JADC2 in Distributed Operations

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ABSTRACT

The challenge of having a force posture survivable against the myriad of threats posed by a near-peer threat is very significant. The constant communication and relative sanctuary of air bases will fade into memory. Our forces will survive through dispersion, adaptation, and movement. In this environment, it will be critical for dispersed forces to be able to operate without any contact with the Air Operations Center (AOC) for extended periods of time. Therefore, Joint Force Commanders will need to provide Mission Tasking Orders (MTOs) to enable Joint Sector Air Commanders and Air Expeditionary (AEW) Commanders to continue operations for days at a time in flexible manner. At the AEW level, A2 and A3 divisions will need to be able to accomplish the functions normally provided by the AOC, such as Target Effects Team and Master Air Attack Planning Teams. Intelligence personnel at this level will also need to be deployed to drop-in bases as required to assist in continuing operations. Commanders from the AEW to the Flight level will need to be empowered with genuine authority to conduct decentralized control in execution for days or weeks at a time, and communication methods will vary and adapt in order to pass information up and down the chain of command. Integration with the Joint Force will require prior planning and direction in MTOs and unit-level commanders will rely heavily on embedded Liaison Officers (LNOs) for communication and coordination. Finally, the command role of the Air Battle Manager will increase significantly in a degraded communications environment to the point of force packaging and assigning targets.

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Day three of the war with China looks very different from any the U.S. has ever fought. The destruction of U.S. bases and key Command and Control (C2) nodes is widespread. Chinese surface-to-surface missiles (SSM) and space denial tactics have wreaked havoc on the framework America has used to fight its modern wars (Priebe et al. 2019, 9). The key theater Air Operations Center (AOC) has no communication with forward bases, satellite communications are down, the larger U.S. forward bases have taken missile damage, and air supremacy is far from assured. A myriad of challenges face American forces, particularly the Air Force. The success of this type of warfare depends on prior preparation, namely the ability to operate in distributed force posture. One of the key challenges of fighting in this posture with a near-peer threat will be effective C2. This white paper will look at this specific aspect of C2 as it relates fighter aircraft putting bombs on target, from the planning process to the end result.

The move by U.S. planners to favor a distributed force posture is motivated by increasing long-range threats to air bases and adversary capability to degrade and destroy communications networks. China represents the best example of this threat. Writing for the RAND Corporation, Dr. Miranda Priebe et al. (2019, 9) state, "[China] possesses a growing quantity and quality of long-range precision cruise and ballistic missiles that can threaten key targets on air bases. Second, People's Liberation Army (PLA) writings call for seizing information dominance early in a campaign, including by degrading or interfering with enemy communications links. China also has the capability to degrade or destroy long-haul, high-bandwidth communications links, such as commercial satellite communication (SATCOM) and submarine cables." The way USAF forces have been stationed in theater, in large, centralized, mostly-unhardened, lightly-defended bases, and the C2 structure—central AOC with limited key communication nodes and lines—we have utilized for the past 18 years of conflict will not stand up well in this threat environment (Lingel 2020, 7). This led the 2018 National Defense Strategy to focus on

"Transitioning from large, centralized, unhardened infrastructure to smaller, dispersed, resilient, adaptive basing that include active and passive defenses…." (Mattis 2018, 6).

Dispersed operating procedures will help keep forces intact and complicate the enemy's targeting, but will also bring about challenges. Dr. Priebe et al. (2019, viii) list three primary types of bases which fighter aircraft will operate from: "stay and fight," "drop-in," and austere forward arming and refueling points (FARPs). Stay and fight bases would be equipped with more robust defenses than modern bases and be the main staging point for the Air Expeditionary Wing (AEW). This base would also house the bulk of the Intelligence assets and other support agencies typically associated with a fighter wing. Drop-in bases would offer less defensive capabilities but would offer sustainment and recovery facilities to enable continuous operations from them. Finally, FARPs would open for only short periods to refuel and re-arm aircraft (Priebe et al. 2019, viii). Within this operating construct, the AEW Commander would be tasked with organizing and operating each of the drop-in and FARPs in his "cluster" of bases, likely sending out portions of Squadrons to operate from the drop-in bases for a specified time (the default unit sent to a drop-in base would most likely be a Flight of 4-8 aircraft). This is the picture and context in which Joint All Domain C2 (JADC2) will be analyzed in this white paper, specifically examining how the AOC passes effective directives to dispersed units, how each AEW and Expeditionary Fighter Squadron (EFS) will operate as a distributed planning cell (mini-AOC) when cut off from the AOC, how decentralized control will affect planning and execution, and finally how airborne C2 and Dynamic Targeting (DT) will provide the final layer of flexibility to enable effective coordination and control of fighter forces.

