



E-8C Joint Surveillance Target Attack Radar System (JSTARS), an airborne battle management and command and control platform that conducts ground surveillance

The value of information exists in time since information most often describes fleeting conditions. Most information grows stale with time, valuable one moment but irrelevant or even misleading the next.

—Marine Corps Doctrine Publication 6

Expeditionary Airborne Battlespace Command and Control

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U.S. Air Force

Throughout history, combatants have sought an advantage over their adversaries in large part by achieving some degree of information superiority. They have sought greater knowledge of enemy troop dispositions, preparedness, intentions, and weapons, all the while concealing similar information about themselves. Always, the advantage such knowledge afforded was ephemeral; commanders had to act rapidly, while the information was still relevant and the advantage still existed. Always, speed of command and action has been critical to a military's ability to seize and maintain the advantage. And always, exploiting such an advantage has required a force capable of moving with enough speed, agility, surprise, and lethality to create a rapidly deteriorating situation with which an adversary could not cope—the essence of *maneuver warfare*.

Today, the U.S. military enjoys a tremendous advantage in terms of rapid and reliable communications technology as well as in advanced intelligence, surveillance, and reconnaissance (ISR)

capabilities. Yet unlike many of the technological developments exploited in past wars, developed largely by or for the military, today's advances are predominantly the result of commercial enterprise and are available to virtually anyone with the resources to purchase them and the wherewithal to use them. As a result, the advantage afforded U.S. forces by information superiority will become even more fleeting. That fact, particularly in light of the quicker, lighter, more mobile, and more lethal forces envisioned by *Joint Vision 2020* and the vision of the Joint Chiefs of Staff for joint operational concepts, leaves little doubt that speed of command will become increasingly important in future conflicts.

This article suggests that within its command and control (C²) doctrinal precepts and architecture, both current and proposed, the Air Force will find it difficult to integrate seamlessly within and become an indigenous part of a transformed future dominant maneuver force. Furthermore, it suggests that forward air control—commanding from the front rather than the rear—is an enduring principle of airpower. The airborne battlefield command and control center (ABCCC) was more than a flying radio relay platform or a long loiter forward air controller (FAC); it was a forward air command element engaging in maneuver warfare.

Background

As they get further and further away from a war they have taken part in, all men have a tendency to make it more as they wish it had been rather than how it really was.

—Ernest Hemingway

The ABCCC was originally developed in the 1960s during the Southeast Asia conflict. The requirement for such a capability resulted from the unique characteristics of the counterinsurgency and unconventional warfare operations encountered in Southeast Asia. According to one declassified report, "Control of ground areas fluctuated; clear-cut battle lines were usually nonexistent; [and] air operations were not conducted solely in South Vietnam." Flexibility and the ability to make quick command decisions to respond to rapidly changing tactical situations were key elements of the ABCCC concept of operations. Continued the report, "The heart and soul of the air effort in Laos and the reason for any success achieved was largely attributable to the forward air control team consisting of an ABCCC and



F-16s testing interoperability upgrades with NATO Airborne Warning and Control System aircraft

U.S. Air Force (Tom Reynolds)

FAC.” The Vietnam experience demonstrated the value added by the ABCCC’s ability to provide more responsive and reliable close air support (CAS) to ground forces. More importantly, it also demonstrated how greater speed of command can contribute to the efficacy of airpower by identifying and exploiting fleeting opportunities when they appear on the battlefield.

The ABCCC was a vital link in the battlespace C² chain during Operation *Desert Storm*. From

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January 16 to February 28, 1991, the EC-130E flew 201 sorties, providing an almost constant command and control presence. Because the ABCCC was airborne,

it was able to communicate with and manage tactical forces operating beyond the normal communications coverage of other tactical air control system elements, such as the Air Support

Operations Center and the Control and Reporting Center. “The mobility and communications advantage inherent in the Airborne Battlefield Command and Control Center platform enabled it to stay abreast of the current ground and air situation within its assigned area of responsibility.” Among the conclusions and lessons learned from a command and control perspective was that “ABCCC battlestaff could indeed serve as the joint force commander’s on-the-scene, air-to-ground battle managers, allocating CAS to the most lucrative targets.”

