USS Coronado leaving Pearl Harbor for RIMPAC '98.

Fleet Imaging Command Group, Pacific (August Sigur)

Command and Control for Joint Strategic Actions

By DOUGLAS A. MACGREGOR

A decade after the dissolution of the Warsaw Pact, and following a series of defense policy reviews, the most critical security question remains unanswered: What kinds of forces, strategies, and resource commitments are needed for the future? This is no accident. A 30 percent reduction in the defense budget since 1989 and a reluctance on the part of the services to adopt any plan that fails to reaffirm their traditional roles and force structures combine to obstruct meaningful change. In fact, the budget topline imposed by defense reviews and legislation has intensified interservice rivalry and prompted the senior military leadership to stress the validity of existing single-service doctrine, organization, and tactics. Thus the United States risks wasting the opportunity to make significant gains on rival militaries. A revolution in military affairs (RMA) will occur whether defense leaders encourage it or not. The choice is whether to be the beneficiary or victim.

Such a revolution is evidenced in potential enemies—nations, failed states, and subnational groups—dispossessed by modernization and each trying to acquire capabilities to strike decisively with weapons of mass destruction (WMD). Strategists must assume that future adversaries will possess not only some form of WMD but precision-guided munitions along with electronic intelligence and satellite imagery provided by third powers.

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Marines during LOE3, Urban Warrior.

2d Marine Division (Craig J. Shell)

Opponents will attempt to outpace the American response to their capabilities and present the United States with a strategic *fait accompli*. Moreover, by threatening a war of attrition or the use of WMD to avenge battlefield successes by the Armed Forces, enemies will seek to eliminate political resolve. This strategy deserves our attention.

Part of the solution involves projecting ground forces into the unified commands much more rapidly and with greater mobility, firepower, and force protection. Fundamental change in the way ground forces organize to deploy and fight is essential to cope with these new dynamics. Army ground forces must become more expeditionary. Marine ground forces must accept that an island hopping campaign is now no more probable than a defense of the Fulda Gap. Both forces will have to cooperate closely with each other and with airpower to exploit America's growing air and space capabilities. Landpower must become an amalgamation of Army and Marine capabilities within a more agile, operational joint framework.[1]

Changes in strategy have always derived from the ability to fight new kinds of war. With that in mind, this piece builds on concepts introduced in the author's *Breaking the Phalanx: A New Design for Landpower in the 21st Century* and argues for a top-down transformation of the joint force land component command (JFLCC) concept.[2] The idea is to take advantage of new technology, operational concepts, and warfighting organizations to more rapidly project and jointly employ ground forces. By building on experience with Army and Marine Corps structures, the changes outlined here are designed to achieve a flatter, less hierarchical command structure that can reduce the time for ground elements to begin combat operations. This transformation involves establishing joint operational command and control (C^2) structures for deploying tactical ground forces that are subordinate to the regional unified commands.[3]

Adjusting to New Dynamics

At the height of their military glory, the Spartans sent a deputation to the oracle at Delphi and demanded arrogantly: "Can anything harm Sparta?" The oracle answered, "Yes, luxury."[4] To the same question about the Armed Forces, the oracle might answer, "Yes, bureaucracy." Ever since the Soviet collapse gave the United States unprecedented military dominance, the ratio of command, control, and support to fighting forces has actually grown without any increase in

combat power or flexibility where it is most needed—on the battlefield. This is interesting because the opposite is true for American business. Corporate headquarters continue to shrink. This paring of top-heavy management has helped productivity climb to record highs while exhibiting historically unique flexibility. Downsizing, reengineering, outsourcing, and decentralization have cut corporate staffs and the functions concentrated at headquarters. Information technology has reduced meetings and created function-based organizations that share critical data.

Rosabeth Moss Kanter of the Harvard Business School characterizes the private sector's response to change in the strategic environment of business in *World Class*. Her words suggest new directions for the way ground forces can be commanded and controlled.

