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AFTER THE STORM

The Growing Convergence of the Air Force and Navy

Major General John L. Barry, U.S. Air Force, and James Blaker

Over the last decade, military reformers have argued that when it comes to developing joint warfare capabilities, the U.S. military services have routinely substituted overblown rhetoric for heartfelt commitment.[1] The services may have redundant capabilities, critics complain, but they continue to stage knife fights over doctrine; they still have problems communicating with each other during actual operations; and they continue to squabble—quietly or not—over their "fair shares" of the defense budget.

There have been, however, few acknowledgements that the ability of U.S. forces to operate jointly is better now than it was a generation ago, when joint operations were rarely on anyone's "radar screens." In fact, it took the "Desert One" disaster, the resulting Goldwater-Nichols Act of 1986, and the ongoing debate over the current revolution in military affairs to lead us up to two fundamental questions. Are the four services trying to improve their joint operational abilities fast enough? How will their ability to operate jointly evolve over the next several years?

The answer to the first question, as this historically based article will demonstrate, has its roots in an expanding technological base; the centrifugal, go-it-alone behavior of the services in the late 1970s and 1980s; and the eventual march toward convergence, especially by the Navy and Air Force, since DESERT STORM. The answer to what happens in the future may be a bit trickier, but we offer a hypothesis: joint operational capabilities will accelerate dramatically, because of ever-expanding technological capabilities, and because of the growing convergence between service visions and doctrines, particularly in the case of the U.S. Air Force and the U.S. Navy.

THE EXPANDING TECHNOLOGICAL BASE: THE DIFFERENCE A DECADE MAKES

Joint operations used to mean nothing more than the participation of two or more services at the same time. There were a number of cultural, organizational, and political reasons for this orientation, but as recently as a decade ago there were important technological reasons as well. For example, given the size, heterogeneity, and different modernization rates of the armed services, the United States simply could not achieve, with few exceptions, cross-service data interoperability. The commanders of Army, Navy, Air Force, and Marine Corps units could communicate with each other, but the computers that actually ran and supported the equipment in their units generally could not exchange data quickly or establish the kind of information flow that was often needed. What we had, therefore, were military services entering the information revolution, but mostly within themselves rather than between each other.[2]

Then a second wave of the information revolution hit the U.S. military. This second wave included a bewildering array of technologies, including information "layering," new architectures and data standardization, the Global Command and Control System, Link 16, and more.[3] Much of this second wave remains esoteric, complex, and incomplete. Overall, however, its impact over the last ten years has been profound. While the technical integration of all major military systems and functions into a true system of systems is far from complete, enough is in place to achieve joint interoperability at the systems and data levels. From a technical standpoint we are literally entering a whole new world of joint forces.[4]

However, our technological ability to change the concept of joint operations from one that means, essentially, "being there with more than a single military service" to something that involves true interoperability, functional integration, and order-of-magnitude improvement in capability does not make the shift automatic. Changing the meaning of jointness requires willpower, and that is a function of culture, history, politics, and vision. To show how far the U.S. Navy and U.S. Air Force have come in these areas, we need to delve into what they have been saying about who they are, where they want to go, and why. From a joint operations perspective, it is a tale of divergence and yet convergence that started three decades ago.

FROM VIETNAM TO DESERT STORM: DIVERGING NAVY AND AIR FORCE DOCTRINES

In the early 1970s, as it became increasingly clear that the United States was pulling out of Vietnam, each of the military services began to assess what the previous decade had meant to it and, more importantly, what lay ahead. The

Army refocused its attention on Central Europe and developed the "AirLand Battle" concept, which eventually provided the foundation for its successful hundred-hour operation against Iraqi forces in DESERT STORM. The Air Force also turned toward planning for a war on the central front in Europe, as did the Navy. But the latter did so in the context of a general shift toward a war at sea, and under it. It was clear that the Soviet Union was building a naval force that could challenge our ability to flow men and materiel across the Atlantic, in the event of a conflict in Europe, and also test our control of the sea. As a result, Navy planning soon focused on blocking Soviet access to the Atlantic sea-lanes, initially between Greenland, Iceland, and the United Kingdom, and subsequently farther north, under the Arctic ice cap and into the Norwegian Sea.