During operations in Kosovo, the ABCCC once again provided a key command and control link helping North Atlantic Treaty Organization (NATO) air commanders to manage air support for Operation *Allied Force*. Kosovo illustrated the tremendous complexity of managing the battlespace and performing real-time targeting in urban environments. Even in the absence of significant ground forces and the resultant low

CAS requirements, Kosovo demonstrated that the combined forces air component commander needed an on-the-scene command presence. The elusiveness of the Serbian forces further complicated an already daunting NATO targeting process. Finding and striking them proved difficult and was exacerbated by the distances involved for the strike aircraft, which resulted in shorter target area loiter times and less time to locate and strike targets. Had the United States not possessed an ABCCC, the targeting information the strikers and FACs had to work with would have been only as good as the location information they had when they took off. The ABCCC was able to relay critical targeting information in real time between the Combined Air Operations Center (CAOC) in Vicenza, Italy, and the airborne FACs and strike aircraft in the Balkans, providing an increased combat effectiveness that otherwise would not have existed.

In the two most recent operations involving U.S. forces, the EC-130E ABCCC platform was not available. The Air Force had retired it in 2002 on the premise that the CAOC would have sufficient communications resources to exercise command and control over vast distances in a widely distributed battlespace. In the absence of an ABCCC, the airborne warning and control system (AWACS) and joint surveillance and target attack radar system (JSTARS) had to fulfill the battlefield management role. This led to problems, both real and perceived, in providing air support to ground forces in a widely distributed battlespace.

In the cockpit of upgraded U-2 reconnaissance plane



U.S. Air Force

For example, Afghanistan presented a number of problems to commanders during Operation *Enduring Freedom*, a truly distributed series of combat operations. The air war was run from the CAOC at Prince Sultan Air Base, Saudi Arabia; the ground operations were controlled from Kandahar, Afghanistan; and supporting aircraft came predominantly from 479th Air Expeditionary Wing at Al Udeid Air Base in Qatar, joined occasionally by aircraft participating in Operations *Northern* and *Southern Watch*. These distributed operations led to coordination problems between air and ground forces that were exacerbated by the absence of an ABCCC. Because of the tremendous distances involved, the CAOC could neither communicate directly with, nor provide command and control to, many aircraft in the Afghanistan theater. As a result, AWACS crews pulled double duty, providing deconfliction and radar control to aircraft transiting the airspace while simultaneously responding to numerous requests for CAS. Providing command and control and establishing communications with battlespace participants proved difficult. There were instances of preplanned strike aircraft flying through the formation of aircraft attempting to support ground forces.

During Operation *Anaconda*, crews flying in AWACS were overwhelmed by requests for CAS. According to one account, "Without ABCCC to sort through the CAS requests and prioritize the missions of strike aircraft . . . officers flying in E-3 AWACS aircraft and working from the CAOC struggled to sort out dozens of urgent requests from troops under fire." The incident at Tarnak Farms, in which an F-16 inadvertently attacked Canadian forces while they were conducting a live-fire exercise, demonstrated the potential for tragedy in a dynamic and widely distributed theater.

The resounding success of *Iraqi Freedom* might lead one to believe the military is right where it needs to be in terms of command and control; however, air support to the rapidly moving and widely distributed ground forces again proved problematic. In its after-action report, 3^d Infantry Division complained of inadequate coordination between air support and their ground operations. Because of the tremendous speed of its movement and the lack of both responsive "on the scene" air command and control and a reliable means of relaying radio communications, there were cases of airstrikes in the 3^d Infantry Division area of control. In one instance, an F-15E mistook a multiple launch rocket system for a

surface-to-air missile battery, killing three and wounding six Soldiers. The Marines also encountered problems coordinating ground support in the absence of the ABCCC. Their solution was to reconfigure several of their KC-130s to be used as airborne Direct Air Support Centers.

Although AWACS and JSTARS performed admirably in their respective design roles, as an ad hoc ABCCC they were not as effective as the Air Force hoped. While both did well with kill boxes,

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each had difficulty responding rapidly to changes and opportunities in the battlespace, and CAS operations quickly overwhelmed them. Their ability to control kill boxes, however, did not demonstrate their ability to fulfill the ABCCC role. In fact, kill boxes represent a compromise, in terms of fire support coordination measures, between what the ground forces need to support an agile and fluid scheme of maneuver and what the Air Force can provide in real time. While kill boxes can be useful emergency or back-up fire support coordination measures, routine reliance on them acknowledges the continuing difficulty the Air Force has integrating into a rapidly moving joint maneuver force and with providing proactive real-time command and control of airborne the-

ater attack assets. The problems experienced were by no means a result of poor performance on the part of AWACS or JSTARS but rather a reflection of their disparate primary missions with respect to that of the ABCCC. JSTARS is predominantly an ISR platform, and when conflicts arose between its primary function and secondary functions—in this case coordinating CAS—the primary role won out. In the permissive air environment of Iraq, AWACS had only to deconflict airspace, not track air threats. However, had there been an air threat, it too would have had to prioritize its primary mission over assisting with CAS. In addition to not having a real battlefield C² capability, neither aircraft had an ideal communications relay capability to support rapidly changing situations on the ground.