Across industries, forces for change are similar: industry consolidation, changing regulation, new technology, more demanding customers, and pressures for lower cost, higher quality, greater speed. The responses are also similar: a search for new markets (often internationally), acceleration of new product development, and implementation of a new organizational model, one that comprises fewer layers, faster processes, greater use of teams, employees educated to solve problems autonomously, deeper relationships. . . . Change is a matter not of failure but of success. The most change is occurring in the most successful companies.

in *Force XXI* the Army is concentrating on developing a tactical C² structure from the ground up

Military progress tends to follow civilian progress, though at a considerable distance. One reason for the lag is that in military culture the burden of proof falls on the advocate. Thus changes in the nature of warfare must be widely recognized within the military in order for innovation to occur. In 1929, for example, there was still no sense in America's professional military that World War I had really changed anything. Opponents of mechanization and defenders of the horse cavalry even suggested that "An unfed motor stops; a starved horse takes days to die."[5]

While there is not space here to debate how much has changed, it is possible against the backdrop of Panama, southwest Asia, Somalia, Haiti, and Bosnia to offer some observations about the direction of change as it pertains to American ground forces.

- For the foreseeable future, rapid response to crises around the world will be in much greater demand than a static territorial defense of central Europe or northeast Asia.
- How quickly a force can deploy is as important as how much force to assemble. To obtain a real advantage from rapid deployment, ground forces must be able to conduct offensive, defensive, or peace enforcement operations almost on arrival in regional unified commands.
- Permitting conflicts to drag on rather than rapidly crushing an opponent risks failure. The proliferation of WMD and the RMA technology to employ them suggest the danger of delay.[6]
- The newer the technology or its application, the more important it becomes to design its use with the world in mind. Single service, theater-specific remedies are features of the past.
- The direction of the current RMA points to a system of systems that encircles the earth. It will be critical for ground forces to integrate seamlessly into the global strike capabilities this system will make possible both to exploit its potential and to guarantee the safety of those forces.

The ability of CINCs to gain quick access to ready ground forces and to their command and control operationally and tactically will thus be decisive. In practice this means that Army and Marine ground forces must be prepared to deploy on a telephone call. Given the reduced size of the active Army component since 1991 and the requirement for rapid force projection, these points underline the need for a C² unanimity which transcends service lines. Thus the Army and Marine Corps should look hard at streamlining their operational level C² within a joint framework.

In *Force XXI* the Army is concentrating on developing a tactical C² structure from the ground up, taking for granted all existing nodes and echelons.[7] Experience in Germany and Korea reinforces a preference for theater-specific Army command and control structures. However, it is no longer possible to limit the scope of Army C² to predetermined locations and narrow tactical missions. Deployments since the mid-1980s show the need for a more global approach.

Top-Down versus Bottom-Up

Jointness exists when services develop mechanisms—operational and tactical structures, processes, and expertise—for bridging service differences and extracting strategic value from interservice cooperation. In this sense, joint C² is defined as a joint system of command links/nodes integrating maneuver forces and strike assets, informed by a variety of sensors such as digital and other communication and data links. Viewed as a unified system, this conceptual structure provides information for planning and executing coordinated "all arms" operations.[8] The critical step, however, is to create joint C² structures on the operational level that help warfighting CINCs respond quickly to events within their regions. The question is how.

One approach to joint C² architecture for ground forces is to borrow from the experience of naval forces, whose global focus led to a different C² evolution. They have tended toward a top-down rather than bottom-up approach on the strategic and operational levels. This has bridged the gap between an efficient global command and control structure and tactical autonomy by stressing functionally-based organizations and modularity. This is the approach of the Marine expeditionary force (MEF), the service's principal warfighting organization for large contingencies.

Unlike the Army Corps structure so essential to division warfighting, an MEF can vary in size and composition from 5,000 to 50,000. At the heart of this expeditionary structure is the Marine air-ground task force (MAGTF), which provides a microcosmic model for joint C² on the operational level for both Army and Marine forces.

The building-block approach to MAGTF organization is based on a simple formula that organizes task forces into discrete command and control elements. At the top is the command element for planning and execution. The three subordinate C² elements are one to direct ground combat operations, one for air-to-air combat, close air support, air reconnaissance, electronic warfare, and control of aircraft and missile systems, and one providing the full range of support functions from sea bases aboard naval shipping or from temporary bases ashore. In addition, the modular structure lends itself to rapid expansion by adding forces to the core units of each element.[9] A joint C² system on the operational level could mirror this simple, discrete, and modular approach. However, it would have to consistently provide useful real-time information in a form that helps the commander recognize key events, formulate responses, and transmit them to subordinates in time for implementation. This is because in addition to moving thousands of subordinate entities and striking targets, land force commanders must deal with a thinking enemy who is reacting to their every move.

