# MIND THE GAP

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David C. Gompert
Richard L. Kugler
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with an introduction by
JOHN P. WHITE

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# INTRODUCTION

by
John P. White

When American defense officials meet informally with their allies and friends from other North Atlantic Treaty Organization countries, the conversation often turns to the growing disparity in combat capability between European and U.S. forces. The problem is bemoaned, but the participants are not stirred to action. This is unfortunate. We need a cross-Atlantic debate that seeks feasible solutions to this problem.

*Mind the Gap* responds directly to that need. It not only dissects the problem of a growing disparity but also rejects its inevitability. Instead, it lays out a multitiered strategy for its solution which is specific and practical, including processes and procedures for implementation. The proposed strategy is complicated and would be difficult to execute; it would raise questions and even objections. That is as it should be. The alliance, nevertheless, has solved larger, more complex problems.

We urgently need to find a way to close the gap because the problem is getting worse. The United States continues to implement its vision of a globally mobile military force equipped with the latest technology. The European members of NATO are not investing in similar capabilities. As a result, the gap will widen and be increasingly difficult to close.

This book is particularly important because the problem is much more fundamental and threatening to our interests than is widely perceived. If we allow this divergence to continue, it could marginalize the North Atlantic alliance that has served its members and the world so well for the last half century. The failure of NATO to close the gap has implications beyond the creation of incompatible forces. It would mean that the alliance will have failed to adapt its enormous capabilities (economic, political, and military) to the new challenges that we all face. The United States would be motivated, indeed required, to act unilaterally in its own self-interests. This would reduce not only the importance

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of Europe in addressing world problems but also both the quality and effectiveness of U.S. national security policy. That would be bad for the United States and for our allies, and even worse for the alliance.

The Cold War was won with, and largely through, NATO. The United States did not do it alone. Our leadership, wealth, and nuclear and conventional forces were critical to the alliance and accepted as such by all the partners. But the partners were central to the solution.

Recent years have seen the world grow more interdependent. The results of this "globalization" have been largely positive for the North Atlantic countries in terms of economic growth and political openness. We are using NATO and other institutions to encourage more interdependence. This is the case with NATO expansion, the Partnership for Peace, and the NATO-Russia Founding Act.

But the benefits will only continue if we nurture the dynamics of interdependence and address the threats to its growth and evolution. They will not come for free. The threats come from many directions, such as rogue states that ignore the rule of international law, the spread of weapons of mass destruction, artificial trade barriers, and interruption to the distribution of critical supplies such as oil. Given their importance, the United States has concentrated its national security policy (entitled "A National Security Strategy of Engagement and Enlargement") on these dangers. Unfortunately, the Europeans have been reluctant to pursue a similar course. The resulting division between us will lead to less effectiveness in solving mutual problems. The members of the alliance, the Europeans and the Americans together, must reverse this trend for the sake of all of us. The allies need to share responsibility for solving these mutual problems. They and we should address such threats in harmony with each other. The most practical way to achieve this objective is to work together to strengthen NATO.

This need for military cooperation has been reinforced for the United States by our experience over the last decade. As we have responded to crises of various sorts, the necessity to operate through coalitions has become readily apparent. Being the world's only superpower is a mixed blessing and carries with it inherent limitations on freedom of action not fully appreciated in advance. Even where we have had the military wherewithal to accomplish our short-term objectives, we realized that we could not achieve our political goals without strong support from allies. Military action is but one step in the larger process of achieving policy objectives, even in minor crises. As with broader political efforts, they are most effective when conducted by coalition partners who share common objectives with us.

The conventional wisdom is that these various coalitions restrain our freedom of action, limit our options, and complicate the execution of military

operations. All of this is true, but it is a price worth paying in order to garner the international support necessary to execute a successful national security strategy.

This has been apparent most recently in the continuing attempt to isolate the regime in Iraq. It is not that the United States does not have the military capability to execute the desired combat operations. It certainly does. As with the Gulf War, much of the allied military cooperation in such actions may not be militarily central to their outcome. But willingness of the allies to commit combat units to support these operations is central to their overall success. It signals resolve and common purpose that are critically important.

The United States cannot achieve its broader political goals in the region without continued support from our Gulf and NATO allies. In fact, unilateral military action to punish Saddam Hussein could substantially reduce the likelihood that we will achieve our political objectives, even in the short run. The issue is not U.S. leadership. All parties recognize that our leadership is critical to success. But that leadership, which includes our enormous military capability, is insufficient absent a coalition of capable nations.

In the future, bombing may be necessary to punish Iraq for its intransigence. But the punishment will not have a longer term effect if the community of nations does not support continued isolation. In fact, it runs the risk of generating more sympathy for the Iraqi people than animus for the Iraqi regime. If the United States is forced to act alone in such a situation, we are in danger of failing to achieve the longer term goal of Iraqi compliance with United Nations resolutions.

Recognizing this problem, the United States has always made a major effort to obtain the support of its allies in dealing with Saddam Hussein's provocations. If a military attack becomes necessary in a future crisis and the United States is forced to act alone, its isolation will be obvious and detrimental to the interests of all of the allies. Why do some of our allies appear willing to put themselves and us in this situation? Our collective failure to construct a solution that addresses our mutual interests reduces their influence and our effectiveness.

But this dynamic is more pernicious. The absence of a common vision and complementary capability invites the Europeans to take the short-sighted view that curbing Saddam Hussein's violations is a problem for the United States while they remain free to buy his oil. It reduces and erodes the effectiveness of the alliance in dealing with other issues of mutual interest. A willingness on the part of the United States to stand alone would reflect an illusory strength. It would allow our allies to support us when it suits them and to look to us to implement some of their goals (e.g., counterterrorism) while they are free to achieve other objectives (e.g., trading with Iran.)

We have experienced the same dynamics in our policy regarding Bosnia and the surrounding region. Installing the Implementation Force

required U.S. leadership but it also required substantial forces from the other NATO countries to be successful.

More broadly, a failure to conduct foreign policy and its military complement in coalitions would increasingly isolate the United States. It would allow our friends to conduct policies of narrow self-interest and constrain us by eroding the legitimacy of our actions. Having the world's best military is only of value if its use is knitted together with the other instruments of foreign policy and world leadership. I recall a meeting dealing with our Russian policy, in which President Clinton told the members of his foreign policy team that an important lesson that he had learned from his first term was that effective foreign policy required using all of the "tools" at his disposal.

This reality makes a strong, effective NATO critical to meeting our overall objectives around the world. The challenge is to change NATO so that its capabilities meet the needs of the new era. The current devolution has to stop.

The process of changing NATO will be slow and arduous, as it has been in the past. We have seen this recently in the debates about how to effect "NATO adaptation."

First, a successful transformation of NATO requires agreement on a common vision and purpose. We are not there yet. In fact, as the authors point out, the lack of agreement on a common strategic purpose is at the heart of the widening gap in capability. Despite having global interests similar to those of the United States, the Europeans have failed to reflect these interests in their policies or their capabilities. Thus U.S. and European security motivations, responsibilities, and corresponding military strategies have all diverged. All of the allies, working together, need to articulate the role of the alliance in a new era of globalization. That such a vision would be inconsistent with much current behavior within the alliance underlines the importance of such an effort. While much of the inconsistency between goal and practice appears to be on the other side, at least as seen from here, the United States needs to approach the process openly, willing to compromise.

Second, the U.S. military has embraced the transformation of its forces through the rapid adoption of advanced information technologies—the revolution in military affairs (RMA). At the same time the Europeans have continued to support force structures more in consonance with prior NATO strategies. This widening gap, so obvious to military experts on both sides, must be closed.

The authors rightly argue that slowing RMA implementation in the United States should not be considered a serious option. The RMA is not national but technological and the Europeans need to embrace it. Even with such an embrace, there must be transatlantic cooperation to resolve the many issues that will appear.

The implementation of an RMA strategy by the United States is very expensive. The Department of Defense budget calls for investing around $60 billion per year over the coming years on new equipment. Such funding will not be available unless the DOD streamlines its support structure to yield $15 to $20 billion in annual savings. In other words, we need a revolution in business affairs (RBA) to accompany the RMA.

The authors assume that this will happen. I am not so confident. My involvement in the Quadrennial Defense Review convinced me of the necessity of these tradeoffs. But it also brought home the difficulty of shifting such resources from current expenditures, which always appear necessary, to future investments. The changes in business practice that are called for must be widespread and lasting to be effective. To date, Congress has largely rejected the administration's proposals in this regard, notably the call for two more rounds of base closures. Congress has also been reluctant to outsource numerous business functions that can be performed by the private sector. If political resistance and bureaucratic inertia stop these changes, both revolutions will fail. This would be tragic, but that does not mean that it will not happen.

The Europeans face the same challenges and are even further behind than the United States in streamlining their support structure. Like the United States, the allies will need an RBA to support and afford an RMA. If the United States aggressively embraces both the RMA and the RBA, the gap will widen.

Third, the United States has stronger defense and information industries than Europe, which further handicaps Europe's efforts to improve its forces. Much of the American advantage comes from the robust information technology industries relatively unencumbered by government protection and other forms of misguided assistance. The U.S. policy of downsizing and rationalizing its defense industrial base is also a net positive—especially when compared with the lack of such progress in Europe. Successful acquisition reform will shift DOD reliance from dedicated military products to standard off-the-shelf products. This plays directly to the strength of U.S. industry and, indeed, may aggravate the gap.

DOD is adopting the technological advances that are the results of the wider business revolution of the last two decades. But unless the DOD implements an RBA itself, it will have ignored the underlying management principles that have made such results possible. Focusing on core competencies, outsourcing noncore functions, flattening organizations, rewarding innovation, and reducing costs aggressively are all practices directly relevant to the DOD. Indeed, they are the RBA.

Adopting a modern, free-market economy may be Europe's biggest challenge given its historical legacy of social welfare and government involvement in business. It is highly unlikely that the necessary changes can be made in the defense sector in isolation, and broad reform may be a very slow process.

The authors, to their great credit, take on all of these daunting challenges. They match their diagnosis of the problems with a specific, realistic, albeit ambitious, strategy that attacks the entire set. Their approach includes: convergence in American and European strategic outlooks and motivations; agreement on a common set of contemporary military operational problems that American and European forces must work together to overcome; convergence on a set of RMA priorities—$C^4$ISR, smart weapons, new military strategies and tactics—that exploit information technology; open network architectures and technical standards that will make networked forces and sensors, the system of systems, a coalition capability, albeit one that can be used independently if need be; and more open transatlantic markets for defense systems and underlying information technologies.

The authors also spell out a host of cooperative programs, involving military planning, force experiments and exercises, joint training, technical cooperation, and transatlantic equity investment by defense and information technology firms.

They should be applauded for their persistence in fashioning realistic, interrelated responses that address the central elements of the RMA gap. Their prescriptions are clear and to the point. But the clarity and specificity of their approach do not deny the complexity of what is needed to close the gap.

*Mind the Gap* is an American examination of what is believed by the authors to be largely a European problem. Europeans may find it too U.S.-centric, but the authors recognize that a successful solution will require changes on both sides of the Atlantic. Their objective is to further the debate among allies about what should be done. The problem may look different in Europe. But that is the reason for debate and collaboration. There is no question that a solution is critical to all of NATO.

All in all, *Mind the Gap* should be a major contribution to the solution of a fundamental problem. It should be read with care and debated by all NATO members. The problem is fundamentally too important not to be solved.

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# CHAPTER 1

# All Aboard—Assessing the Problem and Its Multi-Tier Solution

As every rider on the London Underground knows, failure to "mind the gap" between moving train and platform entails considerable risk of injury. Both the image and the hazard apply all too well to the growing separation between the military strategy, capabilities, and technology of the United States, on the one hand, and those of its closest military partners, the NATO allies, on the other. This chapter analyzes the reasons for this gap and outlines a strategy for closing it, without slowing down the American train.

## Avoiding a Choice Between NATO and the RMA

To many U.S. defense analysts, the train—a.k.a. the "Revolution in Military Affairs" or RMA—is not moving as fast as it could and should be. We are among those who believe the United States should pursue more energetically the capability to project decisive force while reducing the risk of high casualties. If it does not, the threat of weapons of mass destruction (WMD) in the hands of such hostile states as Iraq, North Korea, Libya, and Iran might confront a future American President with prohibitive dangers to U.S. troops. This could leave the United States militarily "superior" yet unwilling to protect its global interests. In turn, declining U.S. credibility could embolden hostile states to bully their neighbors, threaten international peace, and assault U.S. interests.

In essence, the RMA is the use of information technology to gain strategic advantage by networking one's forces, gaining complete knowledge of the battle, and striking from any range with near-perfect precision. These capabilities permit forces to be dispersed, yet integrated, thus less vulnerable, harder for the enemy to engage, and able to use lethal weapons from all ranges against all targets. As important as the hardware of the RMA may be, innovative doctrine, tactics, training, and organization must be developed and refined in an open-ended process of transforming military operations for the information age.

For the United States, the strategic case for the RMA is strong. Its global interests and responsibilities provide the motivation; its success in key information technologies, especially data networking, provide the potential.

Nevertheless, U.S. implementation faces obstacles. For instance, the Department of Defense (DOD) has proposed a new round of base closings to fund investments in the RMA; however, Congress has yet to approve. DOD, for its part, is proceeding cautiously in replacing proven doctrines with untested ones; understandably, it insists on first experimenting not only with new technologies but also with new tactics and ways of organizing. In light of the deliberate approach taken by the U.S. defense establishment, the option of further slowing the American RMA train to permit the allies to step on board is not one we could support.

Even with the tentative U.S. approach toward the RMA, the transatlantic gap in military technology and capability is widening. The use of information technology is far more extensive in U.S. forces than in European forces. The quality of U.S. precision-guided munitions (PGMs) and $C^4$ISR (command, control, communications, computers, intelligence, surveillance, and reconnaissance) has improved greatly since the Gulf War, whereas European forces still remain incapable even of the type operations that U.S. forces conducted in 1991. While this divergence has not prevented the successful NATO peacekeeping operation in Bosnia, most U.S. and European officers and analysts would agree that allied forces today could provide little help in a more demanding and violent engagement. Thus, ironically, the more severe the threat to interests shared by the United States and Europe, the less likely that a true U.S.-European coalition will respond.

That danger is within sight. As the United States opens the RMA throttle in the years to come, the gap could become a gulf. Thereafter, only modest coalition operations (e.g., peacekeeping in Europe) will be feasible. Such a prospect is not so alarming that it should cause the United States to apply the brakes to its RMA. But, as we will explain, it would harm U.S. interests. Indeed, the option of proceeding with the U.S. RMA while leaving the Europeans at the station is hardly better than stopping the RMA to close the gap.

Not that stopping the RMA would close the gap. Serious disparities already exist and could persist even if the United States postpones creating an information-age force. The U.S. military has more firepower and is more mobile than European militaries—quite an important difference in an era when the principal military need is to project large-scale strike power at great distances. Moreover, because the U.S. military is expected, if need be, to do battle with dangerous rogue states in the far corners of the world, it is more combat-ready than most European forces, whose warfighting mission has become vague since the Soviet threat went away. Whereas U.S. forces are geared to destroy any forces that threaten U.S. interests, allied forces are not. So a sizeable gap already exists because of the asymmetry in U.S. and European strategic perspectives—global versus territorial—and the corresponding disparity in power projection and strike capabilities. If the allies now fail to follow the United States into the RMA, the gap will grow to the point where U.S. and European forces cannot operate well together even if they deploy together.

The allies' lack of the requisite military capabilities is but one of the reasons why the United States has virtually sole responsibility for defending *common* European-American security interests, e.g., in the Middle East or elsewhere outside of Europe, where they are most likely to be threatened. Europeans in general, Germans most of all, have an aversion to projecting power beyond their borders. In modern history, European experience in using force other than to defend the homeland has ended badly, notably, in imperialism and world wars. The resulting mind-set explains why a decade ago some allies criticized U.S. retaliatory strikes against Libya for sponsoring terrorism, why in 1991 no German troops joined the Gulf War coalition, and why today Europeans (the British aside) have qualms about the use of force to compel Iraq to abandon its WMD programs.

Aware of the allies' lack of inclination and ability to project power, the United States has assumed in both of its official post-Cold-War national defense reviews—the 1993 Bottom-up Review and the 1997 Quadrennial Defense Review (QDR)—that the Europeans would not provide significant forces in a major theater war (MTW) outside Europe. Accordingly, the United States maintains ample forces *independently* to defend important *shared* interests, such as securing world oil supplies and confronting hostile states that seek WMD. As long as the United States has the means to defend shared interests without allied help, the Europeans lack the incentive to make the sacrifices such help could require.

A vicious circle is at work. Because it cannot bank on the Europeans to join in projecting power to defend common interests, the United States makes it unnecessary for them to do so. Because they are not needed, the Europeans, already skittish about such a controversial strategic mission for their forces, fail to invest in the capabilities and technologies that might begin to satisfy the Americans that it is prudent to include allies in their plans to project power. This lets the Europeans off the hook, and so on.

Under these circumstances, even U.S. abandonment of the RMA would not, in and of itself, reverse the divergence in strategy and capabilities that now exists. All the more reason for the United States not to decelerate. Moreover, as long as it believes it cannot count on the allies anyway to provide large forces for major wars, the U.S. defense establishment will view bringing them along on the RMA as desirable but not essential. As the train pulls out, eventual efforts by the Europeans to embark will be less likely to result in compatibility with U.S. forces. Therefore, now would be an excellent time to break the vicious circle—perhaps the last chance.