By the late 1970s, however, a new pattern emerged in the Navy's thinking. Navy strategists accepted the fact that however vital the Navy's contributions to a Nato–Warsaw Pact conflict in Europe would be, they would be strategic in level and scope, and indirect in nature. At the same time, the strategists saw operations in the Norwegian Sea as increasingly important, and not only because they could bottle up the Soviet submarine threat. By threatening to conduct air operations from the Norwegian Sea, the Navy could also tie down Soviet ground and air forces that otherwise might be thrown against the Central European front. That, of course, was the basic assumption underlying what became the "Maritime Strategy."[5]

As attractive as the Maritime Strategy was to Navy thinkers, its fundamental problem boiled down to protecting aircraft carriers, and doing so within the confines of a strategic paradox. To tie down Soviet forces, the carriers had to get close enough to their northern flank to pose a serious attack threat to the Soviet homeland. The closer the carriers came to the Kola Peninsula, however, the easier it would be for waves of land-based, medium-range Soviet aircraft to find and attack them.[6] This posed a difficult tactical problem, for in the 1970s the Soviets were developing air-to-surface missiles that, delivered in repeated long-range attacks from multiple directions, were likely to inundate U.S. naval battle fleets.

The Navy's response was to extend its airpower-projection capabilities farther and to deploy multilayered defensive shields as far out from the aircraft carriers as possible. In the first case, to extend its power projection capabilities, the Navy bet on the A-12—a relatively long-range bomber designed to replace the A-6—and on long-range cruise missiles (the Long Range Cruise Stand-Off Weapon, for example). Neither bet paid off. Both programs were canceled in the late 1980s because of development delays, cost escalations, and premonitions of a Soviet collapse.

The Navy's efforts to push an effective defensive shield farther out from the carrier were far more successful. The undertaking involved capital investments in attack submarines, new carriers, Aegis-equipped surface ships, the F-14 long-range interceptor, and the F/A-18. It also involved an early information-technology "revolution" of sorts; though the post-Vietnam ship modernization and buildup tended to overshadow the fact, the Navy invested heavily in space-based communications and networked computers.

Much of the above architecture might have developed without a Maritime Strategy. Large, modern carriers, with their ability to carry and operate more aircraft, made sense economically. The buildup of attack submarines was directly linked to the growth of Soviet attack and ballistic missile submarine inventories from the 1970s onward. The Navy's growing capabilities in data linking and communications had been anticipated in the 1960s, at the height of, and in the context of, the Vietnam War. When all is said and done, however, it is hard to separate the Navy's procurement history from its parallel development of the Maritime Strategy. Whether the strategy drove procurement patterns or merely justified them, by the early 1980s the corporate Navy saw both elements as integral parts of a greater whole.

By 1994 the Navy was analytically rediscovering both how dangerous it would be to operate in the littorals, and how impressively combat power could be enhanced by the involvement of all the services.

Committed as it was to a forward strategy that would face formidable and numerous air threats, the Navy recognized the value of engaging those threats as far away from its battle groups as possible, before Soviet Tu-22M Backfire bombers could launch their missiles. But the farther out the shield extended, the more porous it became. That, in turn, dramatically increased the need for integrated cooperation and communication among the ships and aircraft, a need that supported the Navy's proposed Cooperative Engagement Concept. (The CEC, still in development, envisions the creation of a common "battlespace" picture by combining the separate radar and other sensor returns received by the aircraft and ships that make up a battle group.)

The idea of developing a common understanding of a highly complex military situation that encompassed a vast geographic area was, of course, not a revolutionary concept. But two aspects of the U.S. Navy's CEC efforts are worth noting. One was the increased importance the Navy put on space-based surveillance. The other lay in the beliefs and assumptions related to command and control that it developed on how to react to a common battlespace picture. In retrospect, the Navy's interest in both areas appears to have set the foundation for closer joint operational convergence with the Air Force.

If space-based communications had been a central Navy interest prior to the emergence of the Maritime Strategy, within that strategy the tactical necessity of extending an air defense shield beyond the horizon put a premium on this type of communication. (This remained true as the Navy began to build a common battlespace picture to link computers with data streams within its Cooperative Engagement Concept.) At the same time, the Maritime Strategy also elevated space-based surveillance from a "nice-to-have" operational adjunct to a key need, particularly as technical improvements in U.S. satellites in the 1980s offered near-real-time notification of Backfire takeoffs. Through the 1970s and 1980s, then, as the service-centric Maritime Strategy increasingly dominated Navy thinking and planning, it was also helping to construct a common interest area with the U.S. Air Force—in space-based surveillance and in the ability to track what other land-based air forces were doing.

In fact, by the outbreak of Operation DESERT STORM, the Navy had essentially committed itself to two "Air Force" notions. First, the type of battlespace awareness that matters most is that which allows one to focus on what an opposing air force is doing on and over its own territory. Second, in order to deal with this opposing force effectively, one needs centralized command. Now, decentralized operational command and control, of course, was deeply embedded within the U.S. Navy. The service had not only delegated decision-making authority to individual ships but had wrapped decentralization within its own culture and tradition. But as the Maritime Strategy took hold and communications improved, the Navy increasingly moved toward more centralized decision making, at least when it came to coordinating responses to air attacks. Its creation of "composite warfare commanders" for its carrier battle groups was a key milestone. Battle group commanders now had the authority to coordinate their groups' air defense assets as a whole. The doctrine also illustrated, in a small way, that the seeds of convergence lay within a Navy-centric strategy.

