Optimizing Joint All-Domain C2 in the Indo-Pacific

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In a discussion in early 2018 about the new national defense strategy, then Secretary of Defense James N. Mattis emphasized, "[the military] cannot expect success fighting tomorrow's conflicts with yesterday's weapons or equipment."[1] This statement is especially true regarding the current command and control (C2) structure supporting low-observable (LO) strike assets. Considering the most widely employed C2 tactical datalink (Link 16) was initially created in 1975, the "iron triad" C2 platforms averaged only 60–66 percent mission-capable rates in fiscal year 2018,[2] and with the development of advanced adversary weapons such as the CH-AA-10 and CH-AA-X-12, airborne C2 assets are being pushed 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 a modernized Indo-Pacific 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 article argues that to support LO strike assets against threat nations with anti-access and area-denial weapons in the Indo-Pacific, Joint C2 must be restructured to enable distributed, decentralized control. It then outlines requirements for the next-generation tactical datalink to support this decentralized C2 of low-observable strike assets.

Assumptions

This article assumes the reader has past exposure to Indo-Pacific threat capabilities. It also assumes the reader has knowledge of current Joint C2 technology and understands the information flow from a Joint/combined air operations center (AOC) to an airborne asset. This article defines an LO strike asset as a part of a generic Joint strike package comprised of B-2s, B-21s, next-generation air dominance, F-22s, F-35s, EA-18Gs, and RQ-170s that might be tasked to someday penetrate robust Chinese integrated air defense systems. Finally, this article assumes the reader understands the strengths and weaknesses of the Joint Tactical Information Distribution System utilized by current Joint assets.

Limitations of Centralized Control

Since the failures of decentralized control of airpower 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. In a best-case scenario, 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."[3] The strengths of this doctrine are evident in the success of Operation Desert Storm and current air campaigns in US Central Command that have permissive air environments.

One key limitation of centralized control, however, is "continuous centralized control from [an] AOC requires assured communication to forward forces and bases."[4] The vast amount of data that the current Joint C2 structure in an uncontested environment can feed to an AOC also can lead to the 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 an "inability to act in the face of adversary tactics that may . . . cut off communication with the . . . AOC."[5]

If hostilities were to commence against China in the US Indo-Pacific Command (USINDOPACOM) area of responsibility (AOR), several new threat considerations 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 saw in previous wars.

With the imminent proliferation of J-20 stealth aircraft and other advanced Chinese fighters carrying CH-AA-X-12 and CH-AA-10 weapons and advanced surface-to-air threats such as the CSA-X-18, airborne Joint C2 assets will likely 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 frontline 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. Joint Force air component commanders (JFACCs) are unlikely to have the information necessary in AOCs to successfully conduct centralized control without a newer datalink that would allow frontline assets to share the battlespace picture with the AOC.

Additionally, the infrastructure that centralized control is built on has never faced a nation-state threat that can substantially deny communications. The ability of certain threats to deny, jam, or spoof GPS, datalink, and other communications equipment that the current Joint C2 enterprise uses is beyond the classifica-

tion of this article. But one can imagine that if a combatant commander is unable to see the battlespace picture, to pass mission amends to airborne assets, or to receive the results of a mission in a timely fashion, instead of executing centralized control they will be providing no control.

This author experienced the firsthand effects of degraded communications impacting centralized control in the permissive air environment over Syria in 2017–19. On numerous occasions, this author could not establish both voice and digital communications with the AOC due to Joint C2 equipment degradation and could not 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 within the visual range of Russian fighters 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 USINDOPACOM AOR that challenges the doctrine of centralized control is that previous AOCs have never faced a robust anti-access/area-denial (A2/AD) threat that has the credibility to destroy an AOC or other central C2 nodes. Whether China chooses to target an AOC or centralized control node kinetically or nonkinetically, it can significantly disrupt an air campaign if it can isolate assets from their controlling agency. For example, a cyberattack on an AOC that prevents it from passing mission amends could lead to extreme risk to other Joint partners. Imagine an airborne strike package that needs to be retasked to perform defensive counterair against an impending Chinese attack, yet the AOC might be unable to pass the change in mission.

Additionally, if China uses nuclear or conventional standoff 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 clearly is not safe in this AOR.