Closing this gap might not be enough to rebuild a credible NATO military coalition, but it is necessary. If another war broke out in the Persian Gulf tomorrow, the European allies would be able to contribute no more and no better forces than they did seven years ago, when they sent all the suitable forces they

could yet had only a cameo role.[1] If such a war broke out, say, seven years from now, especially if the United States pursues the RMA but the allies do not, the alliance could be militarily irrelevant.[2] Allied forces would be unable to take full advantage of U.S. battlespace information, augment U.S. standoff strikes, or fit into the seamless integration of U.S. ground, sea, air, space, and cyberspace sensors, platforms, and weapons. U.S. military commanders would sooner marginalize than integrate them, lest they get under foot. Because of the opportunity cost, U.S. airlift capability might not be allocated to moving allied forces to the fight. What a pitiful end to the great military coalition that was prepared to wage World War III with the Soviet Union and has kept peace in Bosnia!

No amount of American hubris can alter the fact that such a prospect, for that matter the current situation, is bad both for the Atlantic alliance and the nation. The United States has a strong preference for *militarily effective,* not just politically symbolic, coalition warfare, involving especially the United Kingdom, France, and Germany. Provided they are capable, coalitions spread the risks, sacrifices, and casualties, enhance overall muscle, and of course help satisfy the American people that their young men and women are not being asked to police the world alone. Moreover, to the extent allies can contribute a sizable fraction of the capabilities required for one or another major theater war, the United States will find it easier and more affordable to be ready to respond to the myriad other contingencies that could arise in these unpredictable times. But if the allies are increasingly incapable of operating in a combined force with the United States, the responsibility to protect common interests cannot be fairly shared.

The United States has the economic resources and technology to maintain adequate forces to meet high-priority security needs even if the allies are left behind and NATO decays as a military alliance. But its forces already are stretched thin by global missions in peace, crisis, and war. Moreover, the unilateral—arguably, inequitable—responsibilities imposed by such a state of affairs would weigh heavily, perhaps too heavily, on American shoulders. The United States needs (and should ask its closest friends, who happen also to be its formal allies) to contribute more, not less, to the defense of common interests in and beyond Europe. If the allies fail to do so, whether because they will not or cannot, the American public might tire of the risks and costs of global leadership. The bubble of confidence, indeed cockiness, among the U.S. foreign policy elite, inflated further by RMA potential, could burst if the American people rebel against excessive sacrifices. The assertive internationalist and interventionist policies favored by that elite already extend to the limits of public support; any perception

[1] John E. Peters and Howard Deshong, *Out of Area or Out of Reach?* (Santa Monica, California: The RAND Corporation, 1995).

[2] The coalition of the Gulf War was more a political than military coalition; in the ground campaign, only UK forces were "combined" with U.S. forces and used in a critical assignment.

that its richest and closest allies are free riders will accentuate both unilateralist and isolationist tendencies within the United States.

Additionally, without a greater allied military contribution, the United States could come to be seen abroad as the global "bad cop," too reliant on the use of force while others stake out the high ground of peaceful restraint. Such a pattern is already evident in the "dual containment" of Iraq and Iran. As a consequence, the United States could become the most likely target for terrorism and other threats by rogue states and groups, which of course would further test the willingness of the American people to bear heavy responsibilities for international security.

This transatlantic schism could turn fatal to the alliance in the event of a violent conflict with a WMD-armed rogue over shared interests, in which European forces fail significantly to respond alongside U.S. forces, especially if high American casualties result. Well short of such a crisis, the disparity in U.S. and European capabilities and strategy can cause the United States and its closest friends to work at cross-purposes in peacetime. Even now, the United States is more determined than its European allies to prevent Iraq and Iran from acquiring WMD precisely because U.S. troops, not European troops, will be the ones exposed to such a threat. Until they face the military consequences, the allies will be less inclined to try to isolate the regimes in Baghdad and Teheran, to threaten the use of force to combat aggression and terrorism, and to forego commerce with them.

The long-term peril to the alliance posed by the gap should not be underestimated. The future rationale for maintaining a U.S. military presence in Europe can no longer be that Europe needs protecting.[3] The main strategic advantage of keeping U.S. forces in Europe in the new era is that they can work with allied forces and then deploy from bases there, allies at their side, to contingencies in adjacent regions, for example, Southwest Asia. If U.S. forces cannot fight with, and can barely work with, their allied counterparts because they are technologically incompatible, and if the American public perceives the allies as shirking responsibility for defending common interests, keeping large-scale U.S. forces in Europe will be a hard sell.

We are witnessing not just a military-technological gap but a strategic-political one—the two compounding one another. If the gap can become a gulf, it can also become an ocean, in figurative and literal terms. Closing the military-technological gap would not totally mend the U.S.-European partnership. But it would create the capability for joint action and shared risk, which in turn can engender a more common outlook, better-coordinated—thus more effective—policies, and mutual confidence, now sagging. Such a prospect is all the more

[3] After all, there is no threat to Europe; and in any case, with an economy larger than that of the United States, Europe does not need to depend on U.S. protection. Even the possible need for future peacekeeping within Europe, à la Bosnia, is not a credible argument for keeping a significant fraction of U.S. combat forces in Europe.

reason to worry that the gap is not shrinking but growing and could become harder to close as the United States accelerates its RMA.

Therefore, a way must be found to turn divergence into convergence as the RMA proceeds. This would require that the American RMA become an Atlantic RMA. But how? On the assumption that what will produce convergence is roughly the opposite of what is causing divergence, it is essential to go beyond the symptoms and understand the cause before prescribing the cure.

## What Is Causing the Gap?

***Asymmetry in Strategy—and Paradigm.*** Most criticism of European defense efforts these days focuses too much on the size of allied defense budgets and not enough on how little military and security value the Europeans get for the money they spend. The fact that the United States spends roughly 60 percent more on defense than the European allies—over 100 percent more per capita—aggravates the divergence but is not its cause. The heart of the problem is that the United States is under pressure to use the potential of the information age strategically, and the allies are not.

The United States, as noted earlier, is poised to harness key information technologies—microelectronics, data networking, and software programming—to create a networked force, using weapons capable of pinpoint accuracy, launched from platforms beyond range of enemy weapons, utilizing the integrated data from all-seeing sensors, managed by intelligent command nodes. By distributing its forces, while still being able to concentrate fires, the U.S. military is improving its mobility, speed, potency, and invulnerability to enemy attack.[4] By trading technology for "labor," the numbers of military personnel needed by the United States, in total and in any given operation, are declining, even as the skill required of each of them is increasing. The United States has within its reach the ability to prevail in any foreseeable conflict by virtue of its ability to see, comprehend, and control all aspects of the battlefield.

In addition, the United States is just beginning to reform the management of its defense establishment to take advantage of the technology and best practices of the information age just as many commercial firms have done, to their competitive benefit, over the past decade. The cost of infrastructure should begin to come down for the United States, as more and more support services are procured from private industry, as internal defense organizations import innovative practices from the business sector, and as structures and processes are altered to take full advantage of the new technology. In addition to the RMA gap that is beginning to open, a transatlantic divergence in "military business affairs" could be opening as well.

[4] The exception could be if nuclear or biological weapons are used by the enemy or by both sides, which might have a nonlinear effect on the conduct and course of conflict.

Already, the United States is outspending its European allies in investment—R&D and modernization—by two to one. Insofar as the United States can reduce the number of personnel involved in support services and other infrastructure costs, it can further increase its investment in RMA-type forces and technology. Meanwhile, the Europeans are saddled with excessive personnel, facilities, and support costs—in effect consuming resources badly needed to improve quality and to modernize. Thus the ability of the United States to manage its defense resources better could also add to the gap.

In a broad sense, the U.S. military is ready to do over the next 15 years what well-run American—and for that matter European!—corporations have done over the past 15: rethink and revise the way they are organized and function in order to harness information technology for decisive advantage. The fact that many of those firms had become bloated, sluggish, unfocused, and unfit to face foreign (mainly Asian) competition gave them, at least those with the brains and guts to admit it, a powerful motivation—survival—to change themselves in order to master the new technology. Those who remade themselves now use information technology strategically; those who merely painted the technology over their old way of working fell behind, technologically and financially.

The U.S. military establishment, though far from unfit or inferior, also has a compelling reason to transform itself. It has a national mandate to be able to project enough conventional strike power to render any enemy defenseless and ready to quit, whenever and wherever U.S. interests need defending. The need to deploy quickly and to neutralize the WMD threat argues for dispersion and increases in standoff strike capabilities, which translate into a reduction in the forces that must be placed in the immediate theater. The advantage of being able to hit any target with any weapon from any platform, irrespective of range, armed service, or medium, argues for perfecting battlefield awareness, target detection, and weapon guidance. To meet such requirements, the successful application of information technology is important enough to justify major shifts in investment, doctrine, and training. Absent such compelling needs, the RMA is mere gadgetry.

How does this compare with the Europeans? Taken together, the allies have the world's second most potent and sophisticated military capability. They spend $160 billion a year on defense, with which they maintain 2.5 million men under arms and an array of high-performance weapons and platforms. Yet, the allies invest far less than the United States in advanced military information systems, in research and development (R&D) of new technologies in general, and in recruiting, retaining, and training high-quality personnel.[5] In effect, the allies have a somewhat smaller version of the forces they relied upon to defend their

[5] See Richard Kugler and Tony Vanderbeek, "Where is NATO's Defense Posture Headed?" *Strategic Forum*, no. 133 (February 1998).

land from Soviet aggression. European forces are professional, tough, and well-led. But they are far less useful now that the threat to Europe has abated.

European militaries are not challenged by the same mission as their American cousins, i.e., to be able to destroy the forces and infrastructure of any distant rogue that threatens important allied interests, even if it brandishes nuclear, biological, or chemical weapons. Therefore, they face no imperative to improve their projection capability, to strengthen their standoff precision-strike systems, to integrate their sensors, to network their forces, and to enhance their joint-warfare capability. Because they do not face the chilling prospect of having to operate against rogue states armed with WMD, they are under little pressure to invest in their own RMA, especially at a time of declining defense budgets.

Consequently, the majority of European forces are still immobile and incapable of the "dominant maneuver" and "information dominance" that have become, deservedly, the sound bites of the U.S. military. Lacking a compelling reason to increase defense spending or pare their manpower and support structures, the allies cannot find a spare mark, franc, or lira—soon, "euro"—for building information-age forces. In sum, the United States is moving not only at a different velocity but also in a different direction, with different priorities, based on a different philosophy than its allies in modernizing its forces to exploit the new technology. Keeping with the metaphor of our title, as the U.S. RMA begins to pull away, the allies must choose between the platform and the train.

It is not clear to us—or, we fear, to many allied governments—just what strategic purpose European forces are meant to serve. Since only a small fraction of European forces are truly *mobile,* and the requirement for *immobile* forces is only a small fraction of current European end-strength, even the total size of allied forces is mysterious. While the allies have been content to leave out-of-Europe missions to the Americans, they are well aware that the threat of major war in Europe or aggression against Europe is gone. Why the Europeans have over 50 divisions that *cannot* be projected is harder to understand than why they have only a handful that *can.*

Perhaps the sheer irrelevance of the old territorial defense mission is a disguised blessing. If the Europeans genuinely believed in the enduring importance of that mission, they would be locked into a set of priorities more or less opposite to those of the United States—and that much harder to budge.[6] At least the Europeans are not dedicated to perpetuating massive territorial defense as a top strategic priority; rather, they seem to be prisoners of inertia—more aimless than aimed in the wrong direction. Indeed, some European governments—those of the UK and France, for example—have come to appreciate that until they can

[6] Analogously, the old mainframe computer companies that were not simply slow to move toward distributed processing, but instead determined not to do so, are now all out of business.

restore public comprehension of why military forces are needed, the decline in defense spending will continue.

Some European militaries are being reoriented toward power projection missions, though their reduced defense budgets make overall progress nearly imperceptible. The British have moved the furthest, building on a long record of stressing expeditionary forces. The French, with an interventionist tradition of their own, have a plan to shift from border defense to power projection, but it remains mainly that—a plan. The Germans, especially reluctant because of their history, have earmarked two divisions for use in distant operations, but only one at a time, and primarily in peace support missions; most of their forces have yet to be reoriented.

The European pace of change is much slower than even the hesitant speed with which the United States began the RMA. Having a sense of strategic direction, the U.S. Defense Department is able to justify new investments. For example, the U.S. military establishment can translate growing alarm about Saddam Hussein's WMD aspirations into a political warrant for RMA procurement and R&D. Lacking both a sense of direction and a sense of urgency, the Europeans will find it hard to win popular support for defense spending in general and RMA investment in particular.

The gap is not merely one of different stress on information technology. It is one of paradigm. The United States military is just now plunging into the information age; the bulk of European militaries remain squarely in the previous age. The state of the industries that serve their respective militaries reflects a similar divide, posing another obstacle to closing the transatlantic gap.

***Asymmetries in Industry, Technology, and Markets.*** Motivation aside, the U.S. military benefits from a sturdier industrial base and a more responsive technological base than exist in Europe. The declining number but growing size of consolidated American defense systems corporations—e.g., Lockheed Martin, Raytheon-Hughes, Boeing, Nothrop-Grumman—contrast with the smaller and more numerous European defense firms. Despite an otherwise integrated European market, European defense companies mostly operate on a national scale. Every major European nation remains sufficiently attached to its sovereignty to want to keep at least one major defense contractor.

But even if, at the wave of a wand, European defense industry could be restructured to resemble American defense industry, the gap likely would persist. It is not clear that a highly concentrated defense industry is necessary in implementing the U.S. RMA. Meeting the needs of the RMA requires not so much a concentrated defense systems industry as a vibrant information technology market and a defense industry, however structured, that is agile enough to buy the best from that market.

Indeed, transatlantic differences in defense industries mask the significant fact that the U.S. information technology is stronger than Europe's. Consequently, so are the devices, subsystems, software, networks, services, and skills this industry makes available to the U.S. military market via the large defense system prime contractors. As its dominance in the on-line services market shows, the U.S. information technology industry is usually the first to bring key new products to market. In turn, U.S. defense contractors generally possess stronger design, engineering and integration capabilities than the smaller European defense contractors. This is not because the Americans performing these functions are superior to their European counterparts, but because the market demands more of the former than of the latter. Quite apart from the large size and small number of major U.S. defense contractors, they are better at what they do *and* have easier access to better information technology than their European allies.

Finally, both the U.S. defense contractors and U.S. information technology firms are more competitive than their European counterparts in world markets. Indeed armaments and information technology are two of America's best export performers. With greater market shares at home and globally, their costs are generally lower than those of European competitors, and that translates into lower prices and higher profit margins.

These stronger U.S. defense and information technology industries in turn are being impelled by their military customers to meet the needs associated with the U.S. power projection and strike missions, needs that will become more challenging still as the United States confronts the problem of WMD-armed adversaries. As a result, the task of networking U.S. units, platforms, weapons, sensors and commands—i.e., creating an information system of systems—will pose a significant new challenge to U.S defense and information technology industries. In sum, the United States must and can develop smarter weapons, better communications, and more sophisticated sensors than its European counterparts.

So another vicious circle is in play. European forces cannot acquire information-age capabilities from industries that are not able consistently to provide them at affordable prices. Because of their physical limitations, European forces cannot be assigned demanding new missions, which does not much bother Europeans who have a distaste for such missions anyway. Without strenuous tasks, European militaries will not require their suppliers to become more inventive and efficient. This compound effect of weak demand and weak supply is making it harder for the allies to keep up with the United States.

## The NATO Experience

The current situation contrasts with the basic military compatibility achieved by the United States and the European allies during the Cold War, motivated by the common problem of deterring Soviet aggression and by the belief that neither Western Europe nor the United States alone could match the Warsaw

Pact's forces. Even during the Cold War, the United States had more sophisticated military capabilities than the rest of NATO, though not so much as to make coalition operations impossible.

In the two decades after the Vietnam War, the United States invested heavily in technologies that would enable it to project power, penetrate enemy airspace, and use strike forces to thwart a large-scale armored offensive. It felt compelled to do so; for while the United States had sunk untold billions into the Vietnam War, the Soviet Union had steadily improved its conventional threat against Western Europe. In addition, by 1980 the United States faced the growing danger of a challenge, Soviet or otherwise, to oil-rich Southwest Asia, in light of the fall of the Shah, the invasion of Afghanistan, the Iran-Iraq war, and the defenselessness of the Saudi Arabs.

Consequently, the United States developed ways of defeating Soviet air defenses (e.g., stealth and cruise missiles) and an arsenal of precision-guided anti-tank and extended-range air-to-air munitions. It also beefed up its ability to deploy large forces over great distances, as well as to conduct joint—especially air-land—warfare and to bring to bear its superior overhead surveillance and other sensor technologies. These priorities led to improved strike systems and command, control, communications and intelligence systems. The United States was, in effect, getting a running start at the process of transforming its forces for the information age—namely, the RMA.

Meanwhile, the European allies, being preoccupied with the defense of their borders, concentrated on relatively stationary "main defense formations." They improved these capabilities in the 1980s, with vigorous prodding from Washington, and joined the United States in selective transatlantic defense cooperation programs (e.g., AWACS). But they were not concerned with strengthening their ability to dispatch large forces, to strike deep and from afar, to integrate and utilize the output of highly advanced sensors, and to manage integrated, fast-moving operations with improved command and control. So today, they face the RMA from a standing start.

Nevertheless, because defeating a Soviet attack on Western Europe required the United States and its allies to fight side-by-side, both had no choice but to maintain compatible and roughly comparable capabilities. When confronted by the Soviet threat, the United States and its NATO allies had a common strategic motivation, confronted a similar set of military operational challenges, required technical interoperability, and conducted at least modest defense industrial cooperation. As will be discussed later in detail, they succeeded in Europe, but this experience has not yet been carried over to meet new challenges.

