SPECIAL FEATURE

Joint Capability Development

By BRYON GREENWALD

The U.S. Joint Forces Command works the critical command and control seams of joint warfighting where all Services have concerns but none has a compelling reason to do anything about them.

Due to a lack of preplanned, mandatory interoperability, there are significant challenges in executing command and control (C^2) of joint forces. U.S. Joint Forces Command (USJFCOM) has provided solutions to some of these problems in the past and has recently reorganized its Joint Capability Development Directorate (J–8) to focus even more on integration, interoperability, and development of joint C^2 capabilities. This article outlines some root causes of the joint interoperability problem, highlights contributions made by USJFCOM to enhance joint interoperability and integration, and describes the organization and function of the reorganized J–8.

Historically, the Services—Army, Navy, Air Force, and the Marine Corps—have been responsible for designing, procuring, fielding, and sustaining their own combat gear. This stovepiped process is part of each Service's Title 10 responsibility, which works well for Service-specific items. Even in joint command and control, where one would expect problems, this process was sufficient in the era of jointness up to and including Operation *Desert Storm*, where combat actions were largely deconflicted by space and time, and Service-provided forces did not so much work together as simply stay out of each other's way.

Fleet Combat Camera Group, Pacific (Keith Devinney)

Soldier communicates to Apache helicopter during capture of insurgents in Adhamiyah, Iraq

But beginning with *Desert Storm* and continuing today, the conduct of warfare has changed dramatically from large force-on-force operations between nations to complex, compressed clashes between state and nonstate actors. This shift from third-generation to fourth-generation warfare has driven combat forces from all Services to work more synchronously together, often side by side, to root out elusive opponents in conflicted urban terrain.

Add to this change the advent of the digital revolution as well as the computerization of combat systems, and the complexity of operations increases significantly. In this environment, merely deconflicting forces no longer provides the joint synergy required to achieve goals. To succeed in fourth-generation warfare, command and control of Service-provided forces must be truly interoperable and interdependent. In this environment, current stovepiped requirements and acquisition processes, based on Service Title 10 responsibilities alone, have failed to produce the interoperability and interdependency necessary to command and control today's joint forces.

This is not to say that the combat development community has sat idly by over the last decade. Interoperability has improved since *Desert Storm*, when the digital connectivity between the Services was so bad that a courier had to hand-carry the Joint Force Air Component Command air tasking order in hardcopy out to each Navy carrier. But correcting that shortcoming and others only addressed the most pressing C^2 problems found during that war.

Those efforts did nothing to get ahead of the swelling wave of digitization that has hit the joint force and now mandates the need to pass data and voice on demand from national sensors to joint task force headquarters, between component commands, and on to Soldiers, Sailors, Airmen, or Marines over the last tactical mile. Such are the demands of warfare today. They were foreshadowed in Somalia, where having timely and relevant blue force tracking could have saved lives. These demands are currently scrawled in the sands of Iraq, Afghanistan, and the Horn of Africa. Both U.S. and coalition forces are frustrated by the confusion, redundancy, and inefficiency that hamstring their valiant efforts to crush insurgencies, root out terrorism, and build safe and stable nations.

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Despite improvements, there is much work to do, and the Service-centric development of what are inherently joint and interdependent C^2 systems will not get the job done. In fact, this Service-centric approach has led to the development of multiple, often redundant capabilities, many fielded on the fly in Iraq and Afghanistan. These capabilities might work well for the unit or Service that fielded them, but they are either incapable of working together effectively with command and control capabilities from other Services in a joint context or so duplicative that they clog bandwidth and reduce capability in a cluttered, constrained environment.

A few examples drive the point home. In Operation *Iraqi Freedom*, Army units used

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Force XXI Battle Command Brigade and Below systems to provide situational awareness and blue force tracking. The Marines used Command and Control Personal Computer. The two systems did not communicate. Blue units from one system were invisible to the other, and the potential for friendly fire in joint operations was immense.

Exacerbating the problem, higher headquarters did not have easy, simple visibility over all blue force units. Instead of one blue force tracking device, there were several, and none was visible on the same common operating picture. This complicated not only force tracking and battle command but also critical tactical operations such as clearing fires.


