

U2 Dragon Lady pilot with 5<sup>th</sup> Reconnaissance Squadron waits in pressure suit before flight at Osan Air Base, South Korea, December 11, 2018 (U.S. Air Force/Sergio A. Gamboa)



# Master and Commander in Joint Air Operations

## Winning the Air War Through Mission Command

By Matthew Quintero

*But in case signals can neither be seen [n]or perfectly understood, no Captain can do very wrong if he places his Ship alongside that of an Enemy.*

—VICE ADMIRAL HORATIO NELSON

While planning for the battle of Trafalgar, Vice Admiral Nelson had an ingenious idea. He would break from doctrine—risking command and control (C2) of his fleet—and part his line of ships into two columns to drive directly at the enemy and force a decisive engagement. Success required trust in his captains to execute the intent of his plan in the heat of battle when they could no longer see his flagship's signals. Nelson's intent was clear: his forces were to find the enemy and engage them. Clear commander's guidance, nonreliance on communications between the tactical commander and the operational commander, autonomous execution of mission-type orders, and, most impor-

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tantly, the trust between the commander and his subordinates to execute those orders within his guidance are the hallmarks of a concept as old as Nelson—mission command. Mission command is described in joint doctrine as follows:

*If a commander loses reliable communications, mission command—a key component of the C2 [joint] function—enables military operations through decentralized execution based on mission-type orders. Commanders delegate decisions to subordinates wherever possible, which minimizes detailed control and empowers subordinates' initiative to make decisions based on the commander's guidance rather than constant communications.<sup>1</sup>*

While mission command is not a new concept, much has been written on the topic since 2012 when then-Chairman of the Joint Chiefs of Staff General Martin Dempsey released his white paper, *Mission Command*, which implored his subordinates to “live and breathe” that style of command and control.<sup>2</sup> In 2014, Joint Publication (JP) 3-30, *Command and Control of Air Operations*, was updated to include a discussion of mission command.<sup>3</sup>

Since the advent of satellite communications and the Internet, C2 of joint air operations has become increasingly centralized. Today's far-reaching C2 systems allow operational commanders to make tactical-level decisions from thousands of miles away. Although JP 3-30 discusses the virtues of mission command, it goes on to explain that joint air operations have unique qualities that are not always fit for mission command. JP 3-30 explicitly provides for times when a high degree of centralized control and tactical oversight is desired for an operation. Moreover, it details requirements for “robust command and control systems” to enable that oversight. While these C2 systems may be untenable in future operating environments against a capable foe, the uncontested air environments of Operations *Southern Watch* (OSW), *Desert Storm* (ODS), *Enduring Freedom* (OEF), and *Iraqi Freedom* (OIF) have allowed this way of C2 to thrive.

Proponents of this trend argue that lack of centralized control may “result in failure to capitalize on joint force integration or may degrade operational-level flexibility,” especially in the cases of “sensitive strikes.”<sup>4</sup>

It seems doctrine has forgotten the hard-learned lessons of past air campaigns, specifically the war in the Pacific, where mission command was instrumental in America's victories over formidable Japanese air forces. Likewise, there are no discussions of the most important enablers of mission command, such as trust, delegation, initiative, and commander's intent.<sup>5</sup> These are intangible leadership qualities required of a joint force air component commander (JFACC).

To win America's future air wars, mission command must be woven into the fabric of joint air operations. To prove this assertion, this article first establishes the validity of mission command in major air operations by considering the the Battle of Midway. Then, the efficacy of modern communications technology, which allows centralized C2, is challenged by looking forward to America's potential adversaries. Finally, the article's focus is turned to today's operational leadership challenges and the importance of the JFACC as the key enabler of successful mission command.