Meanwhile, the U.S. Air Force, long characterized by more centralized control, was moving toward convergence as well. The process started in the 1960s, partly driven by the strategic nuclear attack planning efforts tied to the Single Integrated Operations Plan. The Vietnam War, where the Air Force began to employ the centralized planning and coordination of attack, fighter, tanker, and rescue air operations that communications and radar tracking improvements made increasingly possible, helped push the service into the nonnuclear realm. The trend accelerated with the deployment of the Airborne Warning and Control System (AWACS) in the mid-1970s and with the emergence of AirLand Battle doctrine in Europe.

However, the limited types of conceptual convergence we have just described were outside the planning mainstreams of the Navy and Air Force for most of

the last thirty years. They made little progress toward creating "ties that bind"; from the end of the Vietnam War to at least the mid-1990s, the Air Force and the Navy simply thought about and operated within two separate conceptual worlds.

This division was not irrational. Implementing the Maritime Strategy had the practical effect of separating the focus of the Navy power projection from the focus of Air Force operations by over a thousand miles. This kind of geographical separation simply ruled out any concern with or interest in cross-service synergies at the operational or tactical levels. Indeed, the separation tended to promote the opposite effect and reinforce parochialism in both camps. To the Navy, for example, the prospect of operating on its own in the northern reaches of the Norwegian Sea (or off the Kamchatka Peninsula in the Pacific) allowed optimization for a conflict that would probably involve only two forces—those of the U.S. and Soviet navies. Over the years, that fundamental assumption affected a myriad of incremental decisions on weapon designs, stockpiles and logistics, and information and communications systems. As a result, fleet-defense "fire-and-forget" weapons increasingly became the weapons of choice. In planning scenarios uncomplicated by the presence of other services, allied forces, or nonbelligerents, the choice of such weapons was less hindered by concerns that once launched they might have unintended consequences.

The Air Force's current vision recognizes fully that the nation will always need the additional perspectives that come from the air, sea, and ground.

The Air Force, for its part, went down a different path. Its planning context was "denser"; its operating area was filled with a greater variety of forces. Allied aircraft, for example, would be in the air along with hostile ones. The AirLand Battle concept would require close Army–Air Force planning and coordination. Finally, the Air Force could not count on the presence or contributions of U.S. naval forces, nor would it have to worry much about what that service was doing a thousand miles to the north. These were just some of the givens that drove Air Force planning, acquisition, and operational doctrine for most of the last quarter of the twentieth century.

So it was that the Navy and Air Force's divergent planning contexts overshadowed their growing agreement in the areas of centralized command and control of air operations, and the utility of space-based communications and surveillance. In fact, one could argue that the divergent planning streams twisted the fragile agreement into competition. The Navy and Air Force were each moving toward greater centralized control, but only if that control was centralized under its own authority. Likewise, both agreed on the increasing utility of space-based communications and surveillance, but each demanded that its own

requirements be met first, and that it, and not the other service, be given authority to set priorities regarding space-based activities.

DESERT STORM AND THE RETURN TO CONVERGENCE

The effects of the Navy and Air Force's divergent planning paths became dramatically visible during the Gulf War, and they subsequently affected the Navy's future planning far more than they did that of the Air Force. This is probably because DESERT STORM fit the Air Force's planning approach much better than it did the Maritime Strategy, and because civilian and military leaders prevented the Navy from using its full arsenal of fire-and-forget weapons. (There were too many friendly and allied forces in the area, and naval aviation lacked some of the "identification friend or foe" capabilities of the Air Force.)[7]

The Gulf War, in short, was a "wake-up call" for the Navy. The Army and Air Force felt that their strategies and concepts of operations were largely vindicated.[8] This was less true inside the Navy, which came out of DESERT STORM with the sense not only that had it been overshadowed by the Air Force but that the strategic concept it had so carefully developed was essentially irrelevant. As a result, the Navy shifted toward a more "joint" posture—but so did the ever restless Air Force.

The Air Force's Transition to Jointness

Beginning in 1990, each of the military services published a series of "white papers" that provided "vectors" on how to deal with a new security environment and the consequences of the Gulf War. The Air Force published its initial white paper, "Global Reach—Global Power," in 1990. It argued that the United States was now able to strike anywhere in the world with precision, speed, and accuracy. In retrospect, the document was remarkable not only for its prescience but also for its advocacy of change. It anticipated replacing a cold-war Air Force—that is, a forward-stationed garrison force—with an expeditionary Air Force that operated globally out of the United States.