The hub for modern air power planning is the AOC, and for good reason. In the Korean War, the Air Force learned that centralized control was needed for effective and efficient air operations on a large scale. Modern war will require the same centralized coordination.

However, planners must anticipate the AOC being out of communications or fully non-operational for extended periods of time as discussed previously. Therefore, the 72-hour Air Tasking Order (ATO) cycle used for the past fifteen to twenty years will likely not be feasible (Lingel 2020, 6-7). Decision-makers will need to establish the structure for continued operations before kinetic warfare breaks out. Breaking the physical battlespace into areas of responsibility (AORs) assigned to each Region (multiple AEWs grouped together) or AEW would focus the subordinate planning, intel, and fighter forces on a smaller and more manageable working area. Under this structure, the Joint Force Air Component Commander (JFACC) would delegate Joint Sector Air Commanders (JSACs) to oversee command of their geographic AORs. The key difference between this structure and the route package concept used in Vietnam is the fact that all JSACs would still answer to one JFACC, but could operate independently if required (Priebe et al. 2019, 51-52). Whether all services in the Joint Force would be separated into AORs would depend on the geography and phase of conflict, but it is likely that Navy air assets would be assigned at least some missions from the JSAC for the region their carrier group was operating in. Marine and Army aviation would likely focus on support of their specific Marine Expeditionary Unit (MEU) or Brigade Combat Team (BCT) as appropriate.

The second key component for effective direction from the AOC will be to move to Mission-Type Orders (MTO) as opposed to the typical ATO. Dr. Priebe et al. define MTO as "a broad statement of a commander's intent and what a subordinate unit should accomplish without detailed description of how to accomplish the mission" (2019, 54). This direction would then give JSACs and AEW Commanders more leeway with respect to mission timing and distribution of forces in accomplishing objectives of the MTO. The MTO could also be assigned for a longer period than an ATO. For example an MTO could cover two or three weeks. Then when communication with the AOC is lost, the fight can continue as JSACs pass taskings to

AEWs within their AOR. This concept should continue down from the JSAC to the AEW and to the EFS, as a robust adversary could severe communications on multiple levels. The goal for the MTO mindset should be to pass objectives in such a way that an EFS Commander could take his objectives for the coming week and continue to operate even if he is cut off from his JSAC and AEW. More details on how the logistic considerations behind this will be discussed later in this paper. From the joint perspective, Army and Marine units already emphasize this type of mission command (Priebe et al. 2019, 55).

Assuming that the JFACC's intent is effectively passed to units, the next challenge that arises is to implement the MTO without the supporting function the AOC normally provides. AOC-level functions could be passed to the "mini-AOCs." However, it is likely that communication will be hampered enough from the JSAC-level to the AEW that rapid, secure communication will not be possible. Therefore, the AEW-level Intelligence will have to own the entire targeting cycle. The 366 Fighter Wing Directorate of Intelligence has developed a working plan detailing this type of operation. In this plan the AEW A2 and A3 would perform the Target Effects Team (TET) and Master Air Attack Planning (MAAP) Team functions for limited periods of time. This will require unit-level Intelligence troops to be trained in the necessary skills to operate in these roles without reliance on the AOC. On the back end of a mission, the AEW A2/A3 would produce a "Modified ACEREP," which is a "decision quality intelligence" briefing to AEW leadership (366 Fighter Wing Directorate of Intelligence 2020, 4-5). This would allow the planning, targeting, and execution cycle to continue independently of the AOC.

Once the Intelligence and planning functions are operational at the AEW level, effective C2 will require truly decentralized control. The two key pieces of this are authority and communication. In its ideal form, JADC2 imagines a seamless, high-tech communications

structure, allowing maximum situational awareness (SA) to be passed to all players using all domains in harmony. However, the future reality of JADC2 may be that our forces rely on whichever domain is actually functional and available. Long-distance communication, as would be the case in the Indo-Pacific theater, will be degraded and often denied. Local communication will be more feasible, potentially relying on terrestrial fiber, line-of-sight, and even couriers and face to face meetings via aircraft transportation (Priebe 2019, 25, 49).