### **Midway: America's Trafalgar**

The Battle of Midway is regarded as a prime example of an American air battle where the operational commander successfully employed the principles of mission command. Like Nelson at Trafalgar, Admiral Chester Nimitz, the operational commander, had a clear concept of operations that capitalized on the trust of his subordinates and required little in the way of C2 communications.<sup>6</sup> Nimitz trusted his intelligence officers who predicted a Japanese invasion force at Midway Island, and his intent for the defense of the island was clearly communicated via his Operation Plan (OPLAN) 29-42.<sup>7</sup> The plan was well-communicated through the distribution of 86 hardcopies to his carrier battle groups and the Army air forces on Midway.<sup>8</sup>

During the battle and the days leading up to it, Nimitz made few C2 communications due to necessity, the strength of his plan, and the trust he placed in Admirals Raymond Spruance and Frank Fletcher, his subordinate carrier commanders.<sup>9</sup> To prevent detection by Japanese radio direction-finding technology before the battle, Spruance and Fletcher were restrained to visual signals, and Nimitz could only broadcast messages to his fleet. Once the battle began, Nimitz knew to expect incomplete information at best.<sup>10</sup> Nimitz retained operational control over his naval forces and the Army air forces on Midway Island. Tactical control of the battle was left to Fletcher.<sup>11</sup> Once the OPLAN was put in place, he refrained from further involvement in the battle. Success required that Nimitz trust his subordinate commanders to execute his vision. Japanese technology and, more importantly, the imminent threat of Japanese invasion did not allow Nimitz any other options but to completely release tactical control to his subordinates. Regardless, American victory at Midway is largely attributed to Nimitz's leadership. U.S. air forces have not fought an evenly matched opponent since World War II, and there has been no impetus for C2 through mission command in subsequent conflicts. Generations of commanders have since faced lower intensity operations, allowing levels of centralized C2 to be unsustainable in a conventional war.

Current joint air operations do not exhibit the right attitude for waging an air campaign against a capable foe. America's last three major air campaigns—ODS, OEF, and OIF—have all been marked both in doctrine and execution by an increased reliance on C2 systems to make decisions. JP 3-30 has evolved from the tenant of “centralized planning, and decentralized execution” to “centralized control and decentralized execution.”<sup>12</sup> JP 3-30 further explains that “specific missions and capabilities will drive . . . the extent that mission-type orders may be used.” JP 3-30 also explains that “Highly sensitive strike missions . . . will generally require a higher level of detailed planning and centralized



F/A-18F Super Hornet assigned to Air Test and Evaluation Squadron (VX) 23 flies over aircraft carrier USS *Gerald R. Ford*, July 28, 2017, in Atlantic Ocean (U.S. Navy/Erik Hildebrandt)

control.”<sup>13</sup> The pitfall associated with this trend is the reliance on C2 systems rather than commander’s intent. A joint force commander or component commander must anticipate the actions of the enemy and affect the future of an operation. This cannot be accomplished by merely reacting to C2 systems.<sup>14</sup> In a future fight for air supremacy against a determined enemy, access to advanced C2 systems will not be assured, and the sheer number of timely decisions required will make any type of centralized C2 unsustainable.

### **C2 Systems: The Enablers of Centralization**

The JFACC will not be able to conduct business as usual in a fight with an enemy that has the capability to disrupt C2, whether it is due to low-cost harassment of computer and satellite systems or fear of high-end missile attacks. With its enormous network and satellite communications capabilities, the Joint Air

and Space Operations Center (JAOC) is the heart of the joint air C2 system. With the ability to reach back to critical information sources stateside and reach forward to individual aircraft in theater, the JAOC is a powerful tool for the JFACC. This C2 system has worked well for planning major air campaigns in ODS, OEF, and OIF, but it has met shortfalls when trying to communicate with air controllers on the ground, ships at sea, and aircraft over the battlefield. The JAOC is unproved against an enemy actively working to degrade the Internet and satellite capabilities that enable it. Furthermore, it will be unable to closely control tactical units, especially carrier-based aircraft, when those units voluntarily block off communications to remain undetected.