"Global Reach—Global Power" also recognized that expeditionary forces required new and higher levels of situational awareness. The challenge appeared simple—"If we're going to have fewer people based forward around the world, then we're going to have fewer eyes and ears out there, so we need to provide the national command authorities with worldwide situational awareness."[9] A partial answer, or so the white paper argued, was to accelerate America's interest in and use of space for communications and for intelligence collection, surveillance, and reconnaissance.

Late in 1996, the Air Force updated its vision. "Global Engagement: A Vision for the 21st Century Air Force" had a threefold significance. First, the document

asserted that the concepts outlined six years earlier in "Global Reach—Global Power" had proved more than mere rhetoric, that the U.S. Air Force had formally embedded them into its long-range planning process. Second, it stressed the growing importance of space in this process. Finally, "Global Engagement" spelled out what "expeditionary operations" truly mean.

These operations mean deploying more rather than less. They involve going, for particular tasks, anywhere in the world—as quickly as possible. They mean depending upon stealth technology, precision weapons, and space-based operations. In short, the Air Force had to become an aerospace force. It had to become faster, more potent, more accurate, and more effective in its use of force. It had to shift from a reliance on mass to a reliance on knowledge and information. In the end, the Air Force had to do these things because they were the essence of true expeditionary power.[10]

The Navy and Air Force were each moving toward greater centralized control, but only if that control was centralized under its own authority.

The most recent Air Force vision—"America's Air Force: Global Vigilance, Reach, and Power" (2000)—builds upon these themes. It emphasizes—yet again—the fundamental importance of space-based surveillance, command and control, and targeting in enhancing freedom of action and movement, and in preventing adversaries from interfering with U.S. operations. In the Air Force's case, this means that expeditionary aerospace operations will only be possible by compensating for the loss of an "on the scene" perspective with a perspective from space.

That, in turn, inevitably commits the Air Force to joint rather than independent operations. It is a matter of physics. By recognizing that forward-stationed U.S. forces are going to be increasingly vulnerable and sometimes even counterproductive, the Air Force's vision of global vigilance, reach, and power commits the service to building better situational awareness than could be garnered, or would be necessary, if one were already on the scene.[11] (For one thing, it is necessary to compensate for the time and distance involved in responding from the continental United States, if military force is to be used.) The view from space is probably essential if we are to deter or prevent errant behavior, for it represents, almost literally, high ground from which to perceive and understand phenomena spread across great expanses.

But if the perspective from space—generated by technology that allows us to observe, understand, and communicate—is vital, it is not sufficient. The Air Force's current vision recognizes fully that the nation will always need the additional perspectives that come from the air, sea, and ground, particularly if it wishes to deter undesirable events or respond to them from afar. Greater distance

means more time. More time means a greater need for precision, accuracy, and effectiveness in any use of force. Precision, accuracy, and effectiveness demand the best, most comprehensive situational awareness and actionable knowledge that can be obtained, from all sources. Together they give the United States the information edge that—along with stealth and precision—lies at the heart of the American revolution in military affairs and is the fulcrum of military superiority.

In summary, the last decade represents a clear progression for the Air Force and its vision. The journey included the limited use of stealthy and precise force in DESERT STORM, and its full use over Kosovo in Operation ALLIED FORCE (and, very recently, over Afghanistan). In the interim, the Air Force transformed itself from one of the most outspoken advocates of a specialized view of joint operations to a believer in synergy. It went from hinting that it alone could deal with most of the nation's military challenges to the conviction that its global, expeditionary forces will have to integrate improved technologies and situational awareness to enhance the military capabilities of the United States as a whole.

The Navy's Transition to Jointness

If DESERT STORM was an important milestone for the Air Force, it is difficult to exaggerate the impact the conflict had on the U.S. Navy. Within a year, the Navy's general planning context moved from sea control and the open oceans to littoral zones and the projection of power and influence over land. (To reinforce the point, consider the titles of the Navy's key white papers of the 1990s—". . . From the Sea," September 1992;[12] "Forward . . . from the Sea," 1994;[13] "Forward from the Sea: The Navy Operational Concept," 1997;[14] and "Forward from the Sea Anytime, Anywhere," 1998.[15])

Some of this transition almost certainly would have occurred even had there been no Gulf War, for by the early 1990s the Soviet Union was gone, and with it the perceived challenge to U.S. supremacy on the open seas. The early 1990s were also a time of declining budgets, and although General Colin Powell, then chairman of the Joint Chiefs, had proclaimed that cuts would be shared equally (in percentage terms) by all the military services, the Navy, like the Air Force, decided to promote a post–Cold War concept that justified at least a claim for increased budget shares.[16]

". . . From the Sea" argued that U.S. naval power provided presence, enhanced diplomatic contacts, reassured friends and allies, bolstered coalitions, and demonstrated power and resolve. It also argued that forward-deployed naval forces could accomplish their goals without extensive forward basing, which might not be easily available during peacetime. Finally, the white paper asserted, if military force had to be used, forward-deployed naval forces could bring their own joint

maritime, ground, and air power to the fight. The Navy, in short, basically claimed that the Navy–Marine Corps team, without any involvement from the other services, was capable of undertaking joint operations, at least in the world's littoral zones.