It is no accident that the programs and habits of practical cooperation invented by NATO to foster transatlantic military compatibility and interoperability now lie fallow. The NATO force-goals mechanism, which is supposed to hold

members accountable for building and maintaining forces on which the alliance depends, is atrophying. With the United States committed to power projection and the Europeans still largely concentrating on European defense despite the lack of threats in Europe, NATO force planning is trapped in the inertia of the Cold War. Unless its institutions are reformed, NATO will not provide the inducement or the process—the will or the way—to reverse the divergence in U.S. and European military capabilities and technology.

The divergence will grow as the U.S. military begins to make technical decisions for future C⁴ISR networks that will allow all its own forces to wage seamless joint warfare. With the need to support joint warfare already daunting, the United States is giving little attention to the challenge of facilitating European integration into these systems.[7] Moreover, with the allies moving so slowly to create power projection forces and to utilize advanced information technology, why should the United States slow down or alter its own crucial integration efforts?

The NATO peacekeeping experience in Bosnia did not reveal the full extent of the gap. U.S. and allied forces have been able to work around the growing discrepancy between them largely by enabling the coalition to use information acquired, processed and disseminated by the United States. While that ad hoc experience is not adequate for the long run, it should be mined for pointers about how to close the gap, operationally and programmatically. Bosnia shows that U.S. and allied forces are highly resourceful in collaborating, given the good habits gained in NATO, and that American C⁴ISR assets and outputs are of great value to coalition partners. But Bosnia has not tested the alliance's ability to deploy rapidly, maneuver and strike decisively, and yet minimize losses. Moreover, U.S. and allied forces have worked mainly in separate, largely autonomous sectors; they have not had to conduct true "combined" operations. The Bosnia effort is a source of encouragement; but it is not a real test of the ability of the United States and the allies to wage intense coalition warfare against a determined and dangerous enemy far from Europe.

The United States does not depend on its European allies, or on NATO, to meet its most urgent and demanding global defense needs—not as it once depended on them to help defend Europe from Soviet aggression. The fact that it cannot count on them only encourages the United States to maintain its independent capabilities and to pursue the RMA with or without the Europeans. Until the allies show an inclination to contribute to meeting a broader spectrum of defense needs that reflect the security of shared global interests, NATO will exert marginal influence over U.S. military planning, including the direction and speed of the RMA and the design of the system of systems. As a result, the characteristics and standards of military technology will be decided by the U.S. defense establishment.

[7] The U.S. Defense Science Board took up the subject in 1998.

## Sketching a Strategy

Neither halting the RMA nor ignoring the gap is acceptable. How, then, should European and American forces be tied together as the RMA proceeds? What should be the overall strategy for closing the gap?

At a minimum, as U.S. RMA networks arise, allies could be shown how to become "plug-compatible"—namely, by meeting U.S. information standards, perhaps with U.S. technology, according to the U.S. operating doctrines implied by U.S. architecture. European forces could become users of the information gathered, processed, and distributed by the United States, provided they accept standards that will ensure this information is intelligible to their systems.

Such an approach might be feasible in technical terms, and sharing information might be easier than sharing information technology. However, it is hardly a way to convince Europeans that they are strategic partners, not followers. The United States should be a leading partner, not a master. The United States does not want allied governments, military forces, and defense corporations to begin viewing it the way the rest of the computer industry views Microsoft. Moreover, even if the allies are able to receive intelligible data from U.S. sensor networks, European militaries will have little to contribute to the coalition if they have not tailored their combat forces and doctrine to deploy, maneuver, and strike RMA-style.

Another alternative would have European forces perform the "muck and bullets" work—i.e., provide the bulk of ground troops, and thus potential casualties—while the United States furnishes intelligence, air mobility, standoff strike forces, intelligence, communications and, of course, command. This would not close the gap so much as reduce its effect. But it would not work politically or militarily. The Europeans will not accept such an asymmetric division of labor; indeed, it would run afoul of one of the most fundamental and valuable principles on which the cohesion of Atlantic Alliance depends: the indivisibility of risk. In addition, "traditional" ground forces, of the current European sort, cannot operate effectively with RMA ground or strike forces. So this division of labor would, over time, make coalition operations less, not more, feasible.

The option we favor, broadly stated, is for U.S. and European forces to be able to perform *together* all the operational tasks required by current U.S. military strategy: power projection, information dominance, decisive maneuver, and strike—tasks that drive the U.S. RMA and could also drive a NATO RMA. This option requires, first, that the Europeans develop forces that can perform such tasks, and second, that the United States and Europeans can perform such tasks together. In this option, NATO has a crucial role in ensuring that the United States "designs in" the option of coalition warfare to its RMA plans and networks, and that the Europeans meet the force goals and standards that would make them technological, strategic, and political partners.

Choosing this option will require a sustained effort to reverse several developments that have caused divergence. This cannot be done by NATO communiqués. There is no single, silver bullet—e.g., European defense industry consolidation, or the United States "sharing" the fruits of its military technological investments. Rather, a multi-tier strategy is needed, involving:

- convergence in European and American strategic outlooks and motivations;
- agreement on a common set of contemporary military operational problems that American and European forces must work together to overcome, and on a set of RMA priorities—$C^4$ISR, smart weapons, new military strategies and tactics—that exploit information technology;
- creation of open network architectures and technical standards that will make networked forces and sensors, the "system of systems," a coalition capability, albeit one that can be used independently if need be; and,
- creation of more open transatlantic markets for defense systems and for underlying information technologies.

Implementing this strategy will require cooperative activities—traditional and untraditional—involving U.S. and European political consultations, military planning, force experiments and exercises, industrial ventures, and research collaboration. Through such activities, progress on each tier will facilitate progress on the others. Clearly, agreement on which military problems require priority attention would be easier if the distance between U.S. and European global strategic perspectives were narrowed. Agreement on network architectures would be easier if the first two tiers were successful. Market opening and industrial cooperation would be aided by greater political and military harmony. But this is unrealistic; indeed, a strategy of cascading agreement from top to bottom is a formula for progress too slow to stop the gap from growing. Because major success on any tier will be long in coming, work must proceed concurrently on all of them. As progress is made on each level, it will reinforce progress on other levels.

The following four chapters are organized around such a strategy. They will diagnose the deficiencies and offer prescriptions for all of the levels, working from top to bottom. The goal is not to convince governments to "approve" the strategy—to think that this would solve the problem is to misunderstand it. Instead, the goal is to motivate military commanders and planners, government officials, defense thinkers, corporate strategists, and researchers on both shores of the North Atlantic to begin talking and thinking together, and roughly alike—perhaps along the lines of this book—and then acting in ways that pull the United States and Europe together rather than apart as the RMA moves into higher gear.

# CHAPTER 2

# A Shared Strategic Outlook—The First Tier

If a transatlantic RMA is to be pursued, it will have to be motivated by an increasingly common strategic perspective. But how can such a shared perspective be created when the United States and Europe today have very different ones? The history of NATO shows many cases when the two sides at first were miles apart on a critical issue, but gradually came to a meeting of the minds through debate and accommodation. Similar progress can be made again, but only if there is genuine dialogue, not a one-way lecture from the United States coupled with deafness by Europeans. In this case, the solution lies in recognizing that common critical interests are at stake, that cooperation is essential, and that agreement must be reached on core strategic precepts even if details are unresolved.

## One Alliance, Two Perspectives

As the previous chapter suggests, the military-technological gap between the United States and its European allies stems in large part from a divergence in strategy. That divergence began late in the Cold War and grew sharply when the Cold War ended. Upon the collapse of the Soviet threat, the United States shifted the main focus of its defense strategy from defending Europe to strengthening peace in other vital but less secure regions, particularly the Persian Gulf and Northeast Asia.

Transcending these or any other specific threats, the United States is now determined to have the ability to project, on short notice, enough force to overpower any adversary threatening U.S. interests anywhere on the planet. This is not to say that the President, the Senate, and the people have become nonchalant about sending U.S. forces into combat. Yet there is a national political consensus that the United States has global interests and responsibilities that warrant the use of force—with United Nations blessing if possible, without that blessing if necessary. This consensus rests on an implied compact between the people and their government that every effort will be made to keep casualties low.

In this context, U.S. strategists view information technology as offering an important way to improve the mobility, increase the lethality, *and* reduce

the vulnerability of American forces. The RMA thus has a distinct and crucial strategic purpose for the Americans, motivated by U.S. interests and shaped by U.S. politics. Making it more compelling still, the RMA is an attempt to capitalize on U.S. advantages in the dominant technologies of the new era—microprocessors, data networking, and software—to advance the nation's security interests. For the United States, the RMA is a classic example of *drawing on a core strength to meet a core goal.*

No such big ideas stir the Europeans. Their strategic role during the Cold War was to defend their soil, with U.S. help. They made no strategic shift with the end of the Cold War. They have not fully accepted the need to project power, and they do not anticipate using their forces against WMD-armed rogues. The allies lack a powerful incentive to exploit information technology fully.

This is not to say the Europeans have demobilized since the Soviet threat vanished; they have reduced their forces by only 20 percent—less than U.S. reductions, which exceed 30 percent. The European impulse when the Cold War ended was to preserve a capacity to reconstitute a large-scale defensive capability, in case a threat to Europe, presumably from Russia, were to reappear. Having fought or prepared to fight several massive land wars on their own soil in this century alone, the Europeans have been conditioned to regard territorial defense as the essence of national security, the heart of military strategy, and the main rationale for armed forces.

This European attitude justified retaining a large number of forces after the Cold War. But because the threat to Europe had receded, it also led the allies to de-emphasize readiness and modernization. Within their declining defense budgets, the Europeans have stressed quantity (i.e., force structure and end strength) over quality (technology); defensive capabilities over projection and strike capabilities; and meeting payrolls and other current expenses over investment for the future. In sum, for nearly a decade, European and U.S. militaries have been shaped by divergent purposes and, consequently, different priorities.

It is now obvious that a Russian threat to Europe will not reappear. (Even if Russia turns hostile, its economic, technological, and military potential is dwarfed by that of the combined European allies, not to mention NATO as a whole.) So the need of the Europeans to be able to reconstitute very large territorial defense forces is gone. Yet, although the Persian Gulf war and the Bosnia UNPROFOR episode exposed European inability to project large, well-armed forces quickly, they have been slow to change.[8] They know that the United States can defend common interests outside of Europe, whether they help or not. And their declining defense budgets, amid ever-tighter fiscal constraints, provide no

[8] In the Gulf War, only the British and French were able to send ground forces, which accounted for roughly 5 percent of coalition forces. The movement and support of these European forces required extensive U.S. help. As for Bosnia, it took the British, French and other allies several months to prepare and move a few thousand troops for participation in the UNPROFOR peacekeeping operation.

spare resources for investment in capabilities for power projection, unless and until they make that their priority.

To the extent that Europeans have formulated a post-Soviet rationale for defense preparedness, it is that instability in and on the periphery of Europe itself makes it prudent to maintain some reasonably ready, mobile forces. Accordingly, they have organized a fraction of their militaries into "reaction forces," to respond to a range of relatively minor contingencies: peacekeeping, humanitarian relief, sanctions enforcement, shows of force, and small intervention expeditions. These forces can join U.S. power projection operations. However, they need U.S. lift, logistics, intelligence and other support, and they can make only a marginal contribution to U.S. firepower. The capabilities required for intervening in secondary crises in or adjacent to Europe (e.g., the chaos in Albania in 1998) are a far cry from what is needed to project decisive power globally.

It is taken for granted on both sides of the Atlantic that the more demanding, dangerous and distant contingencies will be handled mainly—if need be, exclusively—by the United States. Therefore, the Europeans are not faced with a need to project large combat forces, to embrace new maneuver-and-strike tactics, to acquire and act on comprehensive target data, and to fight in the shadow of WMD. They are not compelled, as the United States is, to increase the deployability, lethality, and survivability of their forces. It is less important for the allies to have forces capable of attacking with unprecedented speed or of operating seamlessly across service lines. The Europeans do not feel they must disperse and network their forces and develop standoff warfare options.

In short, the Europeans today do not perceive the strategic need to protect distant interests and defeat distant threats. Consequently, while they view exploiting information technology as desirable, by no means do they consider it *imperative*. Neither their security nor the safety of their troops demands it. No revolution, including the RMA, will occur spontaneously merely because it is feasible. There must be a strong motivation, and the Europeans do not now have one.

## Identifying Common Interests

Lest Americans rush to indict their allies for being shortsighted, the blame must fall as well on U.S. shoulders for failing to convince the Europeans to share in the global security responsibilities that demand the RMA.

These divergent strategic perspectives are often attributed to a disparity in interests, i.e., that the United States has *global* interests and the allies have European *regional* interests. However, this explanation is circular and misleading. Because the United States is prepared to defend its interests globally, it is assumed to have global interests. Because the Europeans are not prepared—and, thanks to the United States, not required—to defend their interests globally, they are assumed not to have global interests, at least none important enough to defend with

deadly force. It is certainly true that the United States has global security *responsibilities,* and the Europeans do not. But responsibilities are a matter of policy choice, as are the capabilities that back them up. *Interests* reflect the underlying vulnerabilities and opportunities of a society, and its economic vitality, relative to developments elsewhere in the world. In this sense, Europeans *do* have global interests—indeed, interests quite similar to those of the United States.

Of course, European interests beyond the Continent were relegated to secondary importance in the course of two devastating wars, the Cold War, the division of Europe, and the end of colonial empires. Even since the disappearance of the Soviet threat, the liberation of Eastern Europe and the continuing effort to achieve political and economic integration—recently, European Monetary Union—have riveted European attention at home. But the Europeans have had out-of-Europe interests all along. Developments throughout the Middle East, Africa, and the former Soviet Union have been and are today at least as important to European interests as to American interests. The security of world oil reserves—70 percent of which are in the Persian Gulf region—is more vital to Europe's economy than to America's economy. And the spread of WMD has the potential to harm European security no less than that of the United States; indeed, Europe will come within range of the ballistic missiles of Middle East rogue states well before the United States will.

The idea that Europe's main interests are confined to Europe does not square with the growing reality of world economic integration, spreading technology, and global infrastructure. Europe's integration in the world economy is equivalent to that of the United States and makes developments virtually everywhere as consequential for Europe as for the United States. If 25 percent of European exports go to East Asia, how can that region's instability be of greater concern to the United States than it is to Europe? Moreover, globalization means that far-flung dangers—terrorism, drugs, threats to trade routes, information warfare—can find their way to Europe easily via improved transportation and communication systems. Just as the quality of European life is increasingly exposed to conditions and events elsewhere, the safety of European life is vulnerable to all sorts of transregional threats.

So the transatlantic disparity in strategic outlook is not really about interests: it is about whether and how to protect them. It is about responsibilities—a matter of choice. Today, Europeans are less inclined than Americans to contemplate the use of force without exhausting every other option to protect their interests. While this is a noble stance, it is one that is easier for the allies to take knowing that the United States is prepared to use force. The Europeans are more adamant about depending on and adhering strictly to international law, including the UN Charter and UN Security Council decisions. As the experience in Bosnia suggests, they are more comfortable conducting constrained military operations, with restricted rules of engagement, than destroying enemy forces and

infrastructures wholesale. Europeans today are ambivalent about projecting power—especially outside Europe—and, with the partial exceptions of the United Kingdom and France, are reluctant to seek public support for such controversial missions. To Europeans, "defense" means protecting borders; power projection connotes offensive warfare, even if defending overseas interests that are attacked. Generally speaking, they have not presented to their people the case that power projection is the new rationale for national defense.

Because the Europeans lack the inclination to project power, they perceive less need for the capabilities to do so. Lacking the capabilities, they are in a poor position to accept much responsibility, and, in turn, they face less risk than the United States. This shows up in European international policies, e.g., the willingness of most allies to trade with rogue states that are acquiring WMD. Should Iran, some day, have to be countered militarily (e.g., to prevent it from extending hegemony over the Gulf), the task and the dangers will fall on the United States. While the Europeans advocate a less confrontational approach toward Iran than that favored by the United States, they know that the United States has the capability to defeat Iran if confrontation cannot be avoided. This leaves them more relaxed about Iranian capabilities and intentions, and thus free to traffic with a country that refers to their American ally as the "Great Satan." This pattern is a good deal in the short term for the Europeans. But as their global interests grow, so does their dependence on U.S. capabilities, will, and policies.

The United Kingdom has been an exception that accentuates the general European case. When the Cold War ended, the British defense establishment promptly realized that the best hope for retaining public support for a strong, if smaller, military was to reorient plans, doctrine, and capabilities away from the defense of European territory in the direction of quick-response forces. Despite having much of their army tied down in Northern Ireland, British forces acquitted themselves well in the Gulf War (with a lot of U.S. logistic and intelligence help). In the latest dust-up over Iraqi interference with UN WMD inspections, the British augmented U.S. air-strike power in the area.

While their power-projection capabilities are limited, the British now view this mission as the main reason to have forces. Indeed, the UK strategic defense review acknowledges power projection and high-intensity warfare, alongside U.S. forces, as the standard against which to test the adequacy of British forces and plans. London is more concerned than other European capitals about the prospect of WMD in the hands of Saddam Hussein and therefore more willing to resort to force to prevent that from occurring. In other words, with modest capabilities and a sense of responsibility for common interests beyond Europe, the British accept similar risks, pursue compatible policies, and have an interest in similar capabilities as the United States.

For the most part, however, other Europeans will be scarce when the time comes to confront dangerous rogues, especially those armed with WMD.

Such disparity in U.S.-European risks and responsibilities is burying the principle of indivisible security on which the Atlantic alliance was based. If that principle is not disinterred, the prospects for alliance political cohesion are poor. Yet, change concerning something as fundamental as a view of global security, including one's responsibility in it, will occur slowly, barring a major shock. The allied Eurocentric view of security has changed little, despite the removal of Soviet forces from Europe in 1989, Iraq's attempt to absorb Kuwait and dominate Gulf oil supplies in 1990, the demise of the Soviet Union itself in 1991, the growing threat of WMD in the Middle East, genocide in central Africa, and the emergence of China as a potential new global power.