With this reality, commanders must delegate authority to the lowest practical level. The AEW commander will be expected to task his units for specific mission sets. For example, he may task a flight of F-15Es to provide Defensive Counter Air (DCA) coverage of the stay and fight base while selecting another flight of F-15Es to launch on deliberate strike missions. Due to the threat of attacks at the stay and fight base, the AEW Commander could send his deliberate strike F-15Es to stage out of a drop-in base for a few days. This next level of dispersion peels the C2 onion back another layer. To effectively operate at the drop-in base, the fighters will require a contingent of support personnel. Intelligence troops, from the EFS and AEW/A2 level will be required to forward deploy to continue the targeting cycle from the drop-in base (366 Fighter Wing Directorate of Intelligence 2020, 8). In addition, the Flight Commander in charge of the F-15Es will need to be given authority to launch and task his jets as he sees fit until communication is re-established with the AEW.

The tie-in to the joint fight should occur largely at the AOC and JSAC levels. Naval assets would have Liaison Officers (LNO) at the “mini-AOC,” and each AEW would also have a Navy LNO. Coordination for mission objectives and accomplishment would work through the AOC and JSAC and should be deconflicted to allow the unit-level operations not to overlap between forces that are not in communication with each other. Real-time deconfliction of Navy air assets would be handled by airborne or ground-based C2. Deconfliction from Army and Marine forces

would fall into two categories. Deliberate strike mission objectives should be planned at adequate distance from friendly ground forces to allow air planners ample time to strike targets without ground forces encroaching on target areas (assuming SA of friendly ground troops is unavailable for extended periods). Targets closer to the Forward Edge of the Battle Area (FEBA) should be given DT-type directives. In other words, fighters would be required to check in with a C2 asset with higher SA of the FEBA before striking specific taskings. Finally, tasking Close Air Support (CAS) would be straightforward as long as communications with a Joint Terminal Air Controller (JTAC) could be established.

The final portion to examine in this white paper is the case where communications are so degraded that drop-in bases or entire AEWs are cut off from meaningful communication for extended periods of time. In this case, priority must be given to communication with airborne C2 assets. If an asset such as an E-3 were positioned at a key node, specific tasking and targeting information could be given to the Air Battle Manager (ABM). The E-3 could then pass tasking and targeting information to fighter assets who take off with bombs and no other information than their assigned AOR. DT and Strike Coordination and Reconnaissance (SCAR) contracts could be used to effectively continue to attack adversary targets despite a lack of specific information passed to fighters prior to takeoff. Fighters could then return to a FARP or drop-in base to refuel, re-arm, and takeoff in anticipation of their next tasking. The logistics of force packaging with Offensive Counter Air (OCA) and tanker assets would present more challenges. However, a robust MTO could prepare the battlespace with a rhythm of operations which would ensure air assets are airborne and available to be tasked by ABMs real time.

As SSMs and cruise missiles reign down on our key bases during Day one of the “next big war,” our ability to gain air superiority will have largely been decided. If Air Force planners have laid the structures for dividing the battlespace into workable AORs and structured the AOC

to provide workable MTOs, operations will be able to continue. Force dispersion will allow survivability, and authority delegated to JSACs and AEW Commanders will enable decision-making down to the lowest levels. Intelligence troops trained in AOC-type functions, such as TET and MAAP Teams, will be able to continue the targeting cycle at dispersed bases. Finally, tactical level operators, ABMs, pilots, and other aircrew will need the training and flexibility to continue to put bombs on target despite having far less SA than all are used to. If the USAF and our Joint partners can train and prepare for this concept of operations, American forces will stand a much better chance at gaining and maintaining superiority in the air and in all other domains.

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BILBIOGRAPHY

366th Fighter Wing Directorate of Intelligence, Gunfighter Intelligence: Agile Combat Employment Flight Plan § (2020).

Lingel, Sherrill, Jeff Hagen, Eric Hastings, Mary Lee, Matthew Sargent, Matthew Walsh, Li Ang Zhang, and David Blancett. "Joint All-Domain Command and Control for Modern Warfare: An Analytic Framework for Identifying and Developing Artificial Intelligence Applications." (2020).

Mattis, Jim. “Summary of the 2018 National Defense Strategy of the United States of America.” Department of Defense. Washington, United States (2018).

Priebe, Miranda, Alan J. Vick, Jacob L. Heim, and Meagan L. Smith. “Distributed Operations in a Contested Environment Implications for USAF Force Presentation.” RAND Corporation Santa Monica, United States (2019).

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