Defining the Problem

In his later years Pablo Picasso was not allowed to roam an art gallery unattended, for he had previously been discovered in the act of trying to improve on one of his old masterpieces.

— Unknown

Although much of the discussion in the aftermath of Afghanistan and Iraq has focused on problems with CAS, those problems are actually a symptom of a much larger issue—command and control—and what was really missing was the on-scene eyes and inherent flexibility of command and control that the ABCCC brought to the fight. In a College of Aerospace Doctrine, Research, and Education report, Robyn Read uses the operations in Afghanistan to illustrate the shortfalls of CAS in a “non-linear attack mode” within the context of “small wars.” Although much of his discussion deals primarily with the shortcomings of CAS operations, these shortcomings are a symptom of a larger problem: the inability of airpower, within the current doctrinal precepts and C² architecture, to integrate effectively within an agile, fast-moving, nonlinear, joint force scheme of maneuver. In any event, one would certainly have to agree with his assertion that:

air battle command and control were critical elements for CAS in the past but fell out of favor and into relative disuse for a variety of institutional reasons. In a sort of “back to the future” logic, we need to dig into the CAS problem and reenergize the “old” parts that worked and update those technologies and doctrine that are insufficient or inadequately tailored to this mission.



Test flight of X-45A unmanned combat aerial vehicle over Edwards Air Force Base

Defense Advanced Research Projects Agency



Ground crew moving NKC-135 equipped with infrared signature technology

While technology has provided the military with dramatically improved warfighting capabilities, fully realizing and exploiting these capabilities requires that future forces become more inherently joint. They must be *born* joint. They must be network-centric and capable of seamlessly integrating to form a combined-arms, dominant-maneuver force that thinks and acts as one. Future operations will be characterized by light, mobile, networked forces moving rapidly and simultaneously from several different axes in a widely distributed theater of operations; lethal attacks on selectively engaged targets with high probability of success; fewer casualties and less collateral damage; and a better-informed force able to prosecute war at higher levels of effectiveness and lower levels of violence. With the technologies available today, as well as those on the near horizon, the net-centric, dominant-maneuver forces envisioned in *Joint Vision 2020* are within reach. These technologies

will enable the military to act with greater speed, agility, and a more measured and precise lethality; however, they will also dramatically complicate battlespace command and control.

The fundamental challenges facing the command and control of a net-centric, dominant-maneuver force are related to two broad areas: communications technology and C² doctrine or philosophy. First, a net-centric force would require a fast, reliable network that is secure and accessible to all participants in the battlespace. Second, the C² architecture and procedures used by these net-centric forces must be rapidly responsive to changes and fleeting opportunities within the battlespace. Ultimately, to obtain and sustain information superiority, and to achieve dominant maneuver, the myriad activities and communications taking place within the modern battlespace must be constantly integrated and acted on in real time.



E-8C JSTARS aircraft arrives at Robins Air Force Base

U.S. Air Force

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A good deal of effort is being directed toward the technological challenges of net-centric warfare, such as the DOD Global Information Grid (GIG), the Air Force C² Constellation, and the Army's digital battlefield concept. The GIG is a globally interconnected end-to-end set of information capabilities, associated processes, and personnel for collecting, processing, storing, disseminating, and managing information on demand to warfighters, policymakers, and support personnel. The C² Constellation is a network of systems that will tie into the GIG and create a battlespace information and data sharing network. The Army program is intended to network forces in the field and push information and C² responsibilities down to the brigade and lower levels to create a more dynamic and agile maneuver and assault capability.