In the future, persistent access to safeguarded networks cannot be assumed. At the onset of OEF, the JAOC in Saudi Arabia was a technological marvel of C2

capability, described as “how war rooms are depicted in Hollywood movies.”<sup>15</sup> Vast amounts of information collected from both sensors on the battlefield and sources back in the United States were available to the JFACC. These huge amounts of data traveled over secure Internet lines.<sup>16</sup> Since the start of OEF, these internet networks have proved vulnerable to computer network attacks (CNA).<sup>17</sup> In the case of SIPRNet (secret-level Internet), it has since been breached by a virus transmitted from a USB thumb drive at a terminal in Afghanistan. Of note, email accounts within the Pentagon, including those belonging to the Joint Chiefs of Staff, were compromised due to this attack from the far side of the world.<sup>18</sup>

Like Nimitz with his 86 hardcopies of his OPLAN, joint air C2 can overcome CNA through mission command principles. Reliance on high-capacity networks for C2 is seen as a critical vulnerability



that our adversaries are actively planning on. According to one report, “Chinese writings reveal an interest in the full spectrum of CNA tools, including hacking, viruses, physical attack, insider sabotage, and electromagnetic attack.”<sup>19</sup> That report also states, “Chinese CNA targeting focuses specifically on enemy C2 centers.” The same report brings up some interesting points that could be exploited through mission command. First, some Chinese writings argue that U.S. command and control will be unable to operate without their computer systems. It further states that “Chinese strategists generally underestimate the capacity of the system to use paper, pencil, fax, and phone if necessary.”<sup>20</sup> Also of interest is an assessment that “Chinese writings on information warfare show no confidence in China’s ability to get inside . . . deployed ships or other self-contained operational units.”<sup>21</sup> Through independent action without instant information, and reliance on older methods of communications, the United States can maintain the advantage in the face of sophisticated network attacks.

Any requirements for instant updates from aircraft over the battlefield to the JFACC will be heavily reliant on satellite communications (SATCOM), which have historically proven inadequate during major combat operations. During ODS, to connect U.S. Central Command (USCENTCOM) in Tampa, Florida, to the battlefield, SATCOM was required between not only Tampa and the JAOC in theatre but also the JAOC and key “air control” platforms such as the E-2 Hawkeye, E-3 Sentry, and E-8 JSTARS.<sup>22</sup> These aircraft then maintained line-of-sight communications with hundreds of aircraft in theatre. At the onset of ODS, this envisioned SATCOM capacity did not exist, and the existing capacity was quickly overloaded.<sup>23</sup> Additionally, with SATCOM as their primary source of computer file exchange and long-range communications, the United States and allied forces at sea were often left in the dark. S-3 Vikings from the carriers were required to transport hardcopies of vital JFACC orders for flight planning such as the Air Tasking Order (ATO).<sup>24</sup>

Commercial satellite systems were brought in to fill the gaps. In fact, at the “height of *Desert Storm* over 95 percent of [US]CENTCOM’s long-range communications were handled by satellite communications with only 72 percent on military satellites.”<sup>25</sup> Eleven years later during OIF, SATCOM capabilities proved inadequate in connecting end users to the JFACC. When tactical air control parties on the ground could not maintain communications with the JAOC, E-2s and E-3s stepped in to provide live coordination of tasking, aerial refueling, battle damage assessment, and restrikes between the Combined Air Operations Center (CAOC) and tactical aircraft flying in theatre.<sup>26</sup> Twenty-seven years later, E-2s and E-3s still use the same commercial SATCOM systems for long-range communications. Moreover, these SATCOM paths are now being used to bring Internet capabilities to the aircraft.<sup>27</sup> Long-range communication shortfalls and congestion occurred when SATCOM use was completely uncontested. Adversaries rightfully see this as a critical vulnerability of C2 and it is subject to exploitation. A *Chinese Liberation Army Daily* article states, “Anti-satellite weapons that can be developed at low cost and that can strike at the enemy’s enormously expensive yet vulnerable space system will become an important option for the majority of medium-sized and small countries with fragile space technology.”<sup>28</sup> Furthermore, Chinese strategic writings have argued the following:

*The enemy’s naval force and its national military command authorities, naval command centers, and other force links mainly rely on high frequency satellite communications . . . including commercial and military satellite communications, all of which are easily susceptible to electronic interference and deception.*<sup>29</sup>

SATCOM will not be guaranteed in an uncontested environment, much less a contested one. C2 through mission command can relieve the impact of degraded SATCOM. Through well-written mission-type orders, we can place

decisionmaking in the heads and hands of our aircraft over the battlefield.