The Navy's argument was highly effective during the Defense Department's 1993 Bottom-Up Review, which attempted to set new force levels. While the review based most of the services' force requirements on hypothetical conflicts, it made an exception in the case of carrier battle groups, postulating that the value of naval peacetime presence was sufficient to warrant two groups beyond what conflict-based calculations indicated.

"Forward . . . from the Sea," however, retreated from the suggestion that the Navy was capable of handling most "joint" warfare demands by itself. Instead, it portrayed the service as a facilitator for joint operations—once it had cleared the way. The shift in emphasis may have been in response to the criticisms by the other services of the original white paper's claims. The Army, for example, had argued that naval presence offshore, even in littoral zones, had very little political-military leverage in peacetime until the Marines actually planted their "boots on the ground"—and if boots on the ground were the real gauge of leverage, the Army offered the greatest leverage of all. The Air Force, in contrast, had been less directly critical. It had agreed with the Navy's contention that the United States could achieve high political and deterrent leverage without necessarily having boots on the ground. But in the Air Force's view, what most concerned would-be challengers was what "Global Reach—Global Power" had emphasized, the ability to strike quickly over great distances with precision and accuracy. By that criterion the Air Force, not the Navy, was the service of choice.

From the end of the Vietnam War to at least the mid-1990s, the Air Force and the Navy simply thought about and operated within two separate conceptual worlds.

But there was more to the Navy's edging toward "jointness" than the sting of Army and Air Force criticisms. The very individual who had convinced Secretary of Defense Les Aspin that a naval force in excess of calculated warfighting requirements was justified—Vice Admiral William Owens, then the Deputy Chief of Naval Operations for Resources, Warfare Requirements, and Assessments—had also introduced a new, joint perspective into Navy force planning. The assessments undertaken at his direction pointed to dramatic increases in warfighting capabilities through joint theater ballistic missile defense and air strikes. In other words, by 1994 the Navy was analytically rediscovering both how dangerous it would be to operate in the littorals, relatively close to shore, and how impressively combat power could be enhanced by the involvement of

all the services. Both prospects influenced the way the Navy thought about future littoral operations.

Not surprisingly, then, "jointness" became a prominent subtheme of "Forward from the Sea: The Navy Operational Concept" and the 1998 posture statement "Forward from the Sea: Anytime, Anywhere." The posture statement, although it noted the Navy's unique capability to shape the peace and respond to challenges short of war, emphasized that "the Navy and Marine Corps . . . can integrate forces into any joint task force or allied coalition quickly" (by providing key command and control options).

CONCEPT CONVERGENCE OR "POLITICAL CORRECTNESS"?

By the late 1990s, then, both the Air Force and the Navy were seeing the virtues of joint operations, and in something like the same ways, whereas both services had begun the decade with what appeared to be assertions of exclusive primacy.

To put the matter another way, many observers and commentators had seen the Air Force's "Global Reach—Global Power" and the Navy's ". . . From the Sea" as seminal texts, both for the internal, service-specific adjustments they advocated and for the increased funding they potentially justified. The pundits also saw in "Global Reach—Global Power" the handiwork of long-range-attack advocates inside the Air Force, who were perhaps working at the expense of the tactical aviation community, which had provided many of the Air Force's leaders after Vietnam. To Navy watchers, ". . . From the Sea" marked a dramatic rise in Marine Corps influence within the naval services, and a concomitant rise of the countermine and amphibious warfare communities as well.[17] Ultimately, though, the two white papers of the early 1990s had agreed on a common general strategic context. The documents shared the perception that the world had changed profoundly, and would change further, because of the decline and collapse of the Soviet Union; both assumed that the structure and character of U.S. overseas deployments would change; and both pointed to shifts in the allocation of U.S. defense resources because of these changes. Where they disagreed, of course, was on which service should be the major beneficiary of any reallocations. "Jointness," in the context of asserting the respective service's primacy, was a secondary concern.

By the end of the decade, however, the official views of the two services had changed both in tone and in substance. While both services continued to assert their relative importance in the post–Cold War era, they had refined their arguments as to why. If their arguments at the beginning of the decade had essentially ignored the question of how the Air Force and Navy would operate in conjunction with the other services, by the end of the decade each was emphasizing how it could enhance joint operations.