E–2C tactical battle management AEW aircraft approaches USS *John C. Stennis*


Airmen track hostile aircraft during live air-to-air exercise aboard E–3 AWACS aircraft

18th Communications Squadron (Richard Freeland)

U.S. Navy (Jon Hyde)

Recently in Iraq, senior commanders and staff complained about hundreds of "homegrown" databases that were not discoverable, searchable, and transparent by those who needed the information. Senior commanders also fretted openly about the spectricide (blue on blue frequency jamming) resulting from the undisciplined use of similar frequencies in close geographic proximity, causing patrols to lose combat capability and potentially bringing unmanned aerial systems crashing to the ground. Perhaps most indicative of the failure of the current process to help the joint warfighter, senior commanders admitted to spending hundreds of thousands of dollars to grow their own information fusion systems because the individual Services and the joint force had done nothing to provide them an interdependent joint C^2 system that met their specific needs.

This deplorable situation raises questions. First, if warfare today is truly interdependent and joint, but the Services have responsibility only for their own warfighting domain, how does the Department of Defense (DOD) harness the positive aspects of Service-centric programs and develop the joint interoperable and interdependent C^2 capability that joint task force (JTF) commanders need? Second, what is the best way to bring these joint C^2 systems to the fight quickly and economically and meet JTF commanders' requirements? Finally, and more specifically, what organization develops, procures, fields, and sustains combat capability along the critical seams of joint, interdependent warfighting, where each Service has an interest but none has a compelling reason to work outside its Service-specific domain?

Joint Interoperability and Integration

As the leader within U.S. Joint Forces Command for interoperable command and control, the J–8 has worked many interoperability and integration issues in recent years and achieved some success on behalf of the joint warfighter. Solutions range from establishing governance structures that guide policy, strategy, and resourcing to providing technical solutions that bridge the interoperability gaps within and among the Services. Many of these solutions provide interoperability to the tactical edge and are in use in Iraq and Afghanistan today.

At the high end, the Joint Battle Management Command and Control Roadmap and associated board of directors, led by the USJFCOM deputy commander, provide the strategy, organization, and procedure for a DOD-wide integration of C^2 capabilities. The second and most recent version of the roadmap, which is classified and Web-accessible through USJFCOM, uses joint mission thread assessments to provide guidance for material and nonmaterial development.

Currently, the J–8 and its subordinate commands are assessing the joint close air support (JCAS) mission thread, analyzing the ability to exchange digital information between joint terminal attack controllers, CAS platforms, and the Theater Air Ground System to develop investment strategies for capabilities across the full measure of JCAS systems to develop investment strategies for legacy equipment that is not fully interoperable. In partnership with U.S. Strategic Command, USJFCOM has drafted the operational concept, extending the C^2 linkage from the national-strategic down to the operational-tactical levels.

To improve combat effectiveness and reduce fratricide, the Joint Fires Division within the J–8 spearheaded the creation of two governing bodies, the JCAS committee and the Combat Identification–Blue Force Tracking–Joint Blue Force Situational Awareness (CID–BFT–JBFSA) executive steering committee, to provide leadership in these critical areas. Shortly after its creation, the JCAS committee attacked one of the more vexing problems noted in current operations: the lack of common training and certification standards for joint terminal attack controller (JTAC) and joint forward air controller (airborne). Working in consultation with the combatant commands and Services, the JCAS committee brokered memoranda of agreement between all parties, outlining firm standards for JTAC and forward air controller (airborne) training and certification. Moreover, a USJFCOM-led team reviewed existing American JTAC school curricula and accredited three new schools (two U.S. and one coalition program in Australia). This action

increased certification opportunities for joint terminal attack controllers by 30 percent, improving interoperability and combat effectiveness while vastly reducing the potential for fratricide.

In January 2006, the newly formed CID–BFT–JBFSA committee accepted an immediate 90-day Joint Requirements Oversight Council (JROC) tasking to produce a set of CID–BFT investment recommendations for the Defense Department budget cycle. Fortunately, this committee had the benefit of outstanding joint and coalition work on combat identification conducted through the Coalition Combat Identification Advanced Concept Technology Demonstration. This display concluded in September 2005 with an exercise in the United Kingdom involving ground and air forces from nine nations and various combat identification technologies. The resulting Coalition Military Utility Assessment formed the basis for joint acquisition recommendations in March 2006 to the U.S. Army–Marine Corps Board and subsequently the JROC. Both organizations approved the recommendations for the current program objective memorandum, and the Office of the Secretary of Defense recognized the Coalition Combat Identification Advanced Concept Technology Demonstration as the best demonstration in fiscal year 2006.