The United States has not consistently urged the allies to make such a change (even though Secretary Albright's speech at the fall 1997 NATO Ministerial, in which she emphasized the need for collaboration on WMD threats, was a step in the right direction). It often seems that the United States would prefer to preserve its freedom of action than to give the allies a say in the Middle East and other regions beyond Europe, even though the allies have basic interests there similar to those of the United States. Moreover, U.S. defense plans do not assume that the European allies will contribute significantly to the "major theater wars" on which U.S. force requirements are predicated. The conviction in Pentagon corridors is that it would be imprudent to count on the allies to help protect shared interests (e.g., in the Persian Gulf) to the degree that would allow the United States to reduce its own active-duty force structure.

Awareness and initiative are not completely lacking among the Europeans. French President Jacques Chirac recently endorsed the idea of NATO becoming active outside Europe. The French and Germans are trying to develop contingents of about 50,000 troops each for projection missions, although these efforts are primarily focused on peace support operations and other low-intensity missions, not major combat operations. The Europeans are making modest investments in smart munitions and intelligence systems. The Bosnia intervention has given European militaries a chance to witness and use new American $C^4I$ systems and procedures. But their progress is insufficient to prevent further divergence now that the United States is embarking on the RMA.

## Building a New Consensus on Strategic Principles

The moment to begin reversing this divergence is at hand. Europeans can hardly argue that territorial defense should remain their highest military priority. Most informed Europeans are surely concerned about the dangers of WMD, about the transatlantic disparity in military capabilities, about the growing European dependence on the United States to protect its global interests, and about tensions between European and U.S. policies in the Middle East and other regions. Most Europeans would be troubled by the prospect that as NATO loses its military coherence Americans will lose interest in NATO.

By the same token, Americans are beginning to see the futility of trying to counter multiple rogue states without allied support. The strategy of dual containment of Iraq and Iran does not enjoy allied support, especially in Iran's case, and is not producing the desired regime change in either country. In a future crisis, the American public will hardly be keen to confront such WMD-armed rogues if U.S. allies do not share in the risk. From the Gulf War to Bosnia to the latest showdown with Saddam Hussein, Americans want a common Atlantic front, with U.S. and allied forces operating side by side. This is consistent with the fact, evident in recent opinion polls, that the American public would rather share responsibilities for international security with allies than carry them unilaterally.[9]

Thus, neither the European nor American security outlook is etched in stone. The allies may be ready to accept more responsibility if the Americans are ready to give it. An opportunity exists to begin shaping a common Atlantic view of world security. Such a view cannot be an American view thrust at the Europeans on a take-it-or-leave-it basis. The allies will not be prepared to take more responsibility to protect common global interests unless this new common view corresponds with their interests and their judgment of how best to protect them.

This common Atlantic view must address not only interests and threats but also attitudes about the legitimacy of the use of force for purposes other than territorial defense. In this spirit, the following six propositions suggest a strategic viewpoint that *should* be agreeable to the United States and the European allies alike, and could help animate a common approach to military force and capabilities. They are proposed not as some sort of new Atlantic covenant to be negotiated, agreed, and enshrined. Rather, they demonstrate that, with dialogue, a gradual convergence in strategy to protect common interests is a realistic goal.

***Globalization—economic integration, the spread of democracy, and the modernization of emerging regions—is redefining world security.*** The world economy is integrating, trade and investment are growing, and the community of market democracies is expanding. Important parts of the world previously held back by poverty and authoritarianism—e.g., Eastern Europe, Latin America, Southeast and South Asia—are reforming and assuming important roles in the integrated economy. What becomes of such regions—indeed, what happens throughout the expanding community of market democracies—is of great and shared importance to the North Atlantic democracies. Because this underlying trend in world politics and economics is so promising for international security and U.S and European interests, threats to it should be prevented and opposed.

***Global systems are absorbing national systems and redefining national security.*** As the world economy integrates, the safe and unimpeded flow of products, resources, energy, capital, technology, data, and knowledge, as well as the strength of the systems, networks, infrastructure and institutions that enable

[9] Chicago Council on Foreign Relations and University of Maryland polls, 1995 and 1997, respectively.

that economy to function, are of growing interest to all who rely on them, especially the North Atlantic democracies. Whereas the security of a nation formerly meant the inviolability of its soil, it now means national *viability*—which must include the security of the systems on which it depends to function. Aggression against national viability—the ability to sustain the quality and way of life—is aggression even if borders are not breached.

***Despite globalization, dangers persist that could warrant the use of force.*** Because the process of globalization is uneven and incomplete, there are threats to the security of the systems and regions that are crucial to the world economy, thus making them threats to the North Atlantic democracies. Consistent with international law, security threats of the following sort could warrant the use of force. These dangers include:

- Regimes that coerce or attack their neighbors, undermine regional security and progress, and oppose the interest and norms of the growing democratic community.
- Threats against world energy supplies.
- Ethnic violence, genocide, and other internal conflicts that could undermine democracy, reform, and integration of emerging regions.
- Aggressive use or threatened use of WMD.
- Threats against the transport, financial, information, and physical infrastructure of the world economy.
- Terrorism, crime, and other transnational threats.

***These dangers can be aggravated by the globalization of destructive technologies.*** Even as globalization creates shared global interests in need of protection, it is diffusing dangerous technologies, including the means to make and deliver WMD. Thus, the protection of global interests is becoming both more important and more difficult. U.S. military superiority does not erase these dangers, since the United States lacks the means, authority, and inclination to police the world unilaterally. Despite such dangers as WMD, the Atlantic democracies cannot retreat from the defense of their global interests. National isolationism (in the U.S. case) and regional isolationism (in the European case) are not safe options. In seeking to prevent conflict, the Atlantic democracies require the ability to take successful and combined military action in the face of these dangers.

***Improved defense capabilities that exploit U.S. and European technological strengths are needed.*** The United States and its European allies have a shared need for power projection capabilities and for the ability to destroy war-making capabilities of those who trample international norms and threaten Atlantic and global interests. The Atlantic allies also have a common interest in reducing the costs and casualties of having to defend global interests. The United States and Europe therefore have an interest in exploiting, collaboratively, the

technologies that facilitate power projection, speedy military success, and minimal loss of life.

***Responsibilities and risks must be shared fairly.*** In order to ensure public support, strengthen the political cohesion of the alliance, improve credibility and deterrence, and deny adversaries the opportunity to exploit differences among them, the United States and its allies share the view that it is better to act together in peacetime, crisis, and war. It is therefore imperative that they have compatible and interoperable forces and common operational doctrines, and that they face comparable combat risks. Insofar as they have similar responsibilities concerning shared interests, their foreign policies should converge and decisions should be taken jointly.

## Making Progress in Convergence

The reader will have little difficulty extrapolating from these strategic propositions the forces that are needed. They are, of course, just the sorts of forces maintained by the United States, modified to incorporate the technologies and doctrines of the RMA: lean, high-quality, mobile, fast in battle, lethal, networked, jointly operated, and integrated with information dominance. Therefore, if the United States and its allies agree to the foregoing propositions—in deed if not in word—it will become easier to arrive at a common view of military operational tasks, assignments, and requirements. This in turn will place similar demands on U.S and European defense industries and information technologies. In other words, it will help close the military-technological gap.

At the moment, the prospects for a shift in European thinking sufficient to permit strategic "closure" on the strategic tier are neither bright nor unremittingly dim. Fortunately, the mid-to-long term—say, 5 to 10 years—is what counts in the RMA calculus, for this is when current U.S. investments will bear fruit. Much depends upon how the Europeans react to the emerging international situation, especially the prospect of heightened dangers, including WMD, to European interests outside Europe. Perhaps Iraq's determination to acquire biological weapons will galvanize European public concern, unless it is widely perceived that the United States will continue to take care of such matters more or less exclusively.

A more subtle pressure might also begin to operate on European attitudes about military power: as globalization proceeds, nonstate actors—good and bad—become more powerful and plentiful. States that do not maintain the ability to protect their interests in this new era will be the first to lose their clout, their relevance, and, ultimately, their security.

While the Europeans have the furthest to go, whether U.S.-European security outlooks converge also depends on the stance of the United States. Its security strategy is increasingly perceived as more unilateralist than one designed

for coalition building. But this, too, should begin to change. The United States clearly needs to build a transatlantic consensus on Iraq and Iran, provided the resulting policy would have some starch to it. As noted, Secretary of State Madeleine Albright called for greater European help in countering the WMD threat. Former U.S. cabinet officials, Warren Christopher and William Perry, have endorsed the idea of a NATO that can defend not only borders but common interests, including those outside Europe. The strong multilateralist school among the U.S. foreign policy elite, supported by the common sense of the American people, favors working with allies, provided they bear burdens.

But there is still much inertia. The NATO decision to rewrite its strategic concept was initially greeted with a bureaucratic reaction to change as little as possible. The current concept, written when the Soviet Union still existed, says little that would help recast NATO strategy and forces to meet the security requirements of the new era, especially outside Europe's borders. The professional diplomats fear that updating NATO strategy would unleash pressures in Europe for further cuts in budgets and forces. But this attitude will prevent NATO from coming to grips with how its force posture needs changing in light of how the world has transformed. Moreover, until European governments are able to convince their citizens to maintain and modernize their forces and to project power, the prospect is for further cuts.

The United States can take concrete steps to promote a convergence of strategic motivations. It can urge that the new NATO concept reflect its strategic perspective. It can bring to NATO for consultation examples of the global security interests that inform U.S. plans and policies. It can energize the new NATO "Combined Joint Task Force" (CJTF) mechanism with requirements to prepare for the most severe threats, whatever their location. It can make clear its willingness to engage in a productive give-and-take over security policies, roles and missions, command relationships, and operational practices that will flow from a new strategic concept. Finally, it can encourage and welcome greater allied participation in operations and policies outside Europe, including the Persian Gulf.

Just as like-mindedness in U.S. and European global security perspectives will improve the prospects for closing the gap in military doctrine, force requirements, and information architecture, practical progress on military matters will improve the climate for this strategic convergence as the RMA unfolds. This chapter has been about the strategic tier—a top-down assault, as it were, on the divergence. The information age seems to favor bottom-up progress, probably because of its distributive and sharing powers and its stress on horizontal as opposed to vertical structures. As European and American officers, researchers, technologists, and business executives make headway in perceiving and solving common, bite-size problems, the strategists and statesmen will follow—and perhaps political leaders will be more inclined to lead.

# CHAPTER 3

# Building Compatible Forces for RMA Operations—The Second Tier

The United States and its European allies could take years to converge on the common global security view just suggested. In the meantime, though, their military forces could be made more capable of conducting combined operations, which would enable them to cooperate when they agree on broad strategy or at least when they decide to respond jointly to a specific threat. Interoperability would also help rectify the current imbalance in risks and responsibilities—i.e., whereby only the United States can defeat WMD-armed rogues—that accentuates differences over political strategy. With better forces, the Europeans at least could not decline to participate in coalition military operations because they are physically unable to do so, and the United States would not need to act unilaterally for lack of any capable allies. Thus, with interoperable military forces the Atlantic allies might find it easier to agree on security issues that now divide them. This chapter addresses how such an agenda can be pursued.

## Making U.S. and Allied Forces Complementary

Even if the United States and its allies might not be able to agree in advance on precise circumstances in which forces would be used together, they could agree on the need to make improvements to prepare for generic operational military challenges. They could, for example, agree that NATO should be able to call on both U.S. and European RMA forces to undertake tasks such as air intercept, deep strikes, fast-maneuvering ground counterattacks, and sea-based bombardment with cruise missiles. Based on such agreement, European forces could be tailored to perform a general set of missions and tasks that likely would arise when conducting operations with U.S. forces. For example, in the event of a coalition operation in response to aggression by a rogue state, some missions and tasks would arise in the early halt phase of the operation, some in the middle build-up phase, and others in the late counterattack phase. The critical point is that although they might be uncertain about the future situations in which their forces would be called to conduct alliance operations, the United States and the Europeans could agree on the military tasks that are likely to be performed when such operations are launched.

Planning for generic military missions and tasks has a distinct advantage in that it does not hold an Atlantic RMA hostage to debates between the United States and Europe over foreign policy and strategy in each key region and specific situation where their interests might be at risk. It does not depend on a consensus on the legitimacy of the use of force, nor does it require prior agreement on a fixed blueprint that resolves all the programmatic and investment details before any one step can be taken. Concentrating, sequentially, on missions, tasks, forces, and programs allows the U.S. and European militaries to make progress in parallel with, and perhaps to help along, the process of narrowing differences over strategy.

Convergence in military doctrine and requirements can in turn help close the technological gap. Insofar as U.S. and European militaries are setting similar requirements, their defense and information technology industries should be able to compete and cooperate on a transatlantic basis. Moreover, as European requirements become more advanced, industry should rise to the challenge, thus helping further close the gap in capabilities and giving the Alliance, as a whole, a broader, stronger North Atlantic technological base from which to draw.

Making progress in this area will not be easy. Whereas differences in foreign policy and diplomacy often can be resolved by words, military differences cannot. Resolving them requires long-term planning and investment, stitching together technology, structure, and doctrine. Both sides have their work cut out for them. The Europeans face the challenge of learning how to operate in the new ways being adopted by U.S. forces. The Americans will no longer be free to think of the RMA as applying solely to U.S. forces.

Fortunately, the two sides have in place a mechanism of proven value for forging coalition military plans and requirements—NATO. The Alliance's apparatus for military cooperation already has been modestly reformed, with the creation of combined joint task forces (CJTFs) to tackle "out-of-area" needs. But further reform is needed, if NATO is to enable the Americans and Europeans to build a new military coalition that exploits the RMA.

Before suggesting an Atlantic RMA, one needs to examine the military origins, impact, and future course of the RMA. Once the mystique is removed, one finds that the purposes, technologies, and doctrines of the RMA are not alien to NATO, even though the integrated whole is new to European allies. Closing the RMA gap does not require European forces to become carbon copies of their American cousins or to invest heavily in entirely different platforms than their current ones. It merely means that they must adopt enough RMA capabilities and doctrine to be able to fight effectively alongside U.S. forces in a wide spectrum of situations, and that the United States must "open" its RMA capabilities and doctrines to its allies.

## What Does the RMA Mean in Military Terms?

Understanding the challenge of operational convergence between U.S. and European forces requires understanding the RMA itself. Military revolutions arise from the interaction of two forces: the opportunity presented by new factors (usually technology) and the impetus supplied by challenging strategic problems. As already noted, the RMA is propelled by the need to project force quickly to protect global interests and the opportunity to apply information technology to that end. But the initial stimulus came two decades ago on the North German plain and it affected U.S. and European forces.

In the late 1970s, NATO was concerned with a deteriorating military balance in Europe, especially the Soviet capacity to conduct a surprise attack in Central Europe. At the same time, the Iranian revolution and the Soviet invasion of Afghanistan raised alarms in the United States about a growing danger to Persian Gulf oilfields. In both theaters, a key risk was the lack of sufficient combat forces to stop attacks in the critical early stages. In Central Europe, NATO lacked operational reserves to bolster its vulnerable fixed defense. In the Persian Gulf, there were virtually no forces deployed in peacetime to defend Western interests. Thus, in the worse case, both Central Europe and the Gulf were vulnerable to being overrun before the West could mobilize its superior industrial and technological resources.[10]

At the time, the large American forces stationed in the continental United States could not be moved overseas rapidly enough to make a difference. So, the United States embarked on a major change in its defense strategy aimed at swift power projection. It established the demanding goal of being able to add 5 divisions and 12 fighter wings to its European peacetime presence in order to yield a total of 10 divisions and 20 fighter wings within the first month or two of a crisis. It also aimed to deploy about 8 divisions and 12 fighter wings to the Persian Gulf in a similar period. In both theaters, this was enough force to make the difference between defeat and successful defense.

Although it was soon on the road to achieving these mobility goals, the United States was not content with becoming better at power projection. It also embarked upon an effort to make its forces more effective once they arrived. Not only was NATO outnumbered 2:1 on the ground, it also faced a well-armed enemy with a capacity for fast offensive campaigns. Moreover, NATO defense strategy in Central Europe was cursed with a brittle forward defense concept. This concept was to be carried out at the intra-German border in a way that relied on the mechanical application of firepower to contain enemy attacks. NATO had neither adequate operational reserves nor the ability to countermaneuver rapidly. The effect was to make NATO vulnerable to an enemy breakthrough

[10] For more detail see Richard L. Kugler, *Commitment to Purpose: How Alliance Partnership Won the Cold War* (Santa Monica, California: The RAND Corporation, 1993).

attack that could cause its entire defense to unravel and collapse. Powerful NATO air forces were capable of contesting the enemy for air control of the airspace, but they could contribute little to helping beleaguered ground forces stave off defeat.

As a consequence, NATO feared that it might quickly be compelled to use nuclear weapons as part of its strategy of "flexible response." Before the 1970s, U.S. nuclear superiority provided enough of an edge for NATO to rely on the credible threat of nuclear first-use in order to deter a Soviet armor attack in Europe. But once the Soviets achieved strategic parity and could devastate the United States itself, doubts about nuclear deterrence left NATO with a strong incentive to come up with a better conventional defense.

At the time, the United States and its European allies were entering a new phase of modernization. Emerging technologies gave them opportunities to refashion both their air strategy and their ground strategy. These developments led, in the 1980s, to an integrated strategy for a joint "air-land" battle. The result was a major upgrading of NATO conventional defense prospects through a combination of more U.S. forces, better overall NATO force capabilities, and an effective joint strategy that left the Warsaw Pact increasingly uncertain of its prospects in a war.

