Service concepts and analyzing two historical case studies, this study finds that achieving convergence to penetrate and dis-integrate an enemy's A2/AD array requires informed, collaborative, and purposeful Joint C2 structures and processes. Informed C2 structures and processes ensure a shared understanding—up, down, and across the organization—of the organization's components and relationships, the function of the organization, and crucial details about the enemy. Leading up to Just Cause, JTFSO achieved this through routine plan refinement, rehearsals, and the establishment of a robust communication network that facilitated both vertical and lateral dialogue. Conceptually, the Air and Space Force's ABMS initiative seeks to provide a similar network to enable cross-domain convergence. However, while necessary, informed C2 structures and processes are not sufficient in and of itself; to achieve convergence they must also be collaborative.

In addition to establishing the opportunities and capabilities to ensure a shared understanding across an organization, commanders and key leaders must actively drive collaboration across the Joint Force. Just because one Service has the necessary information about another Service's relevant capabilities does not mean that joint synergy will occur. Instead, much like General Stiner did with JTFSO, leaders must drive informed collaboration to develop personal familiarity across Services and build a foundation for mutual trust. In addition, leaders must also cultivate this mutual trust laterally with other leaders. As the unique command relationships between British commanders in the South Atlantic demonstrated, regardless of the formal structures in an organization, collaboration can enable cross-domain synergy.

Finally, even an informed and collaborative C2 structure and process that cannot effectively adapt to the context in which it exists may not achieve its designed function. A C2

structure and process requires purposefulness to facilitate its adaptiveness. A purposeful C2 structure and process can "not only learn and adapt; they can also create."[132] Much as JTFSO was constantly engaging within its OE and learning to adapt and create refined plans, the C2 structure and process enabling convergence must adapt to the OE in which it is employed to create unique solutions for the unique problems it will face. Developing a C2 system with informed, collaborative, and purposeful structures and processes capable of enabling convergence has implications for the organization of the future Joint Force and how it conducts training and develops its leaders (see figure 12).



For a C2 system to enable the convergence, in decisive spaces, of capabilities across domains and echelons, in an ambiguous OE, its structures and processes must be informed, collaborative, and purposeful. Implications for developing these characteristics cut across leader development, organization, and training.

Figure 12. Convergence Enablement Model. Created by the author.

[132] Gharajedaghi, *Systems Thinking*, 37.

Conclusion

> The compatibility between the parts and their reinforcing mutual interactions creates a resonance, a force, which will be an order of magnitude higher than the sum of the forces generated by the separate parts.
>
> —Jamshid Gharajedaghi, *Systems Thinking*

After finding that a Joint Force C2 system requires informed, collaborative, and purposeful structures and processes to enable the convergence of capabilities across domains and echelons, it is now essential to address some implications this finding has for the organization, training, and leader development of the Joint Force. Similar to how the Joint Force is uniting the Service's future operating concepts through JADO, it must also seek to bring the Joint Force together organizationally to enable convergence. While the importance of individual Service excellence is a necessary focus, it is not sufficient. The implication from this study is that the organization of the Joint Force must enable the "nature of the interactions" between the Services to collaboratively create a Force that is more than the sum of its parts.[133] For this to happen, the organization of the Joint Force must facilitate cross-Service communication and familiarity while enabling a prepared and adaptive C2 system.

The development of a cross-Service communications network, like ABMS, may help ensure the compatibility of communications, but it does not create "reinforcing mutual interactions" between the Services.[134] For this to occur, and for cross-Service familiarity to develop, a Joint formation C2 system's preparedness must be a central focus. Instead of relying on ad hoc JTFs and C2 systems, the Joint Force should undertake a deliberate effort during competition to effectively organize a C2 system—with informed, collaborative, and purposeful structures and processes—capable of adapting within an ambiguous OE. This may require

[133] Gharajedaghi, *Systems Thinking*, 46.

[134] Ibid.

organizing standing JTFs or multi-domain task forces (MDTF) that align against a specific mission set composed of enablers that span the domains and echelons required. These inherently Joint formations could provide an informed, collaborative, and purposeful environment that would enable communication among the various components of their C2 systems while building familiarity and preparedness. The shared understanding and mutual trust gained within the C2 system during competition would enable its adaptiveness in armed conflict.