Working in conjunction with U.S. Strategic Command and others, USJFCOM enhanced Joint Blue Force Situational Awareness by leveraging ongoing classified blue force tracking efforts and adding unclassified blue force tracking devices in a cross-domain situational awareness solution. This capability tied several devices together that were not previously visible in one common operating picture.

Linked to this solution are three additional capabilities to pass precision-guided-munition–quality targeting data from the operator in the field to the cockpit via machine interface and data link translation. Using the Digital Precision Strike Suite, the Rapid Attack Information Dissemination Execution Relay, and the Joint Translator/Forwarder, an operator can pass precise target coordinates digitally from the foxhole to the control center and on to the cockpit without fear of human-induced error due to a garbled transmission or transcription error. This combination of new systems greatly reduces both the time it takes to prosecute a target and the potential for air-to-ground fratricide. Several combatant commands have received these capabilities, and USJFCOM has transitioned all of them to Service programs of record for long-term sustainment.

Air Force combat controller watches staged airfield seizure during Exercise Lightning Fury

1st Combat Camera Squadron (James L. Harper)

Joint Terminal Attack Controller team provides target information to A–10s while target is marked by Ground Laser Target Designator–2

99th Communications Squadron (Kevin J. Gruenwald)

Marine directs members of quick reaction force during Exercise Natural Fire in Nginyang, Kenya

Fleet Combat Camera Group, Atlantic (Roger S. Duncan)

Translating data links is easy, however, compared to providing machine foreign language translation. Working with the Defense Advanced Research Projects Agency and the Army, the J–8 has developed several translation devices used by Servicemembers in Iraq and Afghanistan. The most common device fielded is the P2 Phraselator, a one-way personal digital assistant capable of translating several languages including Arabic, Pashtun, and Urdu. Also deployed are the Voice Response Translator, a one-way hands-free device, and the Coalition Chat Line Plus, a software application that provides text, document, chat, and instant messaging translation designed to improve coalition command and control.

In response to an urgent request from U.S. Central Command, USJFCOM is working with the Defense Advanced Research Projects Agency and contractors to develop a two-way, speech-to-speech device for English-Arabic translation. Several prototypes are being used in Iraq. Having secured DOD funding to establish an Army transition office for language translation, USJFCOM will transition all of these capabilities to the Army Sequoyah program of record in fiscal year 2008 for future development and sustainment.

Despite these advances, one of the more challenging areas facing USJFCOM and the Services involves the rapid creation of joint task force headquarters. Service-based command and control headquarters do not possess the organic joint communications or C^2 applications to enable their rapid transformation into a headquarters capable of joint warfighting. To assist in that transition, USJFCOM is leveraging its work in joint architecture engineering to develop a *turnkey* C^2 process to help prospective JTF commanders jumpstart their headquarters using JTF mission template playbooks. This process would identify the personnel, equipment, joint mission essential tasks, networks, and C^2 applications necessary to establish a core joint task force capability to accomplish either major combat, humanitarian assistance, disaster relief, or security, stability, transition, and reconstruction operations. Additionally, the command has followed JROC direction to field a deployable joint command and control system to fill critical capability gaps in combatant command deployable C^2.

The J–8 also leads the development of the Net-Enabled Command Capability (NECC), the principal DOD C^2 system

of the future and the replacement for the Global Command and Control System–Joint and the Service global command and control system family of systems. NECC will provide C² capabilities to support the National Military Command System, joint force commanders, and Service/functional Components down to unit level through enterprise-based joint architectures, integrated applications, and Web services.