In air operations, the deployment of AWACS, new fighters (e.g., the F-15 and Tornado), better air-to-air missiles, and the Patriot surface-to-air missile made effective air defense possible, thus denying enemy air forces access to NATO territory. This took away the enemy's option to carry out a blitzkrieg air offensive to destroy NATO ability to defend against tank attack. Moreover, these systems allowed NATO to perform the air defense mission with fewer aircraft than before, thereby permitting more sorties to conduct offensive air missions.

Cruise missiles helped by targeting rear areas, thus taking pressure off NATO manned air sorties to perform that task. Equally important, in their first systematic effort to gain an edge from new information technologies, the United States and its NATO allies began developing new $C^3I$ assets, aircraft avionics, and smart munitions for conducting air strikes on enemy armored formations at or behind the front line, even at night and in bad weather. Before then, NATO air forces lacked the intelligence assets to see such formations as they massed to attack in echelons, and they also lacked the munitions to destroy armored targets even if they could be found.

As new tactics and new technology appeared, NATO was able to start thinking not just about how to slow a Soviet armor advance, but even about how to win the entire war. Several new technologies worked together to give NATO ground forces the capacity to bring together modern infantry, artillery, armor, and helicopters to form a potent battlefield combination punch, thereby taking advantage of the improving air situation to do better in the land battle. NATO commanders started substituting firepower for mass, thereby allowing front-line

troops to maneuver and to be thinned out in favor of building more reserves, both of which are key to winning armored battles. Again, technology provided high leverage. The attack helicopter with armor-penetrating munitions was especially important, for it gave NATO commanders a capacity to move and concentrate lethal forces quickly, across the breadth and depth of the battlefield.

Equally important were the changes that took place in Western tanks and armored fighting vehicles. New NATO models had bigger guns and better munitions for greater firepower, laser range-finders and solid-state computers for improved firing accuracy, and better armor for survivability. They moved fast enough to make flanking attacks and to separate the enemy's infantry, armor, artillery, and logistic support, making the enemy vulnerable to being defeated in detail.

The overall effect of these ground changes was that NATO shifted away from linear forward defense and attrition war toward echeloned non-linear defense and maneuver war. Its new philosophy made use of heavy firepower, but not in old mechanical ways. It aspired to master the dynamics of concentrating and counter-concentrating, thus gaining an advantage through speed, tempo, and synchronization. Fast, coordinated maneuver became the instrument for making the enemy vulnerable to devastating, precision-delivered firepower. The two together became the key not only to initial defense, but also to the possibility of victory—without having to use nuclear weapons.

Although new technologies made these changes possible, what brought them to life was the recasting of U.S. and NATO operational doctrine. The new technologies and doctrines blended air and ground operations, and combined deep strikes with close battle. They improved drastically the West's defense prospects and they changed the face of warfare.

These changes were led by U.S. forces. But they were also carried out by the Europeans—not as thoroughly, but in significant ways. The new doctrine and force posture came across not as made-in-the-USA but as a synthesis that also included German concepts of maneuver warfare and British approaches to combined-arms operations. By the early 1980s, multilateral brainstorming, coalition operations, and force planning, and the transatlantic bond itself, were working well, with profoundly positive effects for common European and American security.

## The Beginning of Divergence

Although some aspects of the RMA have origins in NATO, U.S. and European militaries are now growing apart. The key reason, as the previous chapter explains, is that with the threat to Europe gone, the United States has refocused its military strategy on the Persian Gulf and East Asia. The sorts of military challenges that exist there, not in Europe, provide the template for how the United States plans for and exploits the RMA.

The Persian Gulf War of 1990–1991 dramatized the divergence in U.S. and European military doctrine and capabilities, especially for conflicts outside Europe. The war validated the U.S. emphasis on swift power-projection, superior maneuver-and-strike forces, and thorough battlefield awareness. It also rewarded the U.S. policy of maintaining an all-volunteer military at high readiness with intensive training. It illuminated the value of information superiority and of smart munitions. And it underscored the importance of joint operations, even though it also revealed stubborn problems in getting ground, air, and naval elements to work in harmony.

In a sense, the Gulf War turned NATO doctrine on its head. The doctrine's original authors envisioned that it would be used to mount a stalwart defense against aggression. Because the Iraqi Army stopped and hunkered down when it reached the Kuwait-Saudi border, the United States was compelled to use the new doctrine offensively. It discovered that the capabilities created to stop a massive armor attack could be used quickly to obliterate the forces and infrastructure of a lesser enemy.

Yet, the Gulf War left questions. The Iraqi Army was fighting way out of its league. Did the decisive victory result from the West's military superiority or Iraq's inferiority? Did it herald similar victories in the future, or was it a unique event? How would the capabilities and tactics that won the Gulf War fare against an enemy prepared to use WMD?

These questions point to a more dangerous regional threat that the United States and its European allies may face in the future: an enemy that may field, say, 20 divisions and 1,000 combat aircraft—enough to aspire to major power status. This enemy may operate in league with regional allies. Indeed, the next adversary is likely to come better prepared and wield better weapons than Iraq did in 1990. Its forces and weapons may be able to carry out asymmetric strategies that target U.S. weaknesses and offset their own.

Or, consider another surprise Iraqi invasion of Kuwait, but carried out more skillfully than in 1990. A smaller but well-armed and mobile Iraqi army might storm through Kuwait and, instead of stopping, drive deep into Saudi Arabia to seize oilfields, ports, and airbases before U.S. forces can arrive in strength. Such Iraqi forces might have better air defenses than now and thus be less vulnerable to attack. They might be better able to maneuver and thus be harder to destroy quickly. They might have accurate, long-range missiles with which to bombard ports and airbases, or they might employ sappers, guerrillas, and local supporters for this purpose. Their naval missiles and mines might be able to interdict and block the Gulf sea lanes, thus interfering with U.S. and allied reinforcement efforts.

The proliferation of WMD would especially complicate the task of U.S. and allied forces. Throughout the Cold War, NATO was faced with preparing

its conventional forces against the background of possible nuclear war. The past decade has seen a welcome respite from this dilemma. The proliferation of WMD and their delivery systems in the Greater Middle East may produce its reappearance. Foes may threaten to use such weapons to deter intervention. Against a WMD-armed regional rogue, the United States would face major new dangers in massing its forces, relying on local allies, and conducting large-scale ground operations. A replay of the Gulf War against a WMD-armed enemy could end with great losses even in victory for the United States.

## The RMA as Response

The RMA is intended to prepare U.S. forces for such demanding contingencies. In essence, the RMA manifests itself in rapid force deployment, decisive force employment, and reduced vulnerability. The first comes from lift assets and lean mobile units. The second results from advanced $C^4$ISR systems, joint doctrine, and strike capabilities. The third comes from dispersing forces, exploiting greater weapon ranges without sacrificing weapons accuracy, and using information dominance to render the other side incapable of inflicting damage.

What puts the R in the RMA is the shift in the sources of military effectiveness: from massed forces and firepower to information that permits less mass yet more effectiveness. Traditional combat was a matter of putting force on force: getting there first with the most, the bigger battalions, the preponderance of firepower. Over the last quarter century, modern forces equipped with precision munitions have been increasingly able to kill anything they can see. Now, sensors are being used and fused in a way that enables those forces to see virtually every target they need to kill. It is the ability to illuminate the battlefield in great detail and thereby fire precisely, rather than the ability to apply firepower broadly over the battlefield in large amounts, that matters. Force is still the *sine qua non* of combat. But parsimony in the application of force, in turn, can drastically reduce lift requirements or the number of forces that are put in harm's way, while greatly enhancing the efficiency and lethality of forces that are used. Hence the RMA produces faster deployments, greater effects, and reduced risk, even if the enemy threatens the use of WMD.

The RMA transforms time and space. It compresses time by accelerating the pace of movement and fighting. The advantage lies with the side that can best master the dynamics of concentrating and counter-concentrating firepower. The RMA reduces the importance of space, not only because of faster deployment and operations, but because long-range weapons (i.e., for deep and/or standoff strike) are as accurate as short-range artillery, tank rounds, and bombs. Thus while mass is dispersed by networking, firepower can be concentrated from long distances with great precision. Lethal targeting combines with fast maneuver to provide a decisive edge in both the deep and close battle. Sophisticated technology is key, but so are good leaders and skilled troops with tactics that fully

exploit the technology. Under most circumstances, RMA forces can defeat much larger but less agile forces.

The ability to see the battlefield in detail without putting high-value platforms or warfighters at great risk, coupled with weapons that can hit even mobile targets from standoff ranges (beyond 20 kilometers), means that such forces can fire with great effect without being effectively fired upon. Such forces could scan the battlespace looking for targets, sift through large amounts of data to generate high priority battlespace knowledge, and strike whichever enemy forces pose the most urgent threats or lucrative targets. Some information assets (e.g., satellites, long-range unmanned aerial vehicles) can provide continuous sweeping surveillance, while others (e.g., air-mobile, ground, and over-the-horizon sensors) can be deployed for more focused looks relatively quickly. The ability to deliver weapons from nearly any range offers the prospect that decisive force can be employed within days, perhaps even hours, rather than the weeks and months currently assumed.[11] With the RMA, a small number of air and ground forces can accomplish a great deal, especially in disrupting or delaying an enemy attack in ways that allow larger reinforcements to converge on the scene in time for a decisive counterattack.

To achieve this, the RMA exploits communications to link all echelons, computers both powerful and proliferated, big but accessible data banks, fast displays, highly sophisticated and integrated sensors, and software that yields an intuitive grasp of the battlefield. The Pentagon's new $C^4$ISR architecture outlined in the recently completed Quadrennial Defense Review and in Joint Vision 2010 exploits these processing and communication advantages. It has four elements:

- A sensor grid that provides detailed, real-time knowledge of the battlefield to great depth (e.g., 300 kilometers in the enemy's rear areas).
- An engagement grid that can help manage the battle and thereby enhance speed and flexibility to U.S. forces.
- An information grid that speeds high volumes of data across the entire U.S. command structure: up, down, and sideways.
- Offensive information warfare systems that blind the enemy and defensive systems that prevent the enemy's blinding us.

Together, these systems give U.S. commanders full knowledge of the battlefield (e.g., terrain and weather), of U.S. and allied force dispositions (size, location, vector, readiness, logistics), and of similar data on the enemy. They also deny the enemy comparable situational awareness and communications, thus illuminating war for one side and darkening it for the other.

[11] For more detail see Institute for National Strategic Studies, National Defense University, *Strategic Assessment 1998: Engaging Power for Peace* (Washington, D.C.: Government Printing Office, 1998), 137–152.

Even with these information advantages, success still depends on the capacity of combat forces to perform these operations effectively. Success cannot be taken for granted if radically different types of forces are deployed—if U.S. forces have RMA assets, but European forces are pre-RMA. The compression of time and the widening of distance raise the hurdles that RMA and pre-RMA forces will face in operating together. If U.S. and European forces are to operate as a team, each must be aware of what the other is doing in some detail. If a threat emerges or an opportunity arises, each component must shift gears on the spot. This entails a high degree of shared situational awareness, which means trading high volumes of secure information quickly, often in the face of heavy electronic or information warfare. If such information cannot be exchanged, forces cannot act in synchrony, which is often the case for pre-RMA forces.

The incompatibility of RMA and pre-RMA forces is manifested operationally in other ways, all of which are affected by the use of information technology. Combined forces must be able to travel safely and be ready to fight upon debarkation under tight timelines. A protected lane opened for a brief period may allow RMA forces and supplies to rush through, but may not be enough for pre-RMA forces, which need more time to move bulkier or less agile forces. RMA forces may elude danger by using stealth, electronic countermeasures, and the ability to see fleeting holes in the other side's coverage; pre-RMA forces may have to be held back or take great casualties in trying. A combined operation that requires deception or the use of hard-to-detect devices may run aground if the slowness or errors of any one force element reveal everything to the enemy. An agile RMA force may be endangered trying to rescue a pre-RMA force, in trouble because it tied itself down.

Fire support is another example of how the gap between RMA and pre-RMA forces can limit combined operations. To get covering fire when called for, coordination must be immediate and flexible, and fire support units must be within range, capable of responding, and survivable. RMA forces engaged in close combat may be able to call for support without worrying about friendly fire inadvertently destroying them. If pre-RMA fire support is inaccurate or there are no quick reliable ways to distinguish friend from foe (and thus fire support cannot keep up with dynamic battlefield circumstances), such assurance will be missing. As a consequence, the RMA forces will not be able to fight with full effectiveness. Conversely, broad fields of fire cannot be laid down by RMA forces if friendly pre-RMA forces cannot get out of the way. The advantage of RMA fire support therefore could be lost.

The threat of WMD further exacerbates incompatibilities between RMA and pre-RMA forces. RMA forces may be able to avoid the effect of WMD attacks through dispersion, movement, precision strikes, and rapid countermeasures (e.g., the ability to detect air-borne toxins and neutralize themselves against them). By contrast, pre-RMA forces may have to be physically concentrated to

create sufficient firepower for operations. If they dig in to limit casualties, they immobilize themselves. If they take heavy casualties, they will be a millstone on combined operations and could inhibit RMA forces from performing their missions.

On the whole, RMA forces may be better off fighting alone than in combination with pre-RMA forces. This is precisely the conclusion that U.S. commanders might reach as their forces are transformed but allied forces are not. If so, the combination of European political reluctance to send forces for political reasons and American reluctance to integrate them for operational reasons could virtually kill any chances for effective coalition responses to future threats to common interests. It is therefore critical both to accelerate European investment in RMA forces and to open U.S. doctrine to include these forces in operations.

## Roles for Europe

What sort of military contribution does the United States need from Europe, and what capabilities do Europeans want for themselves? The Europeans have four options:

- Create a carbon copy of U.S. forces.
- Provide non-RMA help to U.S. RMA operations.
- Foster technical interoperability.
- Participate in RMA combined operations.

The first option—building forces identical to those of the United States—is impractical and unnecessary. The Europeans likely will not be able to progress quickly enough to replicate U.S. forces as the latter continue to undergo RMA transformation. Moreover, even as the U.S. and European strategic views converge, there will be differences, which will warrant somewhat different capabilities. Fortunately, U.S. and European forces can have different degrees of RMA capability and still be able to work together.

The second option—assigning non-RMA European assets to support U.S. RMA operations—relieves allies of the need to enter the RMA, yet in theory allows their militaries to contribute to U.S.-dominated operations. In this option, European forces would reassign traditional assets to duties such as truck transport, ammunition-hauling, medical support, naval demining, SLOC escort, rear-area security, maintenance, and repair. Such tasks are important and U.S. forces suffer from shortfalls in them. But they are essentially combat support, not combat tasks. As a variant, the Europeans could provide traditional ground combat forces while the United States provides deep-strike units.

Both variants of the second option are politically, militarily, and strategically unsound. Neither the United States nor its allies should be content to see the latter provide noncombat forces. Placing large, slow allied ground forces in greater danger than U.S. deep strike forces is not a formula for an

effective coalition. Besides, future wars will be fought not only with sophisticated deep-strike systems, but also with quick, networked RMA ground forces. Compared to using RMA assets across the board, an RMA operation with good deep-strike assets but traditional ground forces for close combat will be far less effective, and perhaps unable to defeat future enemies. Regardless, the reality is that when U.S. forces are committed, their deep strike assets are going to arrive with ground forces that are RMA-prepared. If European ground forces offer nothing more than traditional capabilities, they are not going to be capable of working with U.S. forces in performing major operational tasks. They will have to be left standing in place or confined to the rear areas—present in numbers, but doing little of central importance.

A strategy of parceling zones to U.S. and European forces based on their different capabilities is also problematic. On a pre-RMA linear battlefield, for instance, the United States could take the center while Europeans take the flanks. Or U.S. forces could be positioned for offense and movement while Europeans take defensive positions. But with the RMA, such a division of labor fails for operational reasons. It virtually invites enemy forces to exploit vulnerabilities in the U.S.-European posture. The deeper the battle, moreover, the more operations from different sectors may merge with one another. The notion that U.S. ground forces can advance quickly and deeply while Europeans move slowly over short distances is untenable because it prevents a coherent operational scheme of maneuver from being carried out. The two components would not be able to support each other, and each would find its flanks exposed because the other is operating far away.

The third option—having the Europeans acquire information systems that can talk to U.S. forces, is, alone, inadequate. Access to information is essentially useless if it cannot be exploited. Exploitation, in turn, requires forces with structures, weapons, and doctrines similar enough to carry out RMA operations with only minor adjustments. This option is fine for bridging only a communications gap, but not the larger operations gap.

This leaves the fourth option, which calls for Europeans to develop the weapons, forces, and doctrines needed to carry out genuine RMA operations alongside U.S. forces. This option does not aim for carbon-copy forces. But it does aim for comparable and complementary capabilities, i.e., European forces of sufficient similarity and compatibility with U.S. forces that they can perform meaningful, mutually supporting combat roles and missions in RMA operations.

Under this option, the European allies would have sufficient capabilities to carry out the close teamwork needed in RMA operations. As a result, they would qualify for meaningful positions in combined deployment plans, as well as in campaign plans for force employment with comparable risks and responsibilities. The role of British forces operating with U.S. forces in the Gulf War is the forerunner.

The remainder of this chapter addresses what such European forces would be and how they could be combined with U.S. forces.

## Obstacles Facing Current European Forces

How do European forces need to change so that they become RMA-capable in an operational sense? How do they need to improve so that they can deploy and employ forces rapidly and effectively in RMA operations in concert with U.S. forces? What programmatic agenda should they pursue? These questions can best be answered by first addressing the obstacles facing the Europeans.

