

Optimizing Joint All-Domain Command and Control (JADC2)
for Low Observable Strike Assets in the
Indo-Pacific Area of Responsibility

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INTRODUCTION

In his opening remarks to Congress on the 2018 National Defense Strategy (NDS), then Secretary of Defense Mattis emphasized that “[the military] cannot expect success fighting tomorrow's conflicts with yesterday's weapons or equipment.”¹ This is especially true regarding the current Command and Control (C2) structure supporting Low Observable (LO) Strike assets, considering that the most widely employed C2 tactical datalink (Link 16) was initially created in 1975,² the “iron triad” C2 platforms averaged only 60-66% mission capable rates in Fiscal Year 2018,³ and advanced adversary weapons such as the CH-AA-10 and CH-AA-X-12 are pushing airborne C2 assets farther and farther from the fight. *Today's* Joint C2 assets and infrastructure would be hard pressed to help LO Strike assets win *yesterday's* fight against an Indo-Pacific modernized peer threat. Using an analysis of the limitations of the current “centralized control” C2 structure and doctrine in a peer-level fight and an application of the Agile Combat Employment (ACE) fundamentals to Joint C2, this paper argues that in order to support LO Strike assets against threat nations with Anti-Access and Area Denial (A2AD) weapons in the Indo-Pacific, Joint C2 must be re-structured to enable distributed, de-centralized control. This paper then outlines requirements for the next generation tactical datalink to support this de-centralized command and control of LO Strike assets.

ASSUMPTIONS

This paper assumes one has past exposure to Indo-Pacific threat capabilities. This paper also assumes the reader has knowledge on current Joint C2 technology and understands the information flow from a Joint/Combined Air Operations Center (AOC) to an airborne asset. This paper defines an LO strike asset as a part of a generic joint strike package comprised of B-2's, B-21's, Next Generation Air Dominance (NGAD), F-22's, F-35's, EA-18G's, and RQ-170's that might be tasked to someday penetrate robust Chinese Integrated Air Defense Systems (IADS). Finally, this paper assumes the reader understands the strengths and weaknesses of the Joint Tactical Information Distribution System (JTIDS) utilized by current joint assets.

LIMITATIONS OF CENTRALIZED CONTROL IN THE INDO-PACIFIC

Since the failures of decentralized control of air power during the Battle of Kasserine Pass in World War II, the Joint C2 structure has been modeled on the idea of centralized control of air assets. Best case, a single Air Component Commander exercising centralized control could provide the “broad, strategic perspective necessary to balance and prioritize the use of a powerful, highly-desired yet limited force.”⁴ The strengths of this doctrine are evident in the success of Operation Desert Storm and current air campaigns in Central Command (CENTCOM) that have a permissive air environment. However, one key limitation of centralized control is “continuous centralized control from [an] AOC requires assured communication to forward forces and bases.”⁵ The vast amount of data that the current Joint C2 structure in an uncontested environment can feed to an AOC also leads to temptation of senior AOC leadership to remove authorities and initiative from tactical decision makers. The abuse of centralized control can lead to forward based tactical decision makers facing “inability to act in the face of adversary tactics that may... cut off communication with the... AOC.”⁶

If hostilities were to commence against China in the Indo-Pacific Area of Responsibility (AOR), there are a number of new threat considerations that invalidate assumptions required to execute centralized control of an LO strike package. First, the currently fielded joint tactical C2 assets typically part of a strike package (E-3, E-8, RC-135, or E-2) would have to be placed much farther from the fight than Component Commanders have seen in previous wars. With the imminent proliferation of J-20 stealth aircraft carrying CH-AA-X-12 and CH-AA-10 weapons and advanced surface-to-air threats such as the CSA-X-18, it is likely that airborne Joint C2 assets will have to be placed so far from threats that their usefulness in supporting LO assets and both seeing and relaying the battlespace to an AOC would be negated. The assumption that the front line battlespace picture would be available to the AOC, due to the vast geography of the Indo-Pacific and the advances in threat capabilities, is no longer assured. JFACCs will likely not have the information necessary in AOCs to successfully conduct centralized control without a newer datalink that would allow front line assets to share the battlespace picture with the AOC.