Compounding the communications problem, future naval air forces will operate from self-imposed emissions restrictions. As long-range enemy missile technologies advance, naval forces will operate for days, weeks, or months in highly restrictive electromagnetic spectrum emissions control (EMCON) statuses in order to prevent the enemy from locating and targeting its ships.<sup>30</sup> Like Spruance and Fletcher at Midway, today’s commanders will need to fight and maneuver in silence. For decades, EMCON operations have been the exception and not the rule for the Navy. Ironically, this can be attributed to increasing demand for communications and data paths, which use a large portion of the electromagnetic spectrum.<sup>31</sup> Like Nimitz, the JFACC must give his naval air forces clear intent and guidance before they go EMCON. Then, he must sit back and trust his subordinate commanders to execute that intent.

Mission command can overcome the shortfalls of current C2 systems. Requirements for “robust C2 systems” and their enabling the JFACC to maintain centralized command and control through these systems must be given greater context in JP 3-30. While they are powerful tools in preparing for a conflict, unfettered use of the Internet and SATCOM cannot be expected during a conflict with a skilled adversary. As in the case of the S-3s flying hardcopies of the ATO to the carriers, the JAOC must be ready to use more primitive methods to deliver orders when C2 systems are taken away. Mission command will be essential in the writing of these orders, as the ability to quickly change these orders may be impossible. When communications degraded during OEF and OIF, airborne C2 platforms such as the E-2 and E-3 stepped in to bridge the gap among the JFACC at the JAOC, troops on the ground, and aircraft flying over the battlefield. The usage of airborne C2 platforms should not be limited to air control or radio relay. The JFACC can reduce requirements for long-range communications by allowing increased

levels of decisionmaking to occur within those aircraft. Well-communicated intent channeled through mission-type orders distributed before major combat operations will give America the advantage in future air wars.

## JFACC: The Enabler of Mission Command

Success in mission command requires a commander willing to employ it. As General Dempsey stated in his white paper, “mission command is commander-centric.”<sup>32</sup> A great deal relies on the personality of the commander. He must have the resolve to confront his own cognitive limitations and the will to place uncomfortable levels of trust in his subordinates. While decisions with potential for strategic consequences may not be in his hands, the JFACC must resolve to do everything in his power to delegate decisionmaking to the lowest levels possible:

*Before long distance communications, a commander's span of control was limited to the subordinates who could directly hear his voice. Modern communications allow control over much greater distances. Nonetheless . . . a single commander can only exercise close control over a finite number of other soldiers during a fast-moving battle. And while radios, digitized messages, electronic maps, and symbology have improved upon the human voice in many ways, none of these enhancements has done much to expand the cognitive capacity of the individual tactical commander.<sup>33</sup>*

At the onset of OEF, JFACC General Charles Wald compared the amount of information made available to him during a few days at the JAOC as being equivalent to the amount of data collection and research made available to him during 6 months of ODS.<sup>34</sup> With such an abundance of data, the issue now becomes the ability of the commander to filter signal from noise. If the JFACC and his staff focus on fine details at the tactical level, they will not produce content that is necessary for the operational level of warfare. An overabundance of information can ultimately lead commanders to lose sight

of what is important to their level of command.<sup>35</sup> Perhaps the most insidious side effect of this overabundance may be the inevitable search for perfect information. The quest to have perfect information in order to make a perfect decision threatens to slow the decisionmaking process to the point of inaction. Trust is threatened when subordinates feel this quest is mere meddling by their commanders.