In this setting the opportunity for information overload cannot be overstated. Consequently, the need for functional simplicity as seen in MAGTF is enormous. Masses of information flowing through sensors and aggregated by computer power into pre-formatted messages will not reach the critical points of authority in time if the complexity of the command and control structure impedes its flow. None of this is to suggest that new information technology will provide answers that have eluded commanders in the past. If the commander does not already know what is important, more information will not help. Still, provided the C² structure is simple in organization, today's technology will deliver the information. This is a critical reason why using the close/deep/rear framework as the conceptual basis for C² organization on the operational level offers significant advantages. Each military decisionmaker (close/deep/rear) has an area of authority distinct from the others (modularity), commands pass in only one direction (hierarchy), and each decisionmaker determines within the higher commander's intent how to execute commands (operational autonomy).[10]

Extrapolating from the MAGTF structure to the operational level suggests a JFLCC model with close/deep/rear functionality. The three-star commanding a structure based on either the Army Corps or Marine MEF has an independent mobile headquarters element and three autonomous, mobile headquarters under general officers. For reasons that will become clear, in the notional JFLCC structure outlined here major generals were selected to command the close/deep/rear headquarters. Depending on the crisis, conflict, or peacetime mission, one or all of these headquarters could be deployed. The number of officers and other ranks assigned to all three elements could total as few as 500. Ideally, these headquarters are configured for rapid deployability with strategic airlift that includes wheeled armor, helicopters, and satellite communications.

Within this framework one major general within JFLCC commands the close combat forces deployed to it. Such formations could consist of Army or Marine Corps armor, airmobile infantry, or attack helicopters in support of the close fight. In some actions, for instance, Marine infantry might cooperate closely with Army armored and helicopter reconnaissance. In practice, this joint commander supplants the Army or Marine division commander and headquarters who otherwise would have to deploy from the continental United States (CONUS). It should be transparent from the strategic and operational levels whether the tactical maneuver formation is Army or Marine.

A second major general commands deep combat operations. The term *deep* in this context can be misleading. Time, target, and effect rather than merely space actually separate the deep and close fights. Further, deep in land warfare is operational, not strategic in the sense of strategic air operations. This is not to suggest that precision weapons and dramatically increased firepower from rocket artillery and airpower do not create the need for a joint C² structure on the ground that can exploit these capabilities. On the contrary, for ground force maneuver to succeed, the means to employ strike assets are critical. Sophisticated intelligence collection and targeting

31st Marine Expeditionary Unit (Chris Tourge)

Maritime special purposes force aboard *USS Belleau Wood.*

analysis are of limited value without the C² structure to quickly exploit both information and strike capabilities.

With the emergence of a system of systems global strike complex, the deep fight commander's links to the complex and the Army and Marine tactical formations become pivotal. This structure emerges as the critical bond to the joint force air component commander (JFACC), who will want to exploit the capabilities residing in ground strike and maneuver forces to suppress or defeat enemy air defenses and missile attacks. For that matter, theater antiballistic and cruise missile defense missions will also become integral to the deep structure.

theater antiballistic and cruise missile defense missions will also become integral to the deep structure

In the event that combat maneuver forces are tasked to strike deep into enemy territory, this headquarters would also command those elements. This suggests that the deep headquarters and not the close combat headquarters would control airmobile formations operating in conjunction with attack helicopters in front of advancing friendly ground forces. This deep C² structure would be postured to deconflict and harmonize Air Force air and Army and Marine operations in the deep fight, ensuring mutual support and fratricide prevention. When force movement changes the spatial disposition of ground forces, the close combat commander or even the rear sustainment commander could assume control of these elements.