One obstacle is the European lack of money for investments. The European annual defense budget of $160 billion and manpower of 2.5 million troops builds combat forces of 57 division-equivalents, 3,400 combat aircraft, and 350 naval combatants. This posture is about 50–70 percent larger than U.S. forces, on a defense budget total that is only two-thirds as large. True, several southern region countries, with their poor economies and low personnel costs, sustain large forces on a pittance. But even the wealthy northern European countries spend only about $110,000 per soldier, while the United States spends $170,000. These costs are the inevitable consequence of major differences not only in near-term readiness, but also in the long-term capacity to invest in new capabilities. In essence, the Europeans have lots of quantity but not quality and they are not acquiring better quality fast enough to match the U.S. RMA.

TABLE 1
**Current European Forces and FY 1997 Budgets**

| | BUDGETS ($B) | ACTIVE FORCES | DIVISION EQUIVALENT | COMBAT AIRCRAFT | COMBAT SHIPS |
|---|---|---|---|---|---|
| UK | 33.2 | 210,000 | 3 | 538 | 53 |
| Germany | 33.6 | 350,000 | 7 | 489 | 31 |
| France | 37.2 | 370,000 | 6 | 505 | 60 |
| Belgium | 3.3 | 43,000 | 1 | 132 | 3 |
| Netherlands | 8.0 | 57,000 | 1⅓ | 171 | 16 |
| Denmark | 3.2 | 33,000 | 2 | 64 | 9 |
| Norway | 3.7 | 34,000 | 1 | 80 | 40 |
| **Northern Sub-Total** | **122.2** | **1,097,000** | **21⅓** | **1,979** | **212** |
| Spain | 6.9 | 197,000 | 3⅓ | 207 | 26 |
| Portugal | 1.7 | 55,000 | 1⅓ | 95 | 13 |
| Italy | 20.0 | 325,000 | 4 | 286 | 40 |
| Greece | 3.5 | 162,000 | 12 | 342 | 22 |
| Turkey | 6.8 | 629,000 | 15 | 95 | 36 |
| **Southern Sub-Total** | **38.6** | **1,368,000** | **35⅓** | **1,425** | **137** |
| **Total Europe** | **161.1** | **2,465,000** | **57⅓** | **3,404** | **349** |
| **United States** | **250.0** | **1,145,000** | **29** | **2,266** | **247** |

To improve its smaller forces, the United States spends about $42 billion on procurement and $24 billion on R&D—the mother's milk of any RMA. By contrast, The Europeans spend far less: $30 billion on procurement, and a mere $8 billion on R&D. Moreover, the Europeans focus on stocking such regular items as vehicles, spares, ammunition, and materials, thereby further constraining their ability to buy new weapons. As a result, Europeans provide fewer of their forces with top-quality weapons and other equipment, notably smart munitions or their delivery systems. They also maintain smaller stocks of war reserves, especially stockpiles of ammunition for big, sustained fights. Their logistic support forces are normally smaller than American forces, and they have few of the specialized logistic assets needed for projection and expeditionary missions, e.g., heavy truck transports, construction engineers, mobile field hospitals, port offload personnel, ammunition haulers, POL supply units, and long-distance communications units for widely dispersed operations.

The growing RMA gap is further exacerbated by European force structures that are not designed for power projection and RMA missions. The Europeans have fewer air and naval forces but more ground forces than the United States. But their larger ground forces are supported by mobility forces possessing only 10–15 percent of the total long-distance lift capacity that the United States possesses. Their tactical air forces are configured for air defense missions and bombing stationary targets rather than for flexible deep strikes and supporting mobile combat formations. Aside from British and French, European naval forces are mostly configured for coastal defense missions, not blue-water deployments or strike roles. Britain and France together have four small aircraft carriers, not the 12 big carrier battle groups possessed by the United States. The Europeans have small amphibious forces, far less than the three active Marine divisions and 12 ARGs deployed by the United States. These major differences in force mix further contribute to European force postures that are designed for local missions led by mobilizable ground forces, rather than distant projection missions carried out by joint, high-tech forces.

The partial exception to this rule is the multinational posture of European "reaction" forces assigned to NATO. These forces are trained and otherwise kept prepared for a prompt response in ways that approach U.S. readiness standards. For the most part, they also are well armed with modern weapons. They provide a balanced combination of ground, air, and naval forces. On paper, they are large enough to contribute to the defense of allied interests: 9 divisions, 500 combat aircraft, and 160 naval combatants.[12]

But a rapid-reaction mission merely means that a unit must be ready in a week or two, and does not equate to a projection mission or capability. Indeed, only the British divisions and a few other brigades of the NATO reaction

[12] See North Atlantic Treaty Organization, *NATO Handbook* (Brussels, Belgium: NATO, 1995).

force are designed to execute demanding projection missions. The entire posture, with its limited $C^4I$ and logistics assets, can operate only in a corps-sized formation of four divisions: hence, its name "Allied Command Europe (ACE) Rapid Reaction Corps" (ARRC). ARRC is no longer what earlier critics labeled as an "incoherent hodgepodge." Nor is it the large field army suggested by its paper structure because it cannot operate in multi-corps formations or be used for more than one major operational mission at a time.[13] Moreover, the ARRC has no support assets above corps level, which are critical to projection missions. In NATO plans, such support is to be provided by regional NATO commands in the north and south, though they themselves have only local border defense missions and forces. Thus, the ARRC is unable to assemble expeditionary support assets quickly to move outside Europe.

NATO also lacks strategic mobility forces to support the ARRC, unless the United States provides them. European nations themselves have few heavy airlift assets or well-organized sealift beyond a limited number of cargo ships owned by Britain, France, and a few others. Nor is NATO headquarters charged with creating plans, programs, and force goals for power projection outside Europe, or with monitoring their progress. Thus, the ARRC is far from a powerful corps that can deploy outward rapidly, fight effectively, and keep up with U.S. forces, especially in RMA operations.

The ARRC is fine for missions like Bosnia, with its metered deployments and low intensity operations. It is also well suited to serve as a vanguard of four NATO multinational corps for border defense in Central Europe, provided it does not have to operate so far eastward that it moves beyond the reach of the main NATO logistics facilities in Germany. Perhaps it could be deployed for such demanding projection missions as reinforcement of Turkey. But such operations likely would have to be led by U.S. forces, with the ARRC to serve as a late-arriving supplement. In sum, the ARRC could not conduct major wartime missions outside Europe, and even in a small support role, it could only help out after U.S. power projection forces have entered, and possibly completed, action.

The ARRC inability to deploy rapidly or engage in decisive combat illustrates the degree to which NATO remains hard-pressed to work with U.S. forces in new ways. The problem is not with the ARRC per se, nor with its inadequate numbers of forces. Instead, NATO cannot quickly and effectively apply enough of its large forces to major combat missions. If the Europeans were to stand still, this already-serious problem would worsen as U.S. forces pursue the RMA.

All things considered, how many forces could the Europeans swiftly project outside Europe today, for major combat missions? The answer is about 2 division-equivalents, 3 or 4 air wings, and 20 to 30 naval combatants. Nearly all

[13] Origins of the ARRC are discussed in Richard Kugler, *U.S.-European Cooperation in Out-of-Area Operations, Problems and Prospects* (Santa Monica, California: The RAND Corporation, 1994).

of these would be British and French forces, with only symbolic contributions from the others. Thus, compared to what Europe contributed in the Gulf War, they could contribute no more today, and perhaps less.

Current European plans are to build gradually improved light forces for low-intensity missions such as peacekeeping interventions, but not better forces for the sorts of major theater wars that motivate RMA doctrine, capabilities, and investment. The two countries currently best able to deploy and employ forces in such conflicts are the ones most capable of embarking on the RMA: Britain and France. But even they face the danger of falling further behind the United States as it moves farther and faster down the revolutionary track. Germany and other allies are trying to learn RMA doctrines and operations, but they continue to maintain large, less-ready forces that cannot project to or operate in distant high-intensity conflicts. Moreover, they will be constrained by the reality that swift deployment and RMA employment operations are interlocked. Even if the allies exploit some of the new technologies to operate more effectively in Europe, this is not the type of RMA that the United States is pursuing or that the strategic situation requires.

The implication thus is that the Europeans have big obstacles to overcome if they are to participate in the RMA. They must generate more money for investment, buy the right equipment, and alter their force structure. But these obstacles are not so large that they cannot be overcome over a period of years, if a sustained effort is begun soon.

## Priorities for Improving European Forces

European participation in a transatlantic RMA should begin with two types of planning done in parallel. Programmatic plans must be forged so that the Europeans use their investment resources properly by acquiring the right RMA capabilities. Operational plans must be created to clarify requirements—essential for programmatic plans—and to ensure that as RMA capabilities appear, they will be used with effective doctrine and tactics.

The need for such planning requires NATO to take on an orchestrating role. Unless it does so, at best several European nations may travel down separate and uncoordinated paths. An orchestrating role for NATO does not mean that the integrated NATO command necessarily will formally conduct all or most future RMA operations involving U.S. and European forces. Some may be conducted by CJTFs outside the integrated command, or by European forces that work with U.S. command structures, e.g., CENTCOM in the Persian Gulf. But because multinational efforts must be coordinated, NATO must guide the RMA force planning and commitment process.

With such planning, the European allies will be challenged to develop new capabilities. The Europeans do not need to enlarge their force structures;

indeed, they could reduce their end strength. Moreover, the Europeans do not need to upgrade all their forces to RMA standards, but only one-fourth of them. This is what makes a NATO RMA an affordable and feasible idea.

Of course, RMA hardware—$C^4$ISR and PGMs, for example—costs money. Assuming that parliaments are unwilling to fund budget increases, Europeans should shrink the size of their forces further, provided they do not cut their defense spending correspondingly. Such drawdowns would lower personnel and operating costs, thereby generating additional investment funds within a constant budget. If, for example, the Europeans spent an additional $10 to $20 billion per year on the purchase of new systems, they would elevate procurement to 30 percent of their defense budgets, a level that historically has been adequate for substantial modernization. To generate these savings, force reductions of 15 to 25 percent or more likely will be needed. Such reductions in force size can be made without endangering Europe's security. The current European force defense structures are more than adequate to handle future plausible contingencies in Europe. The Europeans do not need nearly sixty divisions, especially if only two of them can deploy and fight outside Europe.

How might the Europeans spend additional investment funds? The allies could tailor an appropriate fraction of their combat forces for overseas power projection and RMA operations. Requirements will have to be studied closely, but an initial estimate is that an RMA-capable posture up to 15 division-equivalents, along with, say, 800 combat aircraft and commensurate blue-water naval forces, would be ample to meet future needs, including concurrent missions. Some of these forces would be used for missions in Europe and along its periphery; others would be available for missions outside Europe. A smaller posture would have less capacity for concurrent scenarios, but at least could provide enough forces for a single contingency of each type—e.g., peacekeeping, crisis intervention, and major wars. The bulk of these forces should come from the major European powers which are best able to create RMA units. This requirement might be met by, say: three German divisions, three British divisions, three French divisions, one brigade or division each from the Low countries, and the remainder from the southern region countries. Air and naval forces would be provided in similar ways.

If these European forces could achieve operational complementarity with American forces, they would give NATO a coalition RMA capability that would hugely enhance NATO strategic effectiveness and secure American-European common interests in the new era.

## A NATO RMA Projection Force

European investment and adaptation effort should be guided by a concept for organizing forces. Accordingly, the NATO Reaction Force should be replaced by a new NATO Projection Force, to which U.S. ground, naval, and air

forces stationed in Europe would be assigned and with which other U.S. forces could operate. This force would be well suited for reaction missions within NATO borders, especially the defense of new members. More critical, it would be available for missions outside Europe. Such a force would let NATO create subpostures for each critical mission category, while minimizing dual-hatting of the sort that gives individual units too many different missions to handle. For example, NATO would be able to commit several divisions to East European security, a few divisions to peacekeeping missions and related activities, and still have several divisions to defend Turkey and Mediterranean security, and to conduct major regional operations in the Middle East and Gulf. In particular, the Europeans would have enough deployable divisions, along with air and naval forces, to make a major combat contribution to a U.S.-led coalition.

For this projection force to be effective, participating European forces would have to acquire RMA doctrines, and be trained and exercised so that they would be increasingly ready to carry them out in demanding operations even in the face of WMD. They would need to acquire RMA assets, including $C^4$ISR systems and more smart munitions. Wholesale acquisition of new weapons and platforms, however, would not be an immediate priority because existing models are mostly adequate for initial RMA operations. Eventually, new weapons will have to be bought as old models wear out—but in the normal course of events, not in response to the RMA.

Priorities would have to be set, and improvements made a step at a time. Even so, an RMA modernization effort could be quite expensive if not carried out wisely. But again, the goal would not be to mimic U.S. forces, but instead, to give European forces sufficient capabilities so that they can perform complementary RMA missions. This makes a European RMA effort affordable. It is also all the more reason to set improvement goals and coordinate force plans within NATO.

The new European posture would include fewer (e.g., 30) traditional divisions plus more (up to 15) divisions prepared for power projection and RMA operations. European air and naval forces would be reorganized similarly. Such forces would be trained and kept ready and would have sufficient RMA assets to permit them to work closely with U.S. forces.

How would European RMA forces participate in a crisis? U.S. forces might still be able to deploy faster, but some European forces, notably air forces and light ground forces, could be assigned early deployment roles in the initial days of a crisis. In the following weeks, other European forces could be deployed in parallel with U.S. forces, rather than arrive in strength only after the U.S. buildup, if not the conflict itself, is largely completed. Although European air forces might not perform all RMA missions, they could help in the deep strike campaign and in other critical tasks, such as reconnaissance. Many if not all of their ground forces might be able to operate within a fast-maneuver campaign.

Even without big carriers and amphibious assets, European naval forces with cruise missiles could assist U.S. strike forces.

U.S. commanders could not argue that such forces would be unable to keep pace with U.S. operations and so should be marginalized or left in Europe. Indeed, with RMA tactics and training, advanced $C^4$ISR and PGMs, as well as interoperability with U.S. forces, the Americans would have to admit that such allied forces could be counted on even in major intensive fights (e.g., against a WMD-armed rogue). This does not mean that the gap will disappear, but it does mean that an Atlantic coalition could act as one, militarily and politically.

## Can the Europeans Meet the Challenge?

The future of NATO depends on whether European and American forces can operate successfully together whenever common interests need defending. By 2010, at the rate U.S. forces are likely to be transformed, this will not be the case—unless at least a fraction of European forces are also transformed. Can this be achieved?

There are several reasons for believing that Europe can close the gap to the extent required to make NATO a working *military* alliance. First, as noted, the United States and Europe have proven that they can innovate together when motivated by a common strategy. Indeed, from the late 1970s to the late 1980s they produced, together, a credible defense against Soviet aggression. That task was as daunting as this one.

Second, Europeans excell in military competence. Their professional officers are skilled; their pool of high-quality personnel is on a par with the United States; their military establishments have benefited from decades of NATO experience. In general, the quality of their best weapon systems—e.g., tanks, artillery, and aircraft—is comparable to U.S. equipment. As just one example, German artillery tubes are often judged superior to U.S. artillery. Together, the Europeans are the second strongest military power in the world. They already have most of what they need to participate in the RMA. Where they lack is in specific areas: e.g., $C^4$ISR and other information systems, smart munitions, and other deep strike assets. They also lack experience in training and tactical doctrine for RMA operations. These are important deficiencies but many of them can be remedied enough to give the allies RMA forces—and to close the gap enough to ensure that NATO remains militarily effective.

Third, this challenge is not akin to the Anglo-German Dreadnought race of a century ago. Pursuing the RMA, as mentioned earlier, does not require the wholesale replacement of big-ticket platforms. This is apparent even in U.S. spending on procurement. Most military analysts believe the current $42 billion annual rate is inadequate. Plans call for an increase to $54–60 billion. At most, such spending will still be only about 27 percent of the DOD budget, lower than

the 30–35 percent of a much larger annual total during the Reagan years. No new armor or surface ship programs are in the works. Few other major acquisitions of new weapons platforms are planned, with the most notable exception being new tactical aircraft to replace the 1970s-era aircraft. U.S. forces in 2010 will have weapons similar to today's.[14] PGMs (e.g., BAT, SKEET, and JSOW) and their delivery systems are likely to get emphasis, but even their acquisition will account for only 1 or 2 percent of total DOD spending. Similarly, the Europeans can make tangible progress on power projection and the RMA by allocating only about 10 percent of their defense spending to the effort—an affordable amount for a program of decisive strategic importance.

Fourth, because the U.S. military is still developing its new doctrine, catching up on this front is feasible for the allies. Much depends upon how ongoing U.S. RMA experiments fare. The Air Force and Navy could be affected in significant ways, as missiles and smart munitions come to play a larger role in shaping their long-range assets. But the RMA also will have a big impact on the Army. A debate is now brewing on the future character and size of Army divisions and support structures. Some advocates are calling for a shift away from heavy mechanized formations to greater air mobility, attack helicopters, and MLRS/ATACMS deep fire units. Others call for smaller divisions and leaner logistic support structures, or even replacing divisions with a brigade-corps structure. Regardless of the outcome, European forces likely will have to change in similar ways, but they have made transitions of this sort many times before—and they will have the time to adapt.

Closing the gap thus will not require the Europeans to swap their current forces for RMA forces, but instead to introduce RMA capabilities purposefully and incrementally. The mental aspects of war, including the ability to make many decisions quickly, are coming to be as important as the physical aspects—or more important. For now, it is more important that Europeans change their concepts than their structures and platforms.

These steps by the Europeans will only pay off if the United States leverages allied investments and helps create a common NATO "System of Systems." Just as both the Europeans and the Americans have a stake in being able to project and operate their forces together, both have a role in making it happen. This chapter has portrayed what the Europeans must do. The next chapter describes an essential U.S. step toward a NATO RMA.

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[14] See Department of Defense, *Annual Report to the President and Congress* (Washington, D.C.: Government Printing Office, 1998).