Additionally, the infrastructure that centralized control is built on has never faced a threat nation that has the ability to substantially deny communications. The ability of certain threats to deny, jam, or spoof GPS, datalink, and other communication equipment that the current Joint C2 enterprise uses is beyond the classification of this paper. However, one can imagine that if a Combatant Commander is unable to see the battlespace picture, unable to pass mission amends to airborne assets, or unable to receive the results of a mission in a timely fashion, that instead of executing *centralized* control they will be providing *no* control. This author has experienced the firsthand effects of degraded communications impacting centralized control in the permissive air environment over Syria in 2017-2019. On numerous occasions, this author has been unable to establish both voice and digital communications with the AOC due to Joint C2 equipment degradation, and has been unable to pass information or receive data from the AOC such as the Commander’s intent for a new tactical situation. When, for example, one is flying on a low illumination night while 3000 feet behind a Russian Su-35 over Syria and one is unable to pass mission critical information to an AOC or receive authorization to execute certain tactics to lower risk, it is an extremely uncomfortable feeling. The Joint C2 enterprise needs a newer, more robust datalink and to be restructured away from the centralized control of air assets.

The final problem in the Indo-Pacific AOR that challenges the doctrine of centralized control is that previous AOCs have never faced a robust A2AD threat that has credibility to

destroy an AOC or other central C2 nodes. Whether China chooses to target an AOC or centralized control node kinetically or non-kinetically, they have the ability to significantly disrupt an air campaign if they are able to isolate assets from their controlling agency. For example, a cyber-attack on an AOC that prevents them from passing mission amends could lead to extreme risk to other joint partners. Imagine an airborne strike package that needs to get re-tasked to perform Defensive Counter-Air (DCA) against an impending Chinese attack, yet the AOC might be unable to pass the change in mission. Additionally, if China uses nuclear or conventional stand-off weapons against an AOC, the subsequent air campaign could be in jeopardy as the supported assets reliant on centralized control would have nowhere to turn to for subsequent guidance. The infrastructure supporting centralized control is not safe in this AOR.

BENEFITS OF DECENTRALIZED C2 IN THE INDO-PACIFIC

Considering the limitations of centralized control in the Indo-Pacific AOR, C2 in a joint air campaign will need to embrace the speed and lethality of maneuver warfare to help LO strike assets achieve objectives. This doctrine of maneuver warfare “seeks to shatter the enemy’s cohesion through a variety of rapid, focused, and unexpected actions which create a turbulent and rapidly deteriorating situation with which the enemy cannot cope.”⁷ The service that best embraces maneuver warfare in their C2 philosophy is the Marine Corps, which is fitting considering their relevant history of “island hopping” campaigns in WWII in the same Indo-Pacific AOR. Marine Corps doctrine further emphasizes that “to best cope with the uncertainty, disorder, and fluidity of combat, command and control must be decentralized.”⁸ The importance of maneuver warfare is also emphasized by the 2018 NDS which asserts that we need to be “strategically predictable, but operationally unpredictable” in order to “frustrate [the enemy’s] efforts.”⁹ Applied to Joint C2 in the Indo-Pacific, this means that C2 needs to be structured to support a rapid operations tempo that allows for assets to execute a mission, land at an austere airfield, refuel and rearm at a forward arming and refueling point (FARP), and then launch for a subsequent mission prior to the enemy completing the kill-chain for their A2AD weapons on allied airfields. Decentralized control is best suited to support this philosophy, and the doctrine of Agile Combat Employment (ACE) translates this philosophy into guidance for the Joint C2 structure in the Indo-Pacific.

ACE “focuses on the ability to disperse, recover and rapidly resume operations in a contested or austere environment” and asserts that “decentralized control and decentralized execution [are] required to enable an effective campaign.”¹⁰ Whereas centralized control would have difficulty controlling “thousands of sorties per day... at more than one hundred airfields,” a Joint C2 structure optimized for decentralized control of the Combatant Commander’s centralized vision could allow for the speed and redundancy required to win in a robust A2AD environment.¹¹

To implement a decentralized control doctrine, the structure of Joint C2 in the Indo-Pacific should be modeled around the concept of a Distributed Group. A similar concept was effectively utilized in Operation Desert Storm, where the “7440th Composite Wing, operating from Turkey, received only objectives and a target list from the [Joint Force Air Component Commander (JFACC)].”¹² The Group would contain the minimum number of multi-airframe assets necessary to form and support a basic LO strike package (for example 4-8x F-22’s or NGAD, 8-12x F-35’s, 2-4x B-21’s, 2-4x EA-18G’s, 1-2x RQ-170, 4-6x Tanker Aircraft, et cetera). Additionally, the Group would have the maintenance and logistical assets required to