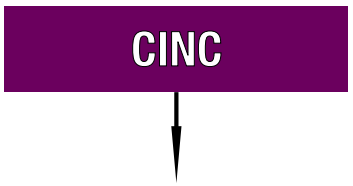
Sustainment operations offer rich opportunity for joint C² under the third major general in the structure. Some weaponry and technology will remain service-specific in the near term, but the Army and the Marines can share logistics support in such areas as cross-service equipment, supply transportation, storage, transfer, port opening services, prepositioning afloat, and over-the-shore logistics. As seen during Desert Storm, rationalizing sustainment operations for ground forces within a joint C² framework simply institutionalizes practices that emerge under the pressure of war anyway.[11] In the long term such a transition will reinforce the need for greater independence in tactical formations and could eliminate the rear area except as a communications zone.[12]

This JFLCC structure could contribute substantially to the formation of a mission-specific joint task force (JTF) headquarters. Three possibilities come to mind. In the simplest case—a large-scale crisis or theater war—the regional CINC assumes the commander JTF (COMJTF) duties and the Army-Marine JFLCC is involved as a subordinate. One JFLCC could control up to 50,000 troops. If the ground force were larger, a second from U.S. Atlantic Command or part of a CONUS-based JFLCC could be deployed. For instance, a second close combat headquarters could be added if JFLCC determined that the accession of more close combat formations made the span of control too great for one.

In the case of a three-star COMJTF, the regional commander could designate the appropriate component commander, whose component command staff would form the bulk of the JTF staff, augmented by the other two component commands. A three-star Air Force commander could recruit the deep fight JFLCC commander and his headquarters if ground forces were needed to augment Air Force suppression of enemy air defense elements. For the volatile Balkans a JFLCC in the Mediterranean could command and control 50,000 troops in combat or peace enforcement operations.

In the case of a smaller JTF led by a two-star COMJTF from within the appropriate component element, that command would again contribute the bulk of the staff, augmented by the other component commands. An example could be disaster relief in a place like Papua, New Guinea, when it was struck by a tidal wave. A major general with close, deep, or rear headquarters already assigned to the regional command could provide the core headquarters and assume mission responsibility. This helps solve the problem of establishing JTF headquarters that are both knowledgeable about the region and formed on short notice for an immediate crisis.

Figure 1. Warfighting CINC (Regional Unified Command)

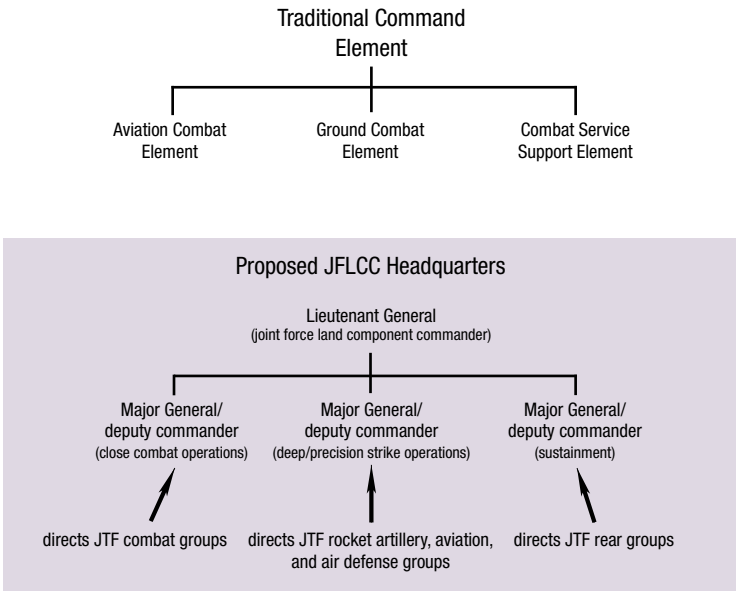


JFLCC

This joint headquarters is structured to control land forces and includes one lieutenant general in command with three major generals oriented on close, deep, and rear functions. These can be Marine or Army-based headquarters with at least one of the major generals from the other service.

There can be two types of JFLCCs: standing (with assigned forces) and contingency (without assigned forces). In the case of embedded operational joint C⁴I, JTFs can be formed as necessary for regional employment.

Figure 2. Traditional and Proposed Command Elements



How many JFLCC headquarters structures should exist and how should they be focused? In the regional commands, the role specialization proposed here could call for JFLCCs comprising designated Army and Marine commanders and joint staffs with responsibility for planning and executing operations within the close/deep/rear framework. Land force commanders must integrate political directives and military power with a thorough knowledge of regional socioeconomic conditions, historical development, and political life. Experience in Vietnam, Southwest Asia, Somalia, and Bosnia indicates that use of military power can go awry without that appreciation. There is an acute need for operational command and control structures, subordinated directly to the regional CINC, to be focused on likely regional contingencies. The world is too complex to suppose that an operational headquarters based in the United States can go anywhere and execute a broad range of complex military tasks on short notice. A possible distribution for JFLCC structures is shown in figure 3 (see page 31).