Persistent sensor coverage and long-range communications systems have enabled tactical micromanagement by operational commanders.<sup>36</sup> Prior to OEF, the JAOC led OSW. OSW policed the Iraqi no-fly zone. USCENTCOM maintained highly centralized control over tactical execution due to the slow pace of the operation. OSW was characterized by a “draconian” set of rules of engagement (ROEs), and the JAOC had to ask USCENTCOM for permission to take any type of enforcement action.<sup>37</sup> In the execution of OEF, USCENTCOM maintained a high level of centralized control reminiscent of OSW through strict ROEs, special instructions (SPINs), and target vetting.<sup>38</sup> ROE during OEF basically required that any target with the potential of collateral damage required approval from USCENTCOM or higher. Reportedly, there were at least 10 times when top Taliban and al Qaeda leadership had been located and placed in the crosshairs of an aircraft during the first 6 weeks of OEF. By the time engagement decisions came back down from USCENTCOM, the opportunity to fire had been lost.<sup>39</sup> More simply stated by a CAOC staffer at the time, “we knew we had some of the big boys. The process [was] so slow that by the time we got the clearances and everybody put in their two cents, we called it off.”<sup>40</sup>

OIF ushered in the era of *network-centric warfare* defined as a “systematic approach aimed at improving combat decisionmaking at all levels by creating a seamless grid of interconnected sensors, weapons, individuals, and command and control mechanisms . . . to enhance the ability to sense, locate, communicate, attack, and assess.”<sup>41</sup> Or in the case of the air war, it was described as “Internet-in-the-cockpit capability.”<sup>42</sup> Once again,

the operational commander would have another avenue to reach out and touch the battlefield. Today’s JFACC has the time and tools to intervene at the tactical level; the JFACC of the future will not have those tools or time.

The strict ROEs and micromanagement in the OEF example can be defended by the high value placed on preventing civilian casualties and maintaining strategic messaging.<sup>43</sup> ROEs come down from the strategic level of war, and commanders at the operational level must work within the guidance they are given. While centralized control during OEF may have had the best intentions, the unintended consequence was that the “time-sensitive” targets were lost to it. The JFACC must allow the decision to pull a trigger to occur at the lowest tactical levels possible. To do so, he must also advocate for ROEs from higher up that allows decentralization and freedom of action. As the commander of Naval Air Forces concluded at the time, “I think we need to put [the decision authority] back in the cockpit if we are going to enable time-critical strike.”<sup>44</sup> The trend of centralizing decisionmaking may work in the uncontested environment of today, but it risks creating a culture that will be hard to change when the United States finds itself fighting an enemy that is capable of contesting it in the sky.

On June 18, 2017, a Navy F/A-18 shot down a Syrian Su-22 in defense of friendly forces on the ground in support of Operation *Inherent Resolve* (OIR). This event marked the only air-to-air shoot-down of enemy aircraft by U.S. forces since Operation *Allied Force* in 1999.<sup>45</sup> When interviewed a few days later, Lieutenant General Jeffrey Harrigan, the Combined Force Air Component Commander (CFACC) and de facto JFACC for OIR, defended the actions of the Navy aircrew. He specifically commented on the need for placing decisionmaking in the cockpit, stating, “when you’re doing 400 knots and the adversary is coming at you at 400 knots there is no time for someone from the [JAOC] to tell you what to do. . . . They were going to be the ones that needed to make that self-defense decision.”<sup>46</sup>



Airman with 1<sup>st</sup> Special Operations Logistic Readiness Squadron conducts forward area refueling point operation at Hurlburt Field, Florida, February 26, 2017 (U.S. Air Force/Joseph Pick)

Furthermore, this guidance was clear to the aircrew well before the event. Months later at a panel interview, one of the Navy aircrew involved in the shoot-down stated:

*CFACC came out to the aircraft carrier not too many days prior to [the shoot-down] . . . talking directly to the aircrew . . . saying that “you know my guidance . . . I have your back” . . . emphasizing the point that you have to go out there and operate autonomously within the commander’s guidance . . . and your decisions have strategic implications so don’t take those decisions lightly.<sup>47</sup>*

And as to the judgment of the pilot who actually pulled the trigger, the aircrew had this to say:

*But it cannot be emphasized enough, that . . . to recognize that it was his job . . . to execute the ROE . . . and squeeze the trigger . .*

*. . . could not have been made possible without our entire command environment from the [commanding officer] up through [the commander’s action group], Admiral, and all the way up to the CFACC.<sup>48</sup>*

This event is a shining example of how mission command worked and why it was required. The JFACC made it clear that he trusted the officers who would be flying his missions. Sadly, the actions by the Navy aircrew on that day could arguably be the culmination of one commander’s efforts rather than the product of a system set up to achieve mission command. Trusting subordinates is arguably the hardest part of mission command.

In the case of Midway, there was a true existential threat to U.S. forces in the Pacific. By being outnumbered, there was no incentive for Nimitz to intervene at the tactical level. His subordinate commanders would have their hands

full in fighting the Japanese carrier fleet. Much like Nimitz, operational commanders cannot expect to approve every engagement in a conflict when hundreds of engagements may be taking place simultaneously. In this effort, the JFACC has powerful tools at his disposal in the form of products such as the ATO and SPINs. Specifically, the SPINs convey the JFACC’s intent and meld that with ROEs to give the aircrew a set of instructions to follow in the execution of their missions.<sup>49</sup> The SPINs also provide for times, usually involving air-to-ground or air-to-air engagements, when JFACC approvals must be sought out. Future JFACCs must strive to reduce these occasions or find ways to delegate those approval powers to lower levels. As in OIR, the operational commander must realize the limitations of their own abilities. The JFACC must provide the correct levels of guidance, ROEs, and mission-type orders to allow their subordinates to execute their intent.





Marine controls forward arming and refueling point operations after refueling Bell AH-1W Super Cobra at Pohakuloa Training Area, Hawaii, July 18, 2018 (U.S. Marine Corps/Adam Montero)

## Conclusion

To win America's future air wars, mission command must be woven into the fabric of joint air operations. Doctrine must change to accommodate it. Commanders must be willing to employ it. The recent example of mission command in the Su-22 shoot-down seems to buck the recent trend of increasing centralization; however, it can arguably be attributed to one determined commander rather than the culture and doctrine that preceded it. JP 3-30 has supported centralization of C2 by calling for C2 systems that allow the JFACC to direct tactical actions over the battlefield and providing times when that may be appropriate. While the JAOC's C2 systems provide powerful tools for information-gathering, overuse risks undermining the value

of well-communicated commander's intent and mission-type orders. A skilled adversary will not allow unfettered use of C2 systems that have become customary. Furthermore, doctrine fails to describe the importance of the JFACC in mission command. As in the OIR example, the JFACC must realize the limitations of his own abilities and trust he has provided the correct levels of guidance to allow subordinates to execute intent.

In the future, decisions to engage the enemy will need to be made at the lowest levels. The JFACC may be led to indecision as he attempts to sift through tremendous amounts of information in order to find a perfect answer. If he attempts to maintain centralized C2, he will soon be overwhelmed by the number of decisions to be made. Even if

he can make those decisions, the enemy may cut off his means of communicating them. The JFACC must trust his officers, alone in their aircraft, to make the right decisions. Trust is the hardest part of mission command. For the commander struggling with trust when strategic consequences may be at stake, it may help to once again read the words of Vice Admiral Nelson. Far from headquarters and without orders, he had to decide whether or not to engage a shore garrison. He had this to say about his decision:

*I have no doubt in the way we proposed to attempt it, by bombardment and cannonading, joined to a close blockade of the harbor. . . . If not . . . our Country will, I believe, sooner forgive an officer for attacking his enemy than for letting it alone.<sup>50</sup> JFQ*

## Notes

<sup>1</sup> Joint Publication (JP) 3-0, *Joint Operations* (Washington, DC: The Joint Staff, 2017), available at <[www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3\\_0\\_20170117.pdf](http://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_0_20170117.pdf)>.