# CHAPTER 4

# Creating a Transatlantic System of Systems—The Third Tier

Closing the gap will require two types of efforts to make forces compatible. European forces, as the last chapter argues, must outfit and reform themselves to be more *like* U.S. forces; by doing so, both we and they can undertake RMA missions in complementary fashion. As this chapter argues, U.S. and European forces must also be *linked* together, so that both sides can share a common knowledge of the battlespace.

## Working Together

The need for compatible forces places most of the work on the Europeans. Most of the work needed for *information systems compatibility,* though, lies on the western side of the Atlantic. The United States is well ahead of Europe in integrating its various sensors, networks, databases, and weapons into what retired admiral William Owens has called a "System of Systems." U.S. decisions made in the process of this integration will color similar decisions made on behalf of NATO as a whole. If the United States constructs its System of Systems for itself alone, rather than for the alliance, the prospect for a NATO projection capability will be bleak, even if the Europeans build more suitable forces.

In other words the United States owes the alliance the obligation to build a plug-compatible System of Systems; Europe, in turn, has the less onerous task of buying the plugs and making intelligent use of the data it receives as a result.

Building on the last chapter's force requirements for a transatlantic RMA, this chapter discusses the following:

- The role of a common System of Systems in a transatlantic RMA.
- Current compatibility issues in forging a common System of Systems.
- Long-term issues in designing a common System of Systems.

## Creating the System of Systems and the "Grid"

It is important to understand what the most serious discrepancy is between European and American military technology. The United States, as much

as any country, and more than most, has acted on the premise that the way to improve weapons systems has been to inject successively higher doses of technology into them. Today's tank is more capable than yesterday's: it is faster, tougher, shoots more projectiles faster and more accurately, has more sensors, and is generally more intelligent. So, by and large, are today's ship, today's airplane, and so on. Tomorrow's will be more capable yet. But we are used to constant progress and, indeed, expect it. Progress, per se, is not revolutionary. The United States, by constantly buying hardware, has technologically better equipment than do the Europeans, on average. This was true in the Cold War; it remains true today. But this difference did not keep NATO from functioning well those many years. Hardware is not the gap that most needs closing if NATO military effectiveness is to be regained for the new era.

What *is* revolutionary is not the caliber of equipment, but the fact that information technology in general, and data networking in particular, is giving rise to an American military that is much more than the sum of its parts. The conjunction of sensors, networks, databases, and weapons—a System of Systems—has the potential for radical improvements in conventional military operations.

Sensor fusion may serve to show how networking can help. Battlespaces are likely to grow more transparent to the United States, not just because sensors are better, but because each individual sensor is part of a network of space-based assets, aircraft, unmanned aerial vehicles, naval radars, ground sensors, and human observers. Sensors using multiple technologies (e.g., electro-optical, infrared, millimeter-wave, radar reflection, acoustic) can *collectively* illuminate the battlespace much better than each might individually. Sensors that can distinguish location accurately but that are unable to identify objects are not fully useful; nor are those that can identify objects but that have little ability to locate them. By uniting these sensor functions, RMA forces can understand the battlefield. If the movement of a target can be given in real time to weapons that guide themselves by reference to a moving dot on a map, the combination offers a highly lethal capability against any visible target.

Good illumination by itself cannot foster the high-tempo RMA operations described in the previous chapter. Information is decisive only when it can be analyzed rapidly, converted into plans of action, deconflicted with all other ongoing actions, resourced properly (e.g., logistics), and effectively communicated to operational units. Widespread networking fosters faster and often better command and control. It permits operational planning to be conducted more effectively and the results distributed farther in less time. It permits greater synchronization of forces in action, and improved coordination in the face of fleeting opportunity or unexpected danger. Forces out of sight from each other can maneuver more efficiently. Augmenting voice communications with video, imagery, and databases, notably maps, fosters an integration of effort that hitherto required face-to-face contact.

Enhanced speed counts. Take the challenges of hunting for SCUD launchers, picking out a missile-bearing speedboat in a crowded harbor, or conducting urban warfare. All three depend on the ability to sense a rapidly emerging threat, determine its characteristics, and respond effectively—within minutes. To the extent that the WMD threat requires friendly forces to be physically dispersed, coherence is reduced. Networking can integrate them and overcome the effects of dispersion.

A System of Systems also helps with ancillary functions: keeping track of logistics, coordinating repair cycles, conducting what-if exercises, modeling the battlespace and simulating alternative operational concepts on it, distributing training materials, and gathering the operational experience of everyone (e.g., after-action reports) to build a knowledge base for all.

Today, networking is an advantage. Tomorrow, it may be a necessity. Most of the basic information technologies behind the RMA arise in the commercial world. They may therefore be purchased by anyone with the means to pay—and prices are declining. Even a Third World military can be greatly improved by acquiring and integrating laptop computers, cellular telephones, digital videocameras, wireless microphones, pocket radars and laser rangefinders, GPS receivers, turnkey air traffic control systems, and services from space. Those who can absorb such technologies could see *us* better. The RMA can make the battlespace transparent for *everyone,* and thus untenable for the bulky platforms with which 20$^{th}$ century militaries still fight. JSTARS and AWACS, for instance, are aircraft without peer as sensors; but neither is particularly stealthy, and, to function, both must emit copious quantities of energy, making them quite visible. Survival favors having many small things over a few large ones, but making the many work as well as the few requires they be networked.

The United States is networking its forces and sensors today. Should it one day need to disaggregate C$^4$ISR platforms into networks of small and inexpensive sensors, and its strike forces into networks of small elite units, this transition, though difficult, will be possible. If Europeans have not caught up, they may not make the transition at all. U.S. and European forces will be distinguished not simply by efficiency, but by the very ability to function in such an environment.

Created by the conjunction of sensors, networks, databases, and weapons lies what may be called the Grid: the virtual information system that ties these systems together, and makes them collectively accessible to operators. The Grid would be the means by which devices and databases could be accessed, and upon which services and applications reside. As users of the Internet and the World Wide Web intuitively understand, virtual entities are very real.

Being "on the Grid" continuously and effortlessly should become second nature for U.S. forces of tomorrow. By so doing, warfighters share a real-time map of the battlefield, annotate this map for others, find out where parts are in

their repair cycle, participate in a simulation or exercise, assess the state of the network (and perhaps defend it from attack), diagnose remote equipment, and call for fire support from remote weapons.

The distinction between the Grid and the System of Systems is of great importance for the prospects of the NATO RMA. For Europeans to create their own system of systems of comparable capability, they would need to invest in component systems—platforms, weapons, and sensors—to the same degree and of the same kind as the United States does. For the Europeans, however, to join the System of Systems, and therefore be on the Grid, would be easier, requiring only acquisition of compatible hardware and software. Indeed, exploiting the RMA as an alliance makes being on the Grid essential. Otherwise, in military operations in which U.S. forces are on the Grid, and European forces are less (or not at) all connected, the latter's contribution may be not only wasted, but counterproductive—*even if they have RMA-type forces, doctrine, and training.* In other words, investments by the allies in better forces would be in vain, from an alliance standpoint, if U.S. forces are on the Grid and allied forces are not.

The consequences of disjunction can be illustrated by a hypothetical vignette. Assume U.S. forces, using the Grid (with its sensor fusion, automatic target recognition, and template matching capabilities), have spotted and confirmed enemy armored vehicles moving out from cover. Such vehicles may not linger exposed forever, but a few minutes should be long enough to strike them with ground-based standoff weapons. On their own, U.S. forces could launch such strikes, but European forces are working the area. Therein lies a dilemma. U.S. forces are uncertain where Europeans are working (e.g., because they do not report their locations automatically). Indeed, enemy forces may have moved precisely because European actions had flushed them out. Launching a standoff strike without checking may frustrate an ally's plans (which, having been made up on the spot, were not reliably and rapidly linked to U.S. operational plans). U.S. and European forces may not even be fielding compatible IFF (identify-friend-or-foe) systems. U.S. forces may want to send the location, bearing, and signatures of the adversary vehicles to the Europeans so that they can target enemy armor precisely. But poor network interfaces, limited bandwidth on the receiving end, and translation difficulties between U.S. and allied systems would cause delays. Allied forces might also want to drill down into the surface data to understand the rationale and thus validity of this intelligence, but there is no way to pose a query from one national intelligence system to another. Prudence dictates that U.S. forces hold off striking what they can easily see, and opportunities are continuously lost.[15]

[15] Dividing the conflict area into zones for U.S. forces and zones for forces off the Grid would obviate the cross-fire problem—assuming actions took place within and not across zones. In the latter case, opportunities would be worse than lost, they would have been conceded beforehand.

Those on the Grid have a better opportunity to see fleeting opportunities in near real-time, pass critical information throughout the ranks, get instant battle damage assessment on strikes and other operations, and feed new conditions into ongoing plans. This information will enable the U.S. military to take the initiative, conduct operations, assess their effects, and generate new options faster than the other side can react. The Grid also gives U.S. forces the ability to act at places of their own choosing. With a growing ability to project sensors across the breadth and depth of the battlefield—from space, unmanned aerial vehicles, or scattered on the ground—coupled with weapons that can exploit this information, the U.S. military is able to strike deep into hostile territory.

In sum, if U.S. and allied forces are to fight together effectively, a NATO Grid, and nothing less, is imperative. Even if the United States alone contributes certain assets—space surveillance, long-range UAVs, direct broadcast satellite connections—to the Grid, they would be operated on behalf of all. Put another way, if the Europeans are to adopt the U.S. emphasis on rapid operations and deep strike, they need to have access to information and networking capabilities that enable such operations to take place.

## Current Issues

Unfortunately, getting the allies on the Grid will not be as easy as, say, giving them an Internet account or the address of a Web site. Under military conditions, establishing networks is not trivial, addressing security concerns is vexing, and common command-and-control arrangements and practices to support RMA operations must be worked out. Moreover, many differences exist between the receipt of data and the generation of operationally useful knowledge. Because the U.S. Grid is "under construction," the salience of these issues is not yet apparent. Yet, their emergence can be perceived and their importance extrapolated by looking at a few current issues: (1) Bosnian operations which suggest problems in forging compatible $C^4$ISR links between U.S. and European forces. (2) Theater missile defense (TMD), a potential show-stopper in the Persian Gulf, and, soon, the Mediterranean. (3) The conduct of U.S. experiments which may lead to policy decisions that will shape the Grid for years to come.

***NATO in Bosnia.*** In late 1995, IFOR (Implementation Force), a multinational coalition under NATO command, deployed several divisions to Bosnia to implement the Dayton peace accords. For the purposes of ground command and control, Bosnia was divided into three sectors: one for the United States, one for Britain, and one for France. Each, in turn, commanded forces from many nations, but mainly NATO allies and "partners" (e.g., Ukraine and Russia).

Bosnian operations have been generally successful, and a $C^4$ISR infrastructure was able to support them adequately, but not without a good deal

of jury-rigging to link incompatible systems.[16] Establishing interoperable communications required NATO to build a system from scratch out of heterogeneous elements in a region they had not planned for, and in terrain that complicated line-of-sight communications. Nevertheless, $C^4$ISR was established despite the shortage of key connectors, shortfalls in satellite capacity, the remoteness of supply centers, wide variations in component systems, and constant entreaties to field untested concepts.

The result was a patchwork. Numerous overlapping communications systems were needed because voice, video-teleconferencing, data, and commercial Internet traffic ran over different systems. These overlapping systems also were needed because of differences in the security classification of material (NATO had a great shortage of certified communications security [COMSEC] equipment) and because high-bandwidth satellite systems do not necessarily mix well with low-bandwidth tactical systems. Early in the existence of IFOR, upwards of 20 percent of all voice calls did not go through. Even later on, users had to carry complex dialing plans on 3x5 cards. Things would have been worse had NATO not started working six months earlier on specific communications interface guidelines for Bosnia. The standard NATO interface for analog voice networks is slow, inefficient, and lacks some functions. But it exists, which cannot be said for digital telephone networks, much less data networks, which are far more crucial to RMA operations than to peacekeeping. NATO, at least, had settled on a common software suite, Microsoft Office (divergent software plagued the 1993 Somalia operation).

The severe intelligence mismatch that might have been expected between U.S. high-technology systems and the less-capable systems in European hands was less evident in Bosnia. The former were developed for conventional high-intensity war and had to be heavily adapted to fit operating conditions that put a premium on hand-crafted databases to record day-to-day activities. Signals intelligence and overhead surveillance from UAVs helped build the overall picture,[17] but the foundation for understanding Bosnia was human intelligence. Here, the British experience in dealing with Northern Ireland proved useful in prescribing collection methods for Bosnia. Indeed, Europeans often grasped the nuances of the Balkans more readily than did the Americans.

A roughly common IFOR intelligence picture came into focus even though contributing nations differed sharply in their practice. Americans were generous in sharing what they knew in order to build common situational awareness, while the British employed strict need-to-know criteria. One NATO command-and-control system (CRONOS) was brought into theater, and another

[16] See Larry Wentz, ed., *Lessons from Bosnia: The IFOR Experience* (Washington D.C.: Department of Defense Command and Control Research Program and National Defense University Press, 1998).

[17] French peacekeeping forces in Bosnia, for instance, used real-time airborne video surveillance to monitor Mostar's polling places, which put them in a position to concentrate their forces against potential disturbances without needing to patrol polls directly. See the Defense Science Board, *Improved Application of Intelligence to the Battlefield* (Washington, D.C.: Office of the Secretary of Defense, 24 February 1997), 46.

(LOCE) was used to disseminate intelligence; but there was no electronic interface to equivalent British systems or U.S. national and strategic and tactical data networks (hand-carried information was the substitute). The NATO above-secret message network, TARE, had a node in IFOR headquarters, but was extended no further into Bosnia.

The common air picture, which necessarily included commercial aviation, is where integration made the greatest strides in Bosnia. NATO had a common air operations center to administer the reconnaissance assets of the 16th Air Force, whose vice commander, in turn, ran the center. Even so, barriers prevented the common air picture from being fed into the common operation picture (COP) hosted on the U.S. Global Command and Control System.

The ability of U.S., British, and French forces to work together in Bosnia, under the IFOR structure, but using NATO and national assets, suggests that a NATO Grid is feasible. Success in Bosnia would have supplied better proof, however, if the situation had been more stressful. The jerry-built system never was tested in battle conditions, and it might not have withstood the stress from bursts of communications loads if combat had erupted. Peace forces faced fewer urgent response requirements than if they had been fighting high-intensity engagements at blistering speeds. Bosnia was neatly divided into three segments, and there were few requirements for combined military operations—none where smooth interoperations might decide between victory and defeat. The air picture was relatively benign, i.e., lacking air or missile attacks on NATO forces. Conversely, the security problems in Bosnia that arose from having to share intelligence with less-than-firm allies (e.g., Russians, Moroccans) may not necessarily be a feature of high-intensity combat.

U.S. planners speak of tomorrow's Grid as being able to illuminate a battlefield the size of Ohio, pick out and track every military target of relevance in real-time, and give all units and commanders whatever information they need. No such U.S. system exists today; certainly not in Bosnia. According to doctrine, NATO commanders in peacetime must rely largely on member states for their needs. In Bosnia, this was good enough; for combat, against a determined and sufficiently equipped foe, perhaps armed with WMD, it is clearly not.

***Theater Missile Defense (TMD).*** The United States is spending several billion dollars a year devising protection against hostile missiles. Because the Europeans spend much less, this is an area where differences in viewpoints widen the transatlantic gap. In time, given the increased salience of the WMD threat from rogue states, one would expect European and American views to converge.

Even if TMD investment were comparable, defending forces and populations against theater missiles soon may require the United States and European nations to meld at least part of their real-time intelligence systems soon.

A viable TMD system that covers the European allies must be part of an integrated NATO TMD system, which, in turn, would have to be on the NATO Grid.

The need for coordination comes from the complexities of missile defense. The current U.S. concept envisions four tiers: (1) direct attacks on missile sites, (2) airborne lasers to knock out missiles as they enter the stratosphere, (3) upper tier missiles for long-range engagement, and (4) lower tier missiles for close engagements. If the first three worked, a U.S. TMD system could defend allies over a wide area. But the first three do not suffice today—despite operations against SCUD sites, none was validated as destroyed by air attacks in the Gulf War; the airborne laser is untested; and the Army's system (THAAD) has failed field tests. Thus, short-range interceptors are still needed, and U.S. short-range systems would not be likely to protect European forces (much less European cities). The United States will share with Europeans its anti-missile technology but it is hard to see the United States dedicating part of its own inventory to defend Europeans forces or populations when Europeans could easily acquire their own assets.

So, Europeans must buy their own short-range protection. But they must have information if such systems are to work well. Europeans insist that the United States supply them early-warning data on missile launches. Because this data is so sensitive, progress in sharing has been slow. The new U.S. space-based infrared (SBIR) constellation will generate even more information, data that can help with missile interception. But the challenge does not stop there. Lower-tier defenses alone may not work well, and they should be considered but one layer of a four-layer defense. Engagement systems, in turn, are but one part of a complex antimissile architecture that includes early-warning sensors, peripheral surveillance systems, threat processors, and civil defense (including NBC detectors). At the very least, complex command-and-control and hand-off arrangements will have to be devised. In this case, a NATO Grid is indispensable for combined TMD operations, which, in turn, will be indispensable for alliance military operations, e.g., against WMD-armed rogues.

***Experiments.*** Experimentation with advanced $C^4$ISR systems and RMA doctrine has become an important step in reshaping U.S. forces. Again, the role of the Grid looms large. The Navy is networking its ships through a Cooperative Engagement Capability (CEC). The Army is digitizing itself through its Force XXI program. The Air Force is beginning to develop powerful methodologies for global operations planning. These experiments offer some broad hints as to whether and how the United States will draw allies into the new operational concepts debate.