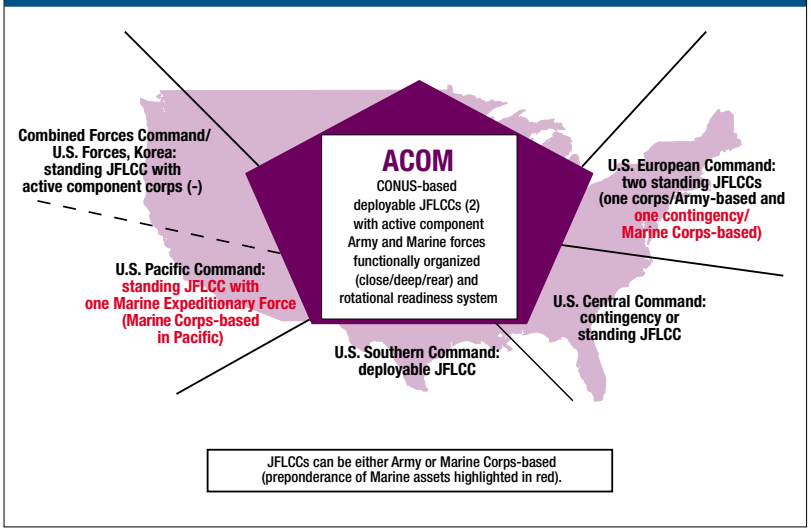
Scrapping many single-service component headquarters in the unified commands and in the United States allows for organizing future joint task forces around functional areas. The resulting joint forward-deployed land force headquarters would then be positioned to replace the CONUS-based Army division and corps headquarters that require months to deploy. Tactical ground maneuver formations could then rotate to regional commands to both exercise and execute forward presence missions much as naval forces rotate in and out of the regional commands. Similar economizing could be applied to CONUS-based Marine headquarters with the object of reallocating general officers and staffs to JFLCCs in the regional commands. These measures would not only reduce deployment times for both the Army and Marine Corps but also save money. It should be remembered that change in force employment has jointness consequences for force development.

C² for Strategic Responsiveness

Weapons of mass destruction and the fragility of alliances under crisis conditions make an extended preparation of ground forces risky for operations close to enemy forces. The enemy will seize all available time to organize or to disrupt the deployment of ground troops. It is therefore dangerous to concentrate combat power too early. Subordinating operational level joint C² to the regional unified commands allows packaging Army and Marine tactical forces for rapid deployment. Without the enormous administrative overhead of Cold War headquarters structures, Army and Marine tactical elements could be configured to move much more rapidly from widely dispersed staging areas overseas and in CONUS.

The theater, army, corps, and division structures were designed for the mass mobilization of industrial age war. Laminating them with tons of electronic hardware and computer software is unlikely to simplify command arrangements, improve readiness, or reduce response time for

Figure 3. Proposed JFLCC Organization and Distribution



deploying ground forces. For example, brigades are still structured to deploy as part of larger divisions. Divisions are structured to deploy as part of larger corps. Deploying one without the other means selectively moving mission-critical elements from one to another. The readiness of one or more of these formations to deploy and fight is thus inevitably degraded.

Strategic responsiveness means organizing ground forces that can be activated before the peace is lost. Grouping ground tactical forces based on functions—close/deep/rear—confers greater independence on tactical formations smaller than divisions that can deploy rapidly and operate across the conflict spectrum. When structured for joint C², these forces provide an agile mix that can dominate maneuver and precision strike within the JTF framework. Packaging tactical forces on a close/deep/rear basis also creates visibility for critical Army assets such as rocket artillery and attack and transport helicopters, currently submerged in the amorphous Cold War structure.

Army and Marine forces are likely to be combined into the core elements of most future joint task forces

The JFLCC structure presented here addresses the urgent need for rapid deployment and operational readiness of ground forces within a joint framework. As mentioned earlier, designating major generals as close/deep/rear commanders eliminates the need for sending division and corps headquarters from the United States. At the same time, post commanders at home would provide a training environment conducive to rapid deployment of tactical formations to the regional unified commands. These commanders would manage core competency training up through and including training center rotations. This suggests a two-dimensional system containing an administrative logistical command structure that supervises and supports training and an operational command structure subordinate to the regional unified commands for deploying ground forces in joint training or conflict within a particular unified command. The Navy currently employs a similar approach.