Benefits of Decentralized C2

Considering the limitations of centralized control in the Indo-Pacific region, 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."[6] The service that best embraces maneuver warfare in their C2 philosophy is the US Marine Corps, which is fitting con-

sidering their relevant history of island-hopping campaigns in World War II in the same region. Marine Corps doctrine further emphasizes, "to best cope with the uncertainty, disorder, and fluidity of combat, C2 must be decentralized."[7]

The importance of maneuver warfare is also emphasized in the *Summary of the 2018 United States National Defense Strategy*: that asserts we need to be "strategically predictable, but operationally unpredictable" to "frustrate [the enemy's] efforts."[8] Applied to Joint C2 in the USINDOPACOM AOR, this strategy means C2 should 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, and then launch for a subsequent mission before the enemy completing the kill-chain for their A2/AD weapons on allied airfields. Decentralized control is best suited to support this philosophy, and the doctrine of Agile Combat Employment translates this philosophy into guidance for the Joint C2 structure in the AOR.

Agile Combat Employment "focuses on the ability to disperse, recover, and rapidly resume operations in a contested or austere environment" and asserts "decentralized control and decentralized execution [are] required to enable an effective campaign."[9] Whereas centralized control would have difficultly 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 A2/AD environment.[10]

To implement a decentralized control doctrine, the structure of Joint C2 in the USINDOPACOM AOR 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 JFACC."[11] The group would contain the minimum number of multiairframe assets necessary to form and support a basic LO strike package (for example, 4–8x F-22s or NGAD, 8–12x F-35s, 2–4x B-21s or B-2s, 2–4x EA-18Gs, 1–2x RQ-170, multiple tanker aircraft, etc.).

Additionally, the group would have the maintenance and logistical assets required to support the assets (such as a forward arming and refueling 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 satellite communications, local fiber networks, encrypted radios, other line-of-sight communications, and others 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 would be degraded. Supporting organizations would limit C2 communications to deconflicting lines of effort, the reposturing 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 A2/AD weapons.[12]

Datalink Requirement

One of the lofty objectives for the new concept of Joint all-domain command and control (JADC2) is creating "all-sensors, all-shooters" connectivity across domains, essentially a "military version of Uber."[13] An extreme example that highlights the best-case application of this concept might include a submarine-launched ballistic missile launched against a target where a Space Force satellite provides the target track, an Army clandestine special operations unit provides the target identification, nearby Air Force and Marine Corps fighter assets provide sensor data to the weapon regarding current enemy integrated air defense system activity in order to increase weapon survivability, and the AOC is thousands of miles away seeing the sensor and shooter data near real time.

This capability is an extremely challenging goal that "will require significant resources and institutional effort, including senior leader attention and interventions."[14] To be sure, in achieving such commonality across all domains, there is significant potential that tradeoffs and compromises to achieve commonality would decrease technical functionality and lethality for frontline assets.

To best suit the war fighter, the "all-sensors, all-shooters" philosophy means the data link should be engineered around supporting frontline Joint assets and the distributed groups as the primary customers, not the AOC.

To support Joint C2 of an LO strike package, 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 data link should be mission-planning programmable and operator selectable. Finally, the tactical datalink should 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 capable of meeting these requirements significantly reduce the effective range and alone are unlikely to meet the "all-domain" philosophy of JADC2.

Thus 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 frontline assets. A key aspect would be a redundancy to enable kinetic and nonkinetic network resilience and sustainability. Supporting Joint assets with standoff capabilities would be the best candidates to serve as central network nodes and relays from distributed groups. These candidates 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 promptly.

Conclusion

With the right vision and the right leadership, there is significant potential for JADC2 to remedy an antiquated C2 structure containing weaknesses that have not yet been exploited by a capable enemy. Air Force Chief of Staff General Charles Q. Brown Jr. has made JADC2 his number one priority; the time to shape JADC2 to enable future victories against modernized peer threats is now.[15] The right leadership is in place and the momentum for change is strong. Military professionals must continue to advocate for a frontline-focused C2 structure, fighting for JADC2 to embrace maneuver warfare and redundancy in all domains to support the war fighter in a robust A2/AD threat environment.

By modeling JADC2 around the concept of distributed, decentralized control, the Joint Force could sustain operations in the likely scenario of an AOC in the Indo-Pacific region becoming kinetically or nonkinetically disrupted. Additionally, designing the "all-sensors, all-shooters" datalink around the philosophy of decentralized C2 and a war-fighter-first multidomain mentality would exponentially increase the lethality of Joint assets facing a modernized Chinese peer threat. In conclusion, war fighters cannot afford to squander this opportunity and must realize JADC2 development "must be tended to carefully if it is to achieve its objectives."[16]

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Notes

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