The crucial means for exercising these Joint formations to develop and refine their C2 structures and processes is training. While institutions like the Army's combat training centers and other Service equivalents are a bedrock of building excellence within a Service, they are not sufficient for developing informed, collaborative, and purposeful C2 structures and processes for the Joint Force. The first implication for Joint Force training is that the C2 system of the Joint formation must be routinely employed and refined in a Joint training environment. This implication, as Admiral Davidson noted during his recent speech at the WEST conference, will also have implications for facility development as "current range, test, and/or training facilities are built separately by each Service…and rarely with the Joint Force in mind."[135] For the Joint Force to have an informed, collaborative, and purposeful C2 system, it must routinely train as a Joint Force.

Another implication for training the Joint Force is that the training must require the Joint formation to effectively balance the need to conduct centralized synchronization and decentralized execution. To balance centralization and decentralization a C2 system requires informed, collaborative, and purposeful C2 structures and processes that, through training, can enhance the formations understanding and trust in the C2 structures and processes. This shared understanding and mutual trust can then enable the flexibility necessary to balance centralized synchronization with the need to accept a high degree of decentralized execution. JTFSO

[135] Davidson, "Transforming the Joint Force," prepared remarks.

employment of numerous training events, rehearsals, and anticipatory exercises serves as an example of the positive effect routine Joint training can have on orchestrating this balance.

Finally, while the organization and routine training of JTFSO went a long way to enable the effectiveness of its C2 structures and processes, the catalyst for success was an effective leader. General Stiner was a capable and willing leader whose breadth of experience spanning both special operations and conventional units instilled in him the importance of building cross-organizational relationships and developing the organization's leaders.[136] In the four decades since Just Cause, the need to develop leaders like General Stiner, capable of confidently leading in complexity, has only grown. The findings of this study highlight implications across two of the Army's five leader development tenets: "supportive relationships and a culture of learning" and "three mutually supportive domains (institutional, operational, and self-development) that enable education, training, and experience."[137]

Whether employing a C2 system during the deliberately planned execution of Just Cause or the continually changing execution of the Falklands Campaign, a crucial component of success was the building and maintaining of relationships while enabling a C2 system that learned and adapted. This finding suggests that whether a leader's development stems from education, training, self-development, or other means, the effectiveness of a future Joint C2 system is contingent upon their purposeful building and nurturing of cross-Service relationships while driving a culture of learning within their C2 system. General Stiner's unique developmental path enabled him to see the importance of relentlessly driving collaboration efforts across JTFSO; the enabling of convergence requires the same from leaders across domains and echelons.

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[136] Flannagan, *Battle for Panama*, 35 and 36.

[137] US Department of the Army, Field Manual (FM) 6-22, *Leader Development* (Washington, DC: Government Publishing Office, 2015), 1-1. Army Field Manual 6-22, *Leader Development*, lists five tenets for leader development: 1) Strong commitment by the Army, superiors, and individuals to leader development. 2) Clear purpose for what, when, and how to develop leadership. 3) Supportive relationships and culture of learning. 4) Three mutually supportive domains (institutional, operational, and self-development) that enable education, training, and experience. 5) Providing, accepting, and acting upon candid assessment and feedback.

A final implication for leader development from this study is that developing leaders capable of leading informed, collaborative, and purposeful C2 structures and processes requires developmental opportunities. These opportunities should span the institutional, organizational, and self-development domains of leader development while ensuring they are mutually reinforcing. By expanding JPME to build familiarity across Services earlier, increasing the numbers of cross-Service attendance at Service schools, and growing the number of Joint assignments, the Joint Force can set conditions for developing leaders with the aperture of General Stiner. Based on the interdependence of these organizational, training, and leader development implications, this study proposes two recommendations to set conditions for a Joint C2 system to enable convergence.

Recommendations

For the Joint Force to create an informed, collaborative, and purposeful C2 system that is responsive in the convergence of capabilities, it should reconceptualize how it organizes to achieve an all-domain unity of effort and how it trains to enhance jointness before an armed conflict. Two recommendations, drawn from the historical analysis of the Falklands War and Just Cause, emphasize the necessity for the Services to gain organizational and training familiarity with each other prior to an armed conflict. These recommendations include the organization of a standing joint all-domain task force (JADTF), initially based on the Army's MDTF concept and the deliberate planning and execution of routine Joint Force training exercises.