support the assets (such as a FARP Flight), be distributed to multiple contingency bases or airfields, and be able to conduct the C2 of operations within its sector of influence. All higher structures would support the Distributed Group administratively, trusting unit level personnel to plan, control, and execute the Combatant Commander's intent. A redundancy of communications such as mobile SATCOM, local fiber networks, encrypted radios, other line-of-sight communications, et cetera would allow flexibility for the Group to command and control operations, trusting unit level intelligence troops and targeteers to perform duties traditionally performed by AOCs. The Joint C2 structure would be built on the assumption that communications with Distributed Wings, AOCs, the JFACC, and the Joint Force Commander (JFC) would be degraded. Supporting organizations would limit C2 communications to deconflicting lines of effort, the re-posturing of Distributed Groups, or sharing data affecting multiple Distributed Groups. While this concept carries a higher support burden and demands more of unit level Commanders, it offers a fighting structure less "reliant on vulnerable communications" and the "greater distribution reduces [LO strike package] vulnerability to air, missile, or ground attack" from threat A2AD weapons.¹³

DATALINK REQUIREMENT TO SUPPORT DECENTRALIZED C2

One of the lofty objectives for the new concept of JADC2 is creating "all-sensors, all-shooters" connectivity across domains, essentially a "military version of Uber."¹⁴ An extreme example that highlights the best case application of this concept might include a submarine-launched ballistic missile (SLBM) launched against a target where the target track is being provided by a Space Force satellite, the target identification is being provided by an Army clandestine special operations unit, the weapon itself receives sensor data from nearby Air Force and Marine Corps fighter assets regarding current enemy IADS activity to increase weapon survivability, with the AOC thousands of miles away seeing the sensor and shooter data near real-time. This is an extremely challenging goal that "will require significant resources and institutional effort, including senior leader attention and interventions."¹⁵ To achieve such commonality across all domains, there is significant potential that tradeoffs and compromises to achieve commonality would decrease technical functionality and lethality for front line assets. To best suit the warfighter, the "all-sensors, all-shooters" philosophy means the datalink should be engineered around supporting front line joint assets and the Distributed Groups as the primary customers, not the AOC.

To support Joint C2 of an LO strike package, one must recognize that signature management and emissions control are of paramount importance to these assets for survival. Thus, sacrifices for low probability of intercept (LPI) and low probability of exploitation (LPE) must not be made for the sake of commonality. To achieve LPI/LPE, the datalink signal strength must be scalable, must transmit in narrow and specific beams (not omnidirectional), must have robust encryption, and will likely need to be at a much higher frequency than currently employed datalinks to support the rapid transmission and reception of Gigabytes of sensory data. Also, due to different classification levels of sensory data provided by joint and coalition assets, aspects of the information shared over the datalink need to be mission planning programmable and operator selectable. Finally, the tactical datalink needs to be integrated with sensor fusion software to tag varying confidence levels of sensory data and adjust that sensor's priority within the network. The physics of a network required to meet these requirements significantly reduces the effective range and by itself will likely not meet the "all-domain" philosophy of JADC2.

Thus, in order to facilitate decentralized C2 at the Distributed Group and keep Distributed Wings and higher Joint Component Commanders informed, the datalink would also need several bands and multiple relays to share select data from C2 centers to and from front line assets. A key aspect would be redundancy to enable kinetic and non-kinetic network resilience and sustainability. Supporting joint assets with standoff capabilities would be best candidates to serve as central network nodes and relays from Distributed Groups. These might include naval vessels, Patriot batteries, RQ-170's, or other land or sea-based mobile relay stations. Additionally, LO strike assets able to receive low fidelity datalink information from satellites and multiple low bands would allow for rear C2 units to pass significant mission changes in a timely manner.

CONCLUSION

With the right vision and the right leadership, there is significant potential for JADC2 to reinvigorate an antiquated C2 structure whose weaknesses have not been punished by a capable enemy. With the new Chief of Staff of the Air Force laying out JADC2 as his number one priority, the time to shape JADC2 to enable future victories against modernized peer threats is *now*.¹⁶ The right leadership is in place and the momentum for change is strong. Military professionals must continue to be advocates for a front line focused C2 structure, fighting for JADC2 to embrace maneuver warfare and redundancy in all domains to support the warfighter in a robust A2AD threat environment. By modeling JADC2 around the concept of distributed, decentralized control it would allow for the sustainment of operations in the likely scenario of an AOC in the Indo-Pacific AOR becoming kinetically or non-kinetically disrupted. Additionally, designing the “all-sensors, all-shooters” datalink around the philosophy of de-centralized C2 and a “warfighter first” multi-domain mentality would exponentially increase the lethality of joint assets facing a modernized Chinese peer-threat. In conclusion, warfighters cannot afford to squander this opportunity and must realize that JADC2 development “must be tended to carefully if it is to achieve its objectives.”¹⁷

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