This approach will deliver the modernized C² capabilities necessary for today's highly dynamic and constantly changing environment more quickly. It relies on coherent data strategies across all associated communities of interest. To that end, the J–8 leads several governance efforts to achieve commonality and unity of effort across the DOD data community. Working with the Defense Information Systems Agency, U.S. Joint Forces Command will ensure that NECC meets warfighter needs by engaging the Service and combatant commands to assist in developing the system's requirements. USJFCOM will also provide the critical nonmaterial products and contributions associated with this new joint C² system. Finally, the command will ask the Services and other combatant commands to participate in a series of realistic integration and interoperability tests prior to spiral fielding of selected capabilities.

The importance of these contributions notwithstanding, the work to date only scratches the surface and, with the exception of NECC, does not get to the core of what it means for capabilities to be "born joint" and not "made joint" after the battle starts. The Joint Battle Management Command and Control Roadmap provides the joint community with a collective azimuth to follow, but does not compel compliance or ensure compatibility out to the last tactical mile. Similarly, the JCAS and CID–BFT–JBFSA committees are coalitions of the willing that do meaningful work; but without the ability to drive solutions to fruition, they operate only at the margin of improvement. Moreover, while the capabilities offered by joint data strategy, joint C² architectures, and interoperability solutions are a start, much work remains to provide the critical bridge between Service C² capabilities and true joint command and control.

Joint Capability Developer

Building on its previous contributions to joint interoperability and integration, USJFCOM has recently redoubled its efforts and taken up these challenges in two important ways. First, as directed by the Deputy Secretary of Defense, the command will serve as the DOD C² portfolio and oversee the development of requirements, programming of resources, and execution of acquisition for a collection of joint C² efforts. As portfolio manager for these programs, USJFCOM will exercise the requisite authority and work with its Service and DOD partners to conduct the necessary testing and integration of doctrine, organization, training, materiel, leadership and education, personnel, and facilities to meet both Service and combatant command needs and provide a comprehensive and sustainable solution.

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Second, U.S. Joint Forces Command has reorganized and refocused internally to enhance the ability of the joint force headquarters to meet its mission needs. Nowhere is this reorganization more apparent than in changes to the J–8 that orient the directorate more toward joint capability development and the integration of command and control systems. Prior to September 1, 2005, the directorate was responsible for developing and validating joint requirements documents, the integration of C² systems, joint fires issues, and traditional resourcing work, as well as a host of lesser functions.

Since early fall 2005, however, the J–8 has focused almost exclusively on joint capability development. This transformation expands on the directorate's earlier interoperability and integration duties, but transfers many of the further functions traditionally associated with it to other elements within the command.

Areas the J–8 focuses on include:

- joint C² portfolio management: supporting the USJFCOM commander in managing the 14 systems/programs in the current portfolio
- C² challenges and solutions: working with combatant commands, Services, and agencies to determine shortfalls and potential solutions
- capability development: collaborating with combatant commands, Services, and agencies to develop both near- and long-term requirements for C² systems and other joint capabilities
- joint C² architectures: providing standards and oversight for joint C² architecture development to facilitate gap analysis, concept design, and systems compatibility
- joint data strategy: leading community of interest development across a number of C² and C²-related areas
- C² transition: conducting doctrine, organization, training, materiel, leadership and education, personnel, and facilities integration and supervising implementation and transition for C² capabilities to programs of record
- joint fires policy and doctrine: leading the JCAS, CID–BFT, and fratricide prevention efforts for the joint force
- joint missile defense: serving as the joint warfighter advocate and bridge between national missile defense and tactical air and missile defense
- DOD unit reference number management: advancing the efficient C²/situational awareness Variable Message Format data exchange to ease correlation of position location information, facilitate blue force tracking, and reduce fratricide
- joint fires testing and training: conducting interoperability testing and training in operational environments
- joint systems integration: leading the Department of Defense systems integration effort through interoperability assessments and systems engineering.

As the conduct of warfare has evolved from large-scale operations to smaller, more selective applications of military power, United States Joint Forces Command has adapted to provide greater capability to the joint warfighting headquarters. While retaining its leadership of interoperability and integration, the Joint Capability Development Directorate has reorganized to place more emphasis on enabling joint command and control and associated capabilities from the joint task force headquarters level down to the Soldier, Sailor, Marine, and Airman serving on point. Combined with its management of the capabilities portfolio, the directorate's new role as the joint capability developer offers the Services and combatant commands a determined partner to work those critical, but largely neglected, command and control seams so necessary to joint warfighting. **JFQ**