The Navy's CEC network enables ships in a battle group to combine their radar data to better defend against cruise and ballistic missiles. Cooperation permits ships, acting together, to determine the track of incoming missiles more accurately than any could have done by working alone; it also lets any ship,

regardless of its own radar picture, engage incoming warheads. The CEC was initially considered such advanced technology that it could not be shared with allies. But this meant that the contribution of European ships to the defense of any combined naval task force would have been zero if the network were employed only by the United States. Recently, the British Navy was brought into the net, with others presumably to follow.

The Army's Force XXI program aims to digitize ground forces by providing every vehicle with a node on a tactical internet. Thus linked, each vehicle could broadcast its precise location, share a common electronic map of the battlefield, and distribute mission orders and related data. Although the U.S. Army intends to digitize all its divisions no later than 2010, it has yet to begin serious interoperability testing with the U.S. Marines or the Air Force—much less with allies. The Germans, who are investing $10 million a year in the process, are active observers and, to some extent, participants. British forces are following events closely. The French and Americans have been looking at several experiments to determine how their various weapons platforms can transfer data.

Work is underway to develop a set of commonly accepted standards, protocols, and message formats that allies might use to coordinate actions. By and large, however, NATO allies are willing to let the United States take the lead, learn from its successes and failures, and, if worthwhile, invest later. But this strategy runs the risk that, once developed, the details of digitization will be so deeply embedded in the U.S. military that they will be difficult to change to accommodate Europeans. For the United States then to say the Europeans must comply (or stay home) will be hardly ideal from the perspective of combined operations.

These experiments suggest that a difficult trade-off awaits Grid designers. Information systems exist to inform operations, and their design reflects tacit and implicit assumptions about how warfighters do their job. Both the assumptions and their effect on systems design become obvious only when warfighters with a different set of assumptions begin to use such systems. Even if systems design is consciously associated with a particular set of practices, a placeholder can be left to accommodate other, equally valid allied practices. But the later the Europeans are brought into the process, the more deeply etched the details will be and thus the harder to change. And, as anyone working on the Year 2000 problem can attest, details matter.

## Principles for a NATO Grid

A NATO Grid would be to NATO RMA forces what the U.S. Grid is to U.S. RMA forces: the means by which the battlespace is illuminated, forces networked, command-and-control integrated, and ancillary functions (e.g., logistics, training) made more efficient. A NATO Grid should be viewed as a utility that any alliance member could use if it had plug-compatible equipment such as

receivers, workstations, fire-control systems and targeting modules, and, of course, software. Europeans already own digital hardware, and some have the rudiments of their own Grid in place or under construction.

In a NATO Grid, ownership of components—such as sensors, switches, processors, or knowledge-bases—ought to matter less than such features as reliability, performance, accessibility, interoperability, and security. Data from a British UAV electro-optical sensor can be linked through a U.S. network to readings from Dutch microphones so that the bitstreams can be fused with the help of a French-hosted software agent and compared to a German-provided database of marine templates to provide targeting guidance to a topside gun on an Italian frigate. A NATO Grid could include civilian elements (e.g., air-traffic control tracks of European Union countries, NASA-hosted image deconvolution software) and commercial elements (e.g., CNN footage of a harbor area, shipping manifest databases privately maintained for fee). Although coalition partners may believe their own assets first, the Grid can be designed so that technology does not foreclose using assets of others.

The most important issue entailed in building the NATO Grid—especially for the European militaries—is how integrated, thus how interdependent, the Atlantic militaries are willing to be. A NATO Grid constructed by stitching together the U.S. Grid and those of Europeans permits each side a measure of independence. A truly integrated NATO Grid would work far better and be more cost-effective, but it would come with some sacrifice of independence. Since a U.S. Grid is likely to be well underway before a NATO Grid sets sail, the United States is likely to retain great freedom of action. But Europeans have choices to make.

The Germans, for instance, have debated the need to join the French in developing a European surveillance satellite, even though any high-intensity combat is likely to see them operate with backing from U.S. satellites. If satellites become tightly integrated with UAV and ground sensors, and sensors, in turn, are tightly coupled to weapons, then loss of access to U.S. satellites may mean more than simply not getting the pictures they came to expect: other sensor systems and sensor-to-shooter links would be degraded. In practice, European military units will retain whatever sensors, networks, and databases are associated with their current and planned weapons systems. But will those sensors, networks and databases work through the NATO Grid or, instead, will data from an essentially U.S. Grid be but one more source of data that would feed each ally's military information networks? The answer may depend on how fast European nations integrate their own sensors, networks, and databases.

Integration is not the only question facing defense policymakers on both sides of the Atlantic. If European militaries come to rely on a NATO Grid, will they continue to invest in new sensors, networks, and computer programs, or will they increasingly rely on the NATO (mainly U.S.-supplied) capabilities? Conversely, will the United States be willing to provide its allies with local networks

and sensors (or sufficient access to global ones) so that the Grid's coverage is as good for allies as it is for itself? If the United States retains complete freedom to operate without European participation, might the Europeans insist on at least some ability to operate without U.S. help, and thus without U.S. consent?

A great deal hinges on how much allies wish to spend for battlespace information that the United States could otherwise provide for little or no cost.[18] Europeans may understand that the U.S. RMA may not make them worse off directly, but failure to invest in autonomous capabilities may leave them dependent on the U.S. Grid and thus unable to wage intense warfare on their own even with improved forces. Alternatively, Europeans may figure that they will fight alongside the United States in any big and intense conflict, and that they can afford to conduct peace operations or small-scale expeditions (e.g., into Africa) with pre-RMA forces. However, the more Europe adds to a NATO Grid the greater its effective influence on decisions over its architecture and use.

The reverse also is true. The more U.S. and European strategic and operational perspectives are aligned, the more often U.S. and allied forces will operate together and thus the greater value to the United States of being able to share information with Europeans. It therefore makes sense to design the U.S. or European Grid to maximize cooperation with allies, while also ensuring it can function well without them. Similarly, the more Americans and Europeans trust each other's intentions, the more they can count on the other's forces and the more freely they can share information, satisfied that information will not only be used correctly, but protected adequately.

Mutual confidence affects several issues that affect a NATO Grid:

- How a NATO Grid would be built from the U.S. and European Grids that are being developed.
- How the content of the NATO Grid can fit how each partner fights.
- How to ensure every ally fair access to the NATO Grid.
- How to maintain security of the NATO Grid.

These are not merely technical issues. They are affected by the sort of strategic understanding to be sought on tier one and they, in turn, will determine whether the force improvements of tier two produce a stronger military coalition. The Grid can be seen as both network and knowledge base. Ensuring

[18] Information services should be understood as access to data, network services (e.g., language translation), applications, and, if economics permits, data storage and processing facilities. Once established, their marginal costs are minimal, and they can be offered for little or no payment—*if* it is U.S. policy to do so. Communications services (e.g., uplinks to satellites) are likely to be charged for whenever the marginal cost of adding capacity is expensive. Yet, trends in switches and fiber optics suggest that it pays to build the fattest terrestrial pipes possible even if they cannot be filled with traffic anytime soon. The marginal cost of handling low-bandwidth applications such as voice traffic or E-mail is almost zero, and the U.S. military may be able to let the Europeans use the infrastructure for free and never notice the difference.

that the ones and zeros are passed correctly is no trivial challenge, but it is a concrete and measurable task on which progress is being made, thanks, in large part, to international standards both official and *de facto.* Ensuring that bits are *understood* correctly and responded to appropriately is not only technically but operationally challenging. After all, common situational awareness exists not only when people see the same symbols on the screen but also perceive their importance in ways that are either identical or can be bridged by the use of human intelligence. Issues of NATO Grid interoperability cannot be separated from issues of how U.S. and European forces bridge their differing tactical and strategic perceptions. The closer the United States and the allies are in defining the military missions and tasks their forces must be able to perform, the more likely a NATO Grid will work.

***Construction.*** There are at least four alternative ways to build a NATO Grid:

- Have Americans and Europeans each build their own Grid and then link the two.
- Have Americans take the lead in developing an architecture, have the Europeans replicate and adapt this architecture for themselves, and then link the two.
- Have NATO build a Grid around a U.S. backbone: a long-distance network infrastructure, critical sensors (e.g., satellites), central services (e.g., directories), and key applications.
- Have the United States and Europe build a NATO Grid from scratch with a U.S. Grid as one component.

An advantage of having each side build its own system and then merge them is that both sides start negotiating the terms of merger on the same foot. But that process still requires considerable trust, standards, and time, especially if the NATO Grid is to be as seamless as a national Grid. And requiring that systems integration be undertaken twice (i.e., on both sides of the Atlantic) or more often (if each large European nation goes its own way) will waste money.

Having the Europeans copy the U.S. architecture would give Europe an autonomous capability. Such a step would save initial outlays and make ultimate integration easier. The Europeans also would save some time and money required for systems integration. But waiting for the United States may reduce their capability in the interim and give the United States extraordinary leverage when the time comes to give out the integration techniques. Porting these techniques will be hard; there will be nontrivial differences between U.S. and European equipment and doctrine, the adjustments to accommodate them may get in the way of melding, and many of the techniques may be difficult to transfer without hefty and costly assistance from U.S. defense firms.

In the third option, the U.S. Grid would be supplemented by sensors, databanks, processors, and fire-control units owned and operated by the Europeans. European users, in turn, would access the U.S. Grid as U.S. users would. But similar access need not mean identical access. Connectivity does not have to override command arrangements (linking Dutch artillery to a NATO Grid built on a U.S. backbone does not, by itself, mean U.S. commanders can fire Dutch weapons). Nor does connectivity override need-to-know criteria that permit sensitive data to be compartmented. Granting such distinctions, the allies would forego the expense of doing their own systems integration,[19] but they also would lack an autonomous capability for RMA-level operations.

In the fourth option, the United States and the Europeans would share the costs of building a NATO Grid from scratch and thereby become mutually interdependent. This option would waste the least effort and most strongly reinforce the alliance structure. Yet, the Europeans would be paying for capabilities they cannot use. The United States, for instance, may want the Grid to track a target in real time so as to convey updated coordinates to its next generation of long-range missiles, but the Europeans may have no such weapons. The United States must also think of other alliances (e.g., with Japan, Australia) and relationships (e.g., with Israel, Latin America). Designing the U.S. Grid around NATO assets may deny the U.S. a capability for autonomous RMA operations, a capability it needs far more than the Europeans do.

The best choice for the Atlantic alliance would combine a common architecture with some elements of a common backbone and service infrastructure—a hybrid of options two and three. The United States is 5 to 10 years ahead of the Europeans and cannot wait for them to catch up before building its own Grid. Yet, building a U.S. Grid without taking into account the likelihood of ultimate integration would fly in the face of alliance requirements. It could reduce the benefit of European force improvements and transatlantic convergence on global strategy and military requirements.

To make a NATO Grid work, the United States should be explicit about its architectural choices, be willing to share the key integration techniques with the Europeans, create enough flexibility so that the Grid can accommodate a range of doctrines and command arrangements, and use commercial standards[20] to facilitate easy plug-and-play. To be blunt, the United States should be generous in order to pre-empt the Europeans developing a separate architecture. U.S.

[19] Europeans would have to write software to link their systems to a U.S. Grid, just as they would have to do for their own Grid. The more services the U.S. Grid offers to and requires from component systems the more complex such software would be (e.g., compared to what may be a less sophisticated European Grid).

[20] Identifying the right commercial standards is easier said than done. Incompatible commercial standards often compete with each other. Some areas have standards under construction; yet others have none. Today's standards may not be tomorrow's. Because some standards are incomplete, choosing the right implementation dialect matters.

initiative and openness would leave Europeans a choice between sharing the U.S. backbone (and/or associated services) or developing their own architecture at great cost to themselves.

Agreement on *how* the Grid is to be built clears the way for working out features of the Grid that would best help both sides—features such as content, fair access, and security.

***Content.*** Information is useless until put in a form compatible with users' weapons, doctrine, sophistication, expectations, and rules of engagement. If the United States military prefers to use dispersed forces, agile operations, and standoff precision strike to conduct its wars, the information it seeks would logically reflect that preference. Its $C^4$ISR systems will scan large areas of terrain, sift the background to locate a few nuggets of actionable activity, sort them by priority, and send the information to strike units. Those who fight differently need different information. If the NATO Grid cannot support their requirements because it reflects U.S. inputs and designs, its value to allies will be modest, perhaps even negative.

Consider the act of identifying and locking onto a truck equipped with a Bushmaster-class machine gun. Current vehicle tracks are flashed to U.S. forces, which then strike from standoff range. Would these data suffice for allies? If their weapons are precise but lack range, allies would need to fire from close up; they would need to know where other enemy assets lay in order to operate from protected spots. If the allies' weapons are not so reliably precise, then allies would need trustworthy, real-time battle damage assessment for subsequent reengagement (preferably before the enemy shoots back). If allies use ground forces to smoke out adversaries, they would need the Grid to find the best way in and out quickly in order to shoot without being trapped in the chaos of small-arms exchange. By contrast, some forces shoot as soon as they have sufficient evidence that the target is more likely hostile than not, rather than wait for certainty beyond the reasonable shadow of a doubt that U.S. forces may require.

Differences in what information should be provided will depend on how vigorously Europeans pursue other RMA investments and doctrines. The more long-range precision weapons they acquire, the faster they adopt stealth and electronic warfare techniques, and the greater their capacity to deploy assets to distant theaters, the more they will be able to conduct standoff operations. These developments would make Europeans more inclined to use the same information that the United States would be generating for its own use. Nevertheless, the NATO Grid has to take inevitable differences in culture, politics, sensitivities, and weapon inventories into account when putting the right information into a common operational picture. The greater the agreement across the Atlantic on strategic and operational tiers, the simpler will be the process and the more seamless the results.

***Fair Access.*** Similarly, a broad convergence between the United States and Europe on the strategic issues—tier one—will help each side trust a Grid to which each has contributed. But Europeans have to believe that a NATO Grid serves them fairly and is not simply a tool of the United States, a reflection in silicon of how the United States would go to war and would have its allies go to war as well.

What is "fair access?" Allies with a need to know ought to be able to upload and download information and tap into the Grid's knowledge and services on an equal basis. Such a Grid would span NATO without creating class distinctions—i.e., first-class Americans, second-class Europeans. If the Grid fits the needs of all users to a comparable extent, Europeans, no less than Americans, can be equally motivated to invest in and rely on it. The buy-in process also would help Europeans understand better how Americans think at the operational level of war (and vice versa). This, in and of itself, would make it easier to fight as a coalition

Some technological barriers to fair access ought to disappear over the next 10 years. Difficulties that foreigners have in even if reading and writing files in English can be overcome through translation programs. When coupled with voice recognition technology, they can facilitate video-teleconferencing or other collaboration over the Grid. Europeans have complained that they cannot keep up with Americans because they cannot afford the hardware (even if a realignment of Europe's defense priorities, as suggested in the last chapter, would give them more resources for investing in the Grid). Yet, a $1,000 desktop computer (early 1998 prices) can run all software not specifically written for such dedicated boxes as mainframes, supercomputers, and MILSPEC (military specification) hosts. Comparable mobile units are falling below $1,500. Digital mobile telephony is also getting less expensive.

Current field-level bandwidth constraints that favor some users over others can be overcome with sufficient resources. The 9,600 bits per second limitations of the Army's mobile units that constrain the Army's Force XXI architecture will soon pass or be correctly regarded as archaic. Used adroitly, commercial technology should be able to fill the gap. For example, Metricom's microcells can transmit 30 thousand bits per second to cards that slot into laptops, AT&T's cellular technology can get 128,000 bits per second to mousepad-sized antennae, and direct broadcast satellite technology can broadcast a billion bits per second to a receiver just over a foot wide. Elsewhere, bandwidth constraints can be eased by intelligent message processing, large local storage (digital video disks circa 2000 should be able to store 17 gigabytes, enough to hold a compressed full-color image of the former Yugoslavia accurate to a meter), and the substitution of standard symbols for some images. Fiber promises near-infinite capacity to all fixed facilities.

Fair access also entails ensuring that common operational pictures supported by the NATO Grid not reflect a U.S. bias. Even if Europe acquires RMA capabilities, Europeans may not look at combat exactly as Americans

because of lingering differences in culture, equipment, and thus doctrine. Consider information that may be gathered about the safety of a village in a war zone. A possible arms build-up is reported nearby. Should the village be marked safe for planning relief operations? Those with rapid reaction forces may say yes ("our forces will intervene in time"). Those without may say no. Whose judgment goes into the common operational picture (or should both)? If a user wants backup for this judgment, where does (double-clicking on) the village icon lead? Further assume a local leader has closed a dirt runway serving the village. What areas—e.g., air operations, ground missions, and logistics planning—will be affected by this news? The answer will be influenced by how the knowledge bases which build the Grid's common operational picture are linked. If there are changes in the situation, which of them should be highlighted for human attention? The answer will affect how the common operational picture is presented.

***Assuring Security.*** Melding two Grids guarantees security headaches. As a system grows larger, so does the number of entry points—negligent users, unknown ports, prisoners caught with laptops accessing the Grid, or even spies. Information warfare—specifically defending systems against malicious intrusion—presents another complicating factor. Adroit intruders can, in theory, read a system's information, feed a system false or misleading information, command devices attached to a system, or cripple a system's operations. If security officials in the United States and Europe do not trust their counterparts, the firewalls between the two grids may keep work from getting done. If both sides trust the other but pursue divergent security policies, hackers may be able to play off weaknesses in one system against those of another.[21] If anything goes wrong, errors may be hard to trace, and responsibility difficult and contentious to assign.

That either the United States or Europe will be reluctant to extend its resources to the other without trustworthy security assurances is obvious. Fortunately, many categories of information previously considered too sensitive to share have been downgraded to NATO Secret so that allies can use them more routinely. Some content is being distributed more widely, even as sources and methods remain a deeper secret. Other data (e.g., the source of a signal) is distributed, while