In terms of C² philosophy, the Army is moving toward greater information sharing and autonomy at the operational and tactical levels. The Army interpretation of *power to the edge* includes not only making necessary data and information accessible at the brigade and lower levels but also providing greater autonomy for field commanders. The Air Force, on the other hand, views power to the edge as more of a technical, infor-

mation-sharing issue, such as data transfer capability from sensor to shooter, or even sensor to weapon, using machine-to-machine communications while retaining and executing C² functions from a central, geographically separated CAOC, perhaps even from the continental United States. At the strategic level and for real-time command and control of a Global Strike Task Force, this approach makes tremendous sense. At the theater operational and tactical levels, however, it is impractical. Although the CAOC can maintain general situational awareness through a globally networked C²ISR architecture, it cannot communicate directly with battlespace participants, nor can it direct theater aircraft that will be acting as an integral element of a fluid and agile dominant maneuver force—moving and operating in complete concert with ground forces.

Expeditionary Airborne Command and Control

Commanders who do not empower the staff to act on their behalf will become prisoners in their own headquarters, out of touch with reality and limited in their ability to influence events.

—Marine Corps Doctrine Publication 6

Since the Air Force will usually fight as part of a joint combined arms team, it should reexamine the concept of forward, decentralized airborne command and control and investigate the pos-

net-centric forces that rely on smooth and continuous push-pull information sharing cannot afford to be disconnected by an asymmetric computer network attack

sibilities of an Expeditionary Airborne Battlespace Command and Control Center (EABCCC). While it is essential that the Air Force exploit technology to save money and resources and reduce its forward footprint, the footprint cannot be entirely eliminated. As Robyn Read suggested, the Air

Force should reenergize the ABCCC concept. It should abandon the elements that are no longer relevant, but it shouldn't "throw

the baby out with the bath water." It must address the challenges of speed of command within a nonlinear, fast-paced modern battlespace. It should update the technology and doctrine that are inadequate for the modern battlespace and develop new interoperable technologies and C² doctrine that will better integrate airpower within a combined arms, dominant-maneuver force at the tactical level.

In addition to providing a forward senior air command presence, an EABCCC may also require a self-contained "roll-off" communications capability (capsule) to serve as a secure and stable means to tie into the GIG. Today, commercial carriers provide 95 percent of all transmission services and infrastructure for the GIG. Unfortunately, they tend to view network security as business, which is not always the same as security for military operations. Net-centric forces that rely on smooth and continuous push-pull information sharing cannot afford to be disconnected by an asymmetric computer network attack on some link in the grid. Having their own mobile hub could provide greater isolation and ensure forward commanders have uninterrupted, secure connectivity with their forces as well as reliable reach-back to rear area headquarters elements and associated joint collaborative planning and communications resources. A mobile capsule could act as the hub of a battlespace-wide area network.

Once the capsule has been offloaded, the EABCCC aircraft could then act as the airborne beyond-line-of-sight trunk completing the battlespace-wide area network and would need the capability to fuse data from theater and national ISR assets, as well as ground force-developed information, to develop and promulgate a common relevant battlespace picture to all participants to include blue and red force tracking. In this capacity, an EABCCC would be a critical component of a commander's ability to maintain

constant battlespace awareness and to exploit fleeting opportunities through the rapid application of airpower.

Remaining Questions

Whoever can make and implement his decisions consistently faster gains a tremendous, often decisive advantage. Decision making thus becomes a time-competitive process, and timeliness of decisions becomes essential to generating tempo.

—Fleet Marine Force Manual 1

The problems experienced in recent operations, which were at least in part attributable to the absence of an ABCCC, were overcome in many instances by ingenuity and, in some cases, luck. Nevertheless, the consensus among the services is that future operations will require some sort of ABCCC capability. Should an EABCCC include a forward air operations control team to provide tactical and operational level C², or should it just be an airborne line-of-sight communications relay and beyond-line-of-sight gateway? Should it include a mobile capsule to serve as a battlespace-wide area network trunk and hub for reliable GIG connectivity? Should the Air Force move a senior command element forward to lead joint maneuver forces in conjunction with the forward senior ground commander? These are just some questions that should be addressed in coming years. Which of these concepts or technologies will prevail remains to be seen.

Despite their apparent differences, there is one sustaining idea within the Army and Air Force programs and philosophy of decentralized C²—the need for a reliable gateway to link the various elements of the network via line-of-sight communications and to act as the bridge and wideband beyond-line-of-sight trunk to the GIG. By separating the doctrinal differences of C² from the technical, the Department of Defense can move forward to find the solutions necessary to support a transformed warfighting philosophy. Through joint experimentation, it can employ a "try it before you buy it" strategy to explore not only potential technology solutions, but doctrinal employment solutions as well. One thing seems certain: as the military transforms to a lighter, more mobile expeditionary force, the need for a more agile and responsive theater air C² structure will increase.

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