Such a top-down method of organizing C² and ground forces promises a flatter command structure with more rapid decisionmaking and strategic responsiveness. More important, it recognizes that Army and Marine forces are likely to be combined into the core elements of most future joint task forces. Of course these changes will also necessitate modifications to Army National Guard and Reserve structures for command and control. The impact of disestablishing unneeded Reserve headquarters is no less important than in the active component.

The potential for integrating information systems with the C² process in support of the arrangements outlined here is limitless. Given the need for simplicity in C² structures and for training, leadership, and equipment to achieve greater autonomy and dispersion on the tactical level, airborne and space-based sensors expanding coverage beyond line-of-sight will allow tactical commanders to exploit opportunities much more rapidly. It is no exaggeration to suggest that the old adage "Give them artillery and you've made them independent" will soon be replaced with "Give them unmanned aerial vehicles and joint C⁴ISR and you've made them independent." Robert Killebrew describes the type of communications capability that could support the modular JFLCC envisioned here.

Communications nets of all kinds can be lodged in space, with databases on the ground and data transferred over dense, redundant nets using virtually unlimited bandwidth. These changes can free maneuver units from dependence on bulky terrestrial systems that are easier to intercept and jam than those in space or near-space. The explosion of space-based commercial systems, now on the horizon, suggests that most, if not all, future space-based military communications may be carried by commercial vendors.[13]

Almost imperceptibly, personal computers have gone from unconnected to connected. And networked embedded processors are starting to integrate diverse activities in the private sector for greater adaptability and transparency. This trend

AV–8B landing at Twentynine Palms.

2d Marine Division (E.J. Young)

will inevitably impact on joint command, control, communications, computers, intelligence, surveillance, and reconnaissance (C^4ISR) systems. Off-the-shelf commercial technology is far more advanced than that fielded in the Armed Forces. How can the military keep up with the maddening pace of change in communications?

The selection of joint C^2 systems with the desired level of baseline interoperability may require leasing operational and strategic C^4I hardware and software from the private sector. There is not much point to investing scarce defense capital in outright purchase of C^4I equipment in the current environment. Technology is outpacing defense research, development, and procurement. Leasing such systems could provide regular upgrades to guarantee state-of-the-art capability.

Closing Thoughts

Senior officers on the operational level are central to the drama that translates strategic goals into tactical action. They must not only constantly link the strategic and tactical levels but comprehend the actions of their opponents in a similar context. How they interpret missions and employ their forces dominates operations. This is why an integrative structure of multiservice command and control must exist on the operational level that induces military leaders to interpret information and activity in ways that exploit capabilities across service lines. This is the underlying purpose of the JFLCC structure described here. It is, of course, only one of several critical steps. Joint training, doctrine, education, and modernization are also essential. Based on progress in these arenas, the JFLCC concept outlined could be adapted to include senior officers from all services. Integrating Army and Marine leadership on the operational level is, however, a plausible start in this much longer process.

Having said that, American ground forces now need a joint warfighting C^2 structure on the operational level with joint C^4ISR that facilitates the rapid deployment of tactical formations by strategic air and fast sealift to the scene of action in the unified command. The concept presented here is designed to meet the need for speed and agility while offering an alternative to debilitating force structure cuts. The JFLCC approach promises long-term economy by reallocating human and matériel resources from the World War II mobilization headquarters structure to the regional unified commands where JFLCCs can be organized and positioned to contribute to JTF headquarters establishment and be ready for immediate joint strategic action.

As mentioned at the outset, the bureaucratic and technological legacies of the Cold War continue to divert attention from the social, political, economic, and technological change in the strategic environment since 1989. Yet the international situation is becoming more dangerous, and nothing is emerging to replace the European world order. This necessitates reshaping the U.S. military system for conflict across the spectrum, across the globe. The concepts here are part of an adaptive

approach at the beginning of a new RMA that will allow Army and Marine landpower to absorb emerging technologies. Ideally, a unified command should be selected to examine these concepts in a joint operational environment.