<sup>2</sup> Martin E. Dempsey, *Mission Command* (Washington, DC: The Joint Staff, 2012), available at <[www.jcs.mil/Portals/36/Documents/Publications/missioncommandwhitepaper2012.pdf](http://www.jcs.mil/Portals/36/Documents/Publications/missioncommandwhitepaper2012.pdf)>.

<sup>3</sup> JP 3-30, *Command and Control of Joint Air Operations* (Washington, DC: The Joint Staff, 2014), available at <[www.dtic.mil/doctrine/new\\_pubs/jp3\\_30.pdf](http://www.dtic.mil/doctrine/new_pubs/jp3_30.pdf)>.

<sup>4</sup> Ibid.

<sup>5</sup> Ibid.

<sup>6</sup> Carl H. Builder, Steven C. Bankes, and Richard Nordin, *Command Concepts: A Theory Derived from the Practice of Command and Control* (Santa Monica, CA: RAND, 1999), 38.

<sup>7</sup> Ibid., 39.

<sup>8</sup> Ibid., 42.

<sup>9</sup> Ibid.

<sup>10</sup> Ibid., 38.

<sup>11</sup> James A. Winnefeld and Dana J. Johnson, *Command and Control of Joint Air Operations: Some Lessons Learned from Four Case Studies of an Enduring Issue* (Santa Monica, CA: RAND, 1991), 57.

<sup>12</sup> JP 3-56.1, *Command and Control of Joint Air Operations* (Washington, DC: The Joint Staff, 1994), v; JP 3-30.

<sup>13</sup> JP 3-30.

<sup>14</sup> Builder, Bankes, and Nordin, *Command Concepts*, 2–3.

<sup>15</sup> Benjamin S. Lambeth, *Air Power Against Terror: America's Conduct of Operation Enduring Freedom* (Santa Monica, CA: RAND, 2005), 280.

<sup>16</sup> Ibid.

<sup>17</sup> James A. Green, *Cyber Warfare: A Multidisciplinary Analysis* (London: Routledge, Taylor & Francis Group, 2016), 23.

<sup>18</sup> Ibid., 22–23.

<sup>19</sup> James C. Mulvenon, *Chinese Responses to U.S. Military Transformation and Implications for the Department of Defense* (Santa Monica, CA: RAND, 2006), 91.

<sup>20</sup> Ibid.

<sup>21</sup> Ibid., 88.

<sup>22</sup> James A. Winnefeld, Preston Niblack, and Dana J. Johnson, *A League of Airmen: U.S. Air Power in the Gulf War* (Santa Monica, CA: RAND, 1994), 205.

<sup>23</sup> Ibid., 208.

<sup>24</sup> Ibid.

<sup>25</sup> Ibid., 205.

<sup>26</sup> Benjamin S. Lambeth, *American Carrier Air Power at the Dawn of a New Century* (Santa Monica, CA: RAND, 2005), 54–55.

<sup>27</sup> *Selected Acquisition Report: Airborne Warning and Control System Block 40/45 Upgrade (AWACS Blk 40/45 Upgrade)*, Executive Services Directorate, available at