The MDTF concept is part of the Army's AimPoint Force Structure Initiative to field an MDO-capable force by 2035.[138] Conceptually, a MDTF "focus[es] on penetrating an enemy environment [by] employing assets that can counter enemy A2/AD capabilities and enemy

[138] Andrew Feickert, "The Army's AimPoint Force Structure Initiative," US Congressional Research Service, last modified on 8 May 2020, 1. Accessed 20 January 2021, https://fas.org/sgp/crs/natsec/IF11542.pdf

network-focused targeting of U.S. units."[139] The MDTF is currently enabler focused, comprised of fires, intelligence, cyber, and signal capabilities and is itself only an enabler available to Corps commanders and higher. However, the Joint Force should expand this concept to form a standing JADTF that is mission rather than geographically oriented, composed of framework units across Services, conventional and unconventional forces, and strategic interagency enablers.

These standing JADTFs would complement geographic combatant commanders by providing an initial structure to enable the development of an informed, collaborative, and purposeful C2 system that fosters the all-domain unity of effort necessary for convergence to occur. Similar to the XVIII Airborne Corps before the execution of Just Cause, a standing JADTF, with involved leadership, would create the conditions to develop shared understanding and mutual trust across domains and echelons. The establishment of a JADTF would, however, require the Services to routinely subordinate a portion of their organization's flexibility to invest in a Joint Force capability. Instead of waiting for the emergent properties gained from uniting in a JADTF, the Services would likely make numerous and convincing arguments for how their committed talent and capabilities could be employed toward other pressing concerns. While the Service culture within the military has drastically changed throughout the decades, it still requires a significant mind-set shift to make the Joint Force the priority instead of Service interests.

The second recommendation from this study is that the training of the Joint Force should occur as a Joint Force on a routine basis, not as a conglomeration of independent training exercises grafted together. The development of Service-specific training capabilities and facilities made sense as the Services reforged themselves at the end of the last century. This recommendation is not a zero-sum rejection of the tremendous benefits gained by the Services from those previous training initiatives; instead, it is a call for the expansion and focusing of these training efforts toward a unified purpose—Joint Force capability convergence.

[139] Andrew Feickert, "The Army's AimPoint Force Structure Initiative," 2.

It is time for the Services to shift their primary focus from building tactical excellence, to fostering operational decisiveness. While training for tactical excellence will always remain necessary, it is not sufficient to develop an informed, collaborative, and purposeful C2 system capable of competing with and defeating a near-peer advisory. Instead, as Admiral Davidson made clear in his speech, the Joint Force most focus on training as a Joint Force. As he also makes clear, this shift in focus will have implications across numerous aspects of Joint Force development and require investing from the Services. As with the development of a standing JADTF, there would likely be substantial budgetary issues raised for each of the Services to continue to maintain their own spheres of training excellence. In the final analysis, if the Joint Force wants to effectively fight as a Joint Force during armed conflict, then it should organize and train as a Joint Force during competition.

Further Study

Two areas of further study that were outside of the scope of this study concern the generalizability and repeatability of convergence. This study assessed the characteristics required of a convergence enabling C2 system through the lens of large-scale combat operations. A further study is necessary to, first, assess the applicability of convergence generally across the range of military operations, and second, whether the C2 characteristics identified within this study are applicable. A second area for further study is the feasibility and requirements for executing convergence across the breadth of a long campaign. While JTFSO's closely choreographed operations in Panama were tremendously successful, a similar campaign against a near-peer threat with great capabilities and capacity would require a repeatable process. Can convergence, as it is currently conceptualized, facilitate such a campaign?

Conclusion

Militaries throughout the world have sought to improve organizational synchronization and integration since at least Napoleon's establishment of the *Corps d'Armée* in 1805.

Convergence, from this perspective, is no different. Achieving it on the battlefield, however, depends on the development of an informed, collaborative, and purposeful Joint Force C2 system. Setting conditions to develop a C2 system with these characteristics starts by reconceptualizing the organization of the Joint Force, how it trains, and how it develops leaders. Through these efforts, the Joint Force can achieve an all-domain unity of effort—enabled by an informed, collaborative, and purposeful C2 system—that will allow it to effectively compete, deter, and win in the complex operating environments of today and tomorrow.

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