But was the shift a result of logic embedded in the concepts the Navy and Air Force had developed in the last decade? Or was it still rhetorical, driven by the rising prominence of, and dedication and priority given to, joint operations outside the military services? Certainly, the decade of the 1990s saw "jointness" rise in the Defense Department as an increasingly important measure of effectiveness for combat operations and the allocation of resources. For example, *Joint Vision 2010,* issued by the chairman of the Joint Chiefs of Staff, established a general template for joint operations. The secretary of defense's annual posture statements increasingly focused on improved joint operational capability as a central criterion for evaluating the department's performance. No fewer than four major defense reviews trumpeted the importance of jointness in the post–Cold War world.[18] It is hardly surprising that the goals and directions articulated by the military services would adopt the value-laden terminology of the times.

What we had, therefore, were military services entering the information revolution, but mostly within themselves rather than between each other.

But a more detailed look at the operational concepts the Air Force and Navy were injecting into their own strategic planning reveals that their growing support for joint operations was more than expedient and political. The Navy's development of network-centric warfare is a case in point.

Network-centric warfare, as the Navy has developed it, grew in part from the Cooperative Engagement Concept described earlier. The essence of the concept was that merging different perspectives into common awareness provided a dramatically better way to deal with the complex problems now posed by warfare.[19] As the Navy improved its communications links and its computing power, Cooperative Engagement's advocates increasingly turned to network theory to help design modes of cooperation among ships and aircraft—or rather, the computers they carried—and measure how different approaches increased the overall effectiveness of fleet operations. As naval pragmatists applied network theory to solve the severe problems of defending a fleet, they hit upon the real power of networks—it was not the number of ships, aircraft, and other platforms that finally mattered but how those entities shared their capabilities.

Not surprisingly, then, by the time Robert Metcalfe (founder of the 3Com Corporation and designer of the Ethernet) formulated his "law"—that the utility of a network is proportional to the square of its nodes—the Navy was already seeking to apply the concept systematically. Today, the Navy's efforts are driving it toward joint operations for that very reason; if other service components become part of a larger, multinode network, the power of the joint force and its parts will increase exponentially. The growing availability of secure

communications links, for example, will allow the U.S. military to build the kind of joint force networks that promise to operationalize Metcalfe's Law. Once they are established, no amount of service parochialism is likely to be able to stand long in the way of this process.

TOWARD A SINGLE CONCEPT OF JOINT OPERATIONS

Until recently, there were two broad, and competing, views of how the U.S. military ought to think about, organize for, and conduct joint military operations. One argued in favor of functional specialization. That is, it suggested that while different force components could perform many of the same combat functions, the best way to conduct joint operations was to assign each function to the service component that was "best qualified" for it. The other view advocated synergy. It argued that because different force components could perform many of the same functions, the key to increasing combat effectiveness was to combine operational and tactical-level forces in ways that would result in higher combat output than would be generated by a single service. Much of the discussion on jointness in the 1990s was an esoteric debate between these two views—cloaked, of course, by a unanimous, prior, formal commitment to becoming more "joint."[20]

The discussion often relied upon a toolbox analogy. Yes, wrote the "specialists," joint commanders should choose the "right tool at the right time for the right job." If, for example, they required widespread, system-level bombardment, they might logically turn to the Air Force to accomplish the task and give the Air Force component commander carte blanche for planning and executing attacks. This was essentially the argument advanced by General Tony McPeak, then chief of staff of the Air Force, following DESERT STORM. The "synergists" also believed in the toolbox analogy, but they argued that the joint commander ought to build a customized "tool" for the job at hand (because no job is the same as its predecessors). The commander ought to create this tool by blending the desired elements from each of the services. This was essentially the argument Admiral William Owens, later vice chairman of the Joint Chiefs of Staff, advanced shortly after DESERT STORM. (Interestingly enough, there are echoes of both the specialist and synergist views in the "lessons learned" studies that emerged from Operation ALLIED FORCE, the seventy-three-day air campaign against Serbia.)

The above views of jointness are of more than academic interest, especially given the progress of the recent defense review. The schools of thought point logically to different operational command and control arrangements and to different resource allocations. Specialization, for example, takes advantage of inherent efficiencies in the integrated traditions, doctrines, discipline, service loyalties, and procedures of single institutions. Synergy, in contrast, blends

particular service strengths on a mission-by-mission basis to provide higher combat output than any single service could produce.

Pushed to its logical extreme, specialization ultimately argues in favor of a command and control system that keeps the responsibilities and operations of various service components distinct and separate. Service interaction, in this view, should be concerned largely with maintaining clear and distinct lines of authority. Each service will be able to do what it does best and worry less about what another service is doing. Yes, there is bound to be redundancy in such a system. The Army, Navy, and Air Force will need their own logistics, intelligence, communications, and other support units because of that very specialization. They will need to concentrate on honing their particular specialties and reinforce their distinctiveness to help avoid operational and command confusion in conflicts. But specialization will pay off in highly effective overall campaigns, so long as each of the services does what it does best and stays out of the others' way.