<[www.esd.whs.mil/Portals/54/Documents/FOID/Reading%20Room/Selected\\_Acquisition\\_Reports/16-F-0402\\_DOC\\_13\\_AWACS\\_Blk\\_40-45\\_Upgrade\\_DEC\\_2015\\_SAR.pdf](http://www.esd.whs.mil/Portals/54/Documents/FOID/Reading%20Room/Selected_Acquisition_Reports/16-F-0402_DOC_13_AWACS_Blk_40-45_Upgrade_DEC_2015_SAR.pdf)>; *Selected Acquisition Report: E-2D Advanced Hawkeye Aircraft (E-2D AHE)*, Executive Services Directorate, available at <[www.esd.whs.mil/Portals/54/Documents/FOID/Reading%20Room/Selected\\_Acquisition\\_Reports/16-F-0402\\_DOC\\_68\\_E-2D\\_AHE\\_DEC\\_2015\\_SAR.pdf](http://www.esd.whs.mil/Portals/54/Documents/FOID/Reading%20Room/Selected_Acquisition_Reports/16-F-0402_DOC_68_E-2D_AHE_DEC_2015_SAR.pdf)>.

<sup>28</sup> Mulvenon, *Chinese Responses*, 68.

<sup>29</sup> Ibid., 71.

<sup>30</sup> Zachary Hoyt, “Get Used to EMCON,” U.S. Naval Institute *Proceedings* 143, no. 7 (July 2017), available at <[www.usni.org/magazines/proceedings/2017-07/professional-notes/E2%80%94get-used-emcon](http://www.usni.org/magazines/proceedings/2017-07/professional-notes/E2%80%94get-used-emcon)>.

<sup>31</sup> Ibid.

<sup>32</sup> Dempsey, *Mission Command*.

<sup>33</sup> John Patrick White and Zalmay Khalilzad, *Strategic Appraisal the Changing Role of Information in Warfare* (Santa Monica, CA: RAND, 1999), 161.

<sup>34</sup> Lambeth, *Air Power*, 280.

<sup>35</sup> James Kahan, *Understanding Commanders' Information Needs* (Santa Monica, CA: RAND, 2000), 32.

<sup>36</sup> Lambeth, *Air Power*, 296.

<sup>37</sup> Ibid.

<sup>38</sup> Ibid., 297–298.

<sup>39</sup> Ibid., 314.

<sup>40</sup> Ibid., 314–315.

<sup>41</sup> Lambeth, *American Carrier*, 96.

<sup>42</sup> Ibid., 97.

<sup>43</sup> Lambeth, *Air Power*, 320.

<sup>44</sup> Ibid., 349.

<sup>45</sup> Jim Michaels, “Attacks Heighten Complexity of Air War in Syria,” *USA Today*, June 23, 2017, available at <[www.usatoday.com/story/news/world/2017/06/23/attacks-air-war-assad-syria/424609001/](http://www.usatoday.com/story/news/world/2017/06/23/attacks-air-war-assad-syria/424609001/)>.

<sup>46</sup> Ibid.

<sup>47</sup> Jeff Krueger, “Panel # 2—JO Panel— from Tailhook 2017 Symposium,” *Livestream.com*, n.d., available at <<https://livestream.com/wab/tailhook2017/videos/162478715>>.

<sup>48</sup> Ibid.

<sup>49</sup> JP 3-30.

<sup>50</sup> Alfred Thayer Mahan, *The Life of Nelson: The Embodiment of the Sea Power of Great Britain* (Boston: Little, Brown and Co., 1897), 128.

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*Cross-Functional Teams in Defense Reform: Help or Hindrance?*

By Christopher J. Lamb



There is strong bipartisan support for Section 941 of the Senate's version of the National Defense

Authorization Act for 2017, which requires the Pentagon to use cross-functional teams (CFTs). CFTs are a popular organizational construct with a reputation for delivering better and faster solutions for complex and rapidly evolving problems. The Department of Defense reaction to the bill has been strongly negative. Senior officials argue that Section 941 would “undermine the authority of the Secretary, add bureaucracy, and confuse lines of responsibility.” The Senate's and Pentagon's diametrically opposed positions on the value of CFTs can be partially reconciled with a better understanding of what CFTs are, how cross-functional groups have performed to date in the Pentagon, and their prerequisites for success. This paper argues there is strong evidence that CFTs could provide impressive benefits if the teams were conceived and employed correctly.



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