Adaptation, however, is not just a function of technology. The Russian officer who witnessed Prussia's titanic victory over Austria at Koniggratz in 1866, Major General Dragomirov, dismissed newspaper claims that new breech-loading rifles were responsible for Prussian success. "It wasn't the needle gun by itself . . . but the men who carried it." And the French military attaché was probably more insightful when he noted that regardless of what technological advantage the Austrians possessed, it would not have changed the outcome in 1866: the war was won by the Prussian high command.[14]

To adapt to this new environment, a common view of what can work and what is necessary must shape the design of ground forces. If the Army and the Marines cannot articulate a collective, coherent vision, the defense bureaucracy will more likely supply the force structure it knows than the one the Nation needs. Some of these changes involve the recognition that surface ships have not become significantly faster and that Army and Marine Corps combat forces can thus reach the scene much faster by air.

Making judicious choices today about modernization and configuring tactical ground forces for rapid deployment in the close/deep/rear joint framework will equip forces with the operational reach, force protection, and mobility that both Army and Marine crisis response forces lack. At the same time, prudent requests for further additions to air and fast sealift transport and prepositioning capabilities can augment the JFLCC role in boosting tactical responsiveness of landpower. The alternative—keeping headquarters that are no longer strategically relevant and relying on new information technology to enable Cold War organizations to fight the last war better—will not transform the force. Moreover, it risks wasting the opportunity to steal a dramatic march on potential enemies. Paraphrasing the oracle of Delphi, "Missed opportunities to make real changes are luxuries that can harm the U.S. military in the 21st century." JFQ

NOTES

[1] Williamson Murray, "In Search of the Army after Next: Another Perspective," *Marine Corps Gazette*, vol. 82, no. 1 (January 1998), p. 71.

[2] Douglas A. Macgregor, in *Breaking the Phalanx: A New Design for Landpower in the 21st Century* (Westport, Conn.: Praeger, 1997), outlines concepts for reorganizing the Army and the contribution of a joint command and control structure for landpower.

[3] The boundaries of the levels of conflict tend to blur and may not correspond to levels of command. Nevertheless, in the American system the strategic level is usually the concern of the National Command Authorities and the highest military commanders, the operational level that of theater commands, and the tactical level that of sub-theater commands. *Essays on Air and Space Power*, vol. 1 (Maxwell Air Force Base, Ala.: Air University Press, 1997), p. 13.

[4] Earl Wavell, *The Good Soldier* (London: Macmillan, 1948), p. 43.

[5] Charles Messenger, *The Blitzkrieg Story* (New York: Charles Scribner's Sons, 1975), p. 58.

[6] For instance, cruise missiles are attractive strategic weapons. They offer a first strike and retaliatory capability. They are relatively small and can be launched from various platforms, including trucks, submarines, and aircraft. They are easy to hide and disperse. W. Seth Carus, *Cruise Missile Proliferation in the 1990s* (Washington: Center for Strategic and International Studies, 1992), p. 45.

[7] "Force XXI: Division Redesign," *Army Times*, June 22, 1998, p. 5.

[8] F.E. Littlebury and D.K. Praeger, *Invisible Combat: C³CM: A Guide for the Tactical Commander* (Washington: AFCEA International Press, 1986), p. xi.

[9] U.S. Marine Corps, *Expeditionary Organizations* (1998), chapter 3, p. 5.

[10] S.L. Brodsky, "Control Aspects of C²" in *Selected Analytical Concepts in Command and Control*, edited by John Hwang et al. (London: Gordon and Breach Science Publishers, 1982), pp. 56–57.

[11] Terry J. McKearney, "Rethinking the Joint Task Force," *U.S. Naval Institute Proceedings*, vol. 120, no. 11 (November 1994), p. 54.

[12] Alvin H. Bernstein and Martin C. Libicki, "High-Tech: The Future of War? A Debate," *Commentary*, vol. 105, no. 1 (January 1998), pp. 28–34.

[13] Robert B. Killebrew, "Learning from Wargames: A Status Report," *Parameters*, vol. 28, no. 1 (Spring 1998), p. 133.

[14] Gordon Craig, *The Battle of Koniggratz: Prussia's Victory over Austria, 1866* (Westport, Conn.: Greenwood Publishers, 1964), p. 174.