Improbable? Certainly, but extending the logic of synergism leads to unreasonable conclusions of its own. The point is that as long as these two views contended for dominance, it was hard to agree on the practical and objective meaning of jointness. This disagreement appeared across a wide range of military interests. For example, it affected views of what joint experimentation really entails—whether dealing only with activities that lie outside the purview of the military services, or getting the services to work together more synergistically. Further, it made unclear what the Joint Requirements Oversight Council is supposed to do (that is, trading off roles, responsibilities, and resources across the services, or defining the sum of individual service desires). In short, the disagreement in the 1990s as to what jointness really implies was one of the major reasons the United States has been slow to transform its military forces, despite rhetorical claims otherwise.[21]

Given the trends we have identified, however, we predict the triumph of the synergistic view of jointness over the next year, particularly where the Navy and Air Force are concerned. The result will be the closing of a promise-reality gap, in terms of jointness, that has existed for far too long. The benefit will be effects-based capabilities that are good for our regional commanders in chief and right for our nation.

NOTES

1. See, for example, Philip A. Odeen et al., *Transforming Defense: National Security in the 21st Century,* Report of the National Defense Panel (Washington, D.C.: U.S. Govt. Print. Off., 1 December 1997), pp. 83–7; William Owens, *Lifting the Fog of War* (New York: Farrar, Straus, and Giroux, 2000), pp. 218–30.

2. The military power inherent in the information revolution comes from "bits"—the underlying electronic representation of data. Sensors generate bits, communications channels transmit bits, computers process bits, commanders act on information represented as bits, and weapons are directed by messages composed of bits. But to interoperate effectively, systems must be able not only to exchange relevant bit streams but also to interpret the bits they exchange according to consistent definitions—merely providing information in digital form does not necessarily mean that it can be readily shared. Interoperability also requires that systems be interoperable at the data level—that the format and semantics of the data be coordinated so as to permit interoperation. Technical interoperability places detailed demands at multiple levels, which range from physical interconnection to correct interpretation by applications of data that is provided by other applications. In 1990, the capability of U.S. forces in this respect was rudimentary.

3. "Layering" involves separating bit-transport technologies, transport protocol, and applications. It facilitates making C4I (command, control, communications, computers, and intelligence) systems interoperable in the presence of rapidly changing technologies and multiple technology choices. Layering makes it possible to tie different C4ISR (C4I plus surveillance and reconnaissance) systems together without losing technology independence, scalability, decentralized operation, appropriate architecture and supporting standards, security, or flexibility. In other words, it is able to compensate for the heterogeneity among the systems across the different services.

4. For detailed assessments to back up the claim of a qualitative technical change over the last decade, see, for example, National Research Council, National Academy of Sciences, *Realizing the Potential of C4I* (Washington, D.C.: National Academy Press, 1999); Office of the Inspector General, *Implementation of the DoD Joint Technical Architecture* (Washington, D.C.: Dept. of Defense, 1998); Government Accounting Office [GAO], *Joint Military Operations: Weaknesses in DoD's Processes for Certifying C4I Systems Interoperability*, GAO/NSAID-98-31 (Washington, D.C.: GAO, 1998); Defense Information Support Agency, *Joint Warrior Interoperability Demonstration, 1996 Demonstration* (Alexandria, Va.: DISA, 1996).

5. For the Maritime Strategy in its fully developed form, see James D. Watkins [Adm., USN], "The Maritime Strategy," U.S. Naval Institute *Proceedings,* Maritime Strategy Supplement, January 1986.

6. The rise of Soviet naval aviation in the 1960s was triggered by the transfer of Tu-16 Badger bombers from Soviet Long-Range Aviation to the Northern Fleet. The Northern Fleet armed the Tu-16s with a series of antishipping air-to-surface missiles through the 1960s. In the mid-1960s, the Soviets began development of the first medium-range bomber designed specifically for maritime strike and reconnaissance—the Tu-22M Backfire. The first prototype flew in 1969, but problems with its low-level performance led to significant modifications and the emergence of the Backfire-B in the mid-1970s. The Backfire-B became the subject of considerable U.S. public debate in the late 1970s and during the 1980s because of its potential strategic nuclear strike capabilities against American territory. But its greatest impact on U.S. military planning, at least so far as the Navy was concerned, focused on the threat the aircraft posed to the Maritime Strategy.

7. These factors required Navy F-14s to obtain visual confirmation of targets before they could engage them, in effect negating the long-standoff capabilities of the Phoenix missiles.

8. DESERT STORM did not conform entirely to the framework the Army and Air Force had been developing under the rubric of the AirLand Battle. But the campaign highlighted the Army's decision after Vietnam to build a heavy, highly mobile ground force able to wage a war of maneuver against a Soviet–designed and equipped army. The Army leaders who fought the Gulf War had been in the generation of junior and field-grade officers who developed the all-volunteer force and brought it back from the disarray of the late Vietnam, early post-Vietnam period. They were justifiably proud of the hundred-hour ground campaign that wrapped up the Iraqi ground forces in Kuwait. In the Air Force's case, the success of the air campaign and the

demonstration of the effectiveness of precision-guided munitions bolstered the arguments highlighting the potency of airpower, long pronounced by Air Force theorists.

9. Ronald Fogleman [Gen., USAF], speech delivered at the Defense Forum Foundation, Washington, D.C., 24 January 1997.

10. As an aside, it is noteworthy that *Global Engagement* generated considerable discussion in the 1997 Quadrennial Defense Review, particularly over what came to be called the "rapid-halt debate." The debate emerged from the Air Force's belief that airpower based in the United States could provide enough force, fast enough, to halt military aggression anywhere in the world. This was *not* a claim that airpower alone could win any military conflict. It was rather an argument about timing. Air Force spokesmen maintained that U.S. airpower could halt aggression before opponents achieved their objectives, and that it could reduce their strength sufficiently to end a conflict relatively early, and with smaller U.S. ground forces. In the heat of the 1997 Quadrennial Defense Review, however, spokesmen from the other services misinterpreted the Air Force's argument. They sometimes claimed that airmen were proclaiming the irrelevance of U.S. ground and naval forces and casting, yet again, a covetous eye on a larger share of the defense budget.

11. In the absence of a military threat that justifies their permanent presence, stationing U.S. forces on the territory of other nations necessarily increases their suspicions U.S. motives. The skepticism may be muted, rationalized, balanced rhetorically, ignored officially, or seen as the price of diplomatic gain. But without a military reason, shared by the host nation, for stationing U.S. military forces on its territory, the initial solace will be replaced by suspicion.

12. Sean O'Keefe, Frank B. Kelso, and Carl E. Mundy, Jr., "*. . . From the Sea": Preparing the Naval Service for the 21st Century* (Washington, D.C.: U.S. Dept. of the Navy, September 1992).

13. John H. Dalton, J. M. Boorda, and Carl E. Mundy, Jr., *Forward . . . from the Sea* (Washington, D.C.: Dept. of the Navy, 1994).

14. Jay L. Johnson, *Forward from the Sea: The Navy Operational Concept* (Washington, D.C.: Dept. of the Navy, 1997).

15. John H. Dalton, Jay L. Johnson, Charles C. Krulak, *Forward from the Sea . . . Anytime, Anywhere: Department of the Navy 1998 Posture Statement* (Washington, D.C.: Dept. of the Navy, 1998).

16. For an excellent overview of Navy thinking in the 1990s see Edward Rhodes, "From the Sea and Back Again: Naval Power in the Second American Century," *Naval War College Review,* Spring 1999, pp. 13–54.

17. Rhodes points out that "in one sense this is simply a logical corollary of the basic conception of a littoral strategy: if the point of naval power is to project force ashore, Marines are a critical element. It is, however, remarkable in two regards. In the first place, this marriage gave unprecedented prestige and power to the Marine Corps; the Navy was acknowledging the Corps as at least an equal partner, and possibly as the critical partner, in naval operations. The Marines represented the point of the Navy's spear. In the second place, this conception of 'joint' operations ignored the Army and Air Force. The Navy was thus essentially making the claim that the Navy–Marine Corps team, without any involvement of the other services, was capable of undertaking the joint operations, or at least the joint operations in the world's littoral, that would be demanded by national decision makers. Thus while the Navy conceded a remarkable degree of its autonomy, it conceded it only to the Corps." Rhodes, p. 19.

18. Commission on Roles and Missions of the Armed Forces, *Directions for Defense* (Washington, D.C.: U.S. Govt. Print. Off., 1993); and William S. Cohen, *Report on the Quadrennial Defense Review* (Washington, D.C.: U.S. Govt. Print. Off., May 1997); both available on *Military Analysis Network*, http://sun00781.dn.net/man/docs/index.html. See also the 1993 Bottom-Up Review, available on the *Military Analysis Network* Website, and Odeen et al.

19. Much of this brief overview is drawn from Naval Studies Board, National Research Council, *Network Centric Warfare* (Washington, D.C.: National Academy Press, 2000).

20. William A. Owens, "Living Jointness," *Joint Force Quarterly,* Winter 1993–94, pp. 7–14.

21. See Thomas G. Mahnken, "Transforming the U.S. Armed Forces: Rhetoric or Reality?" *Naval War College Review,* Summer 2001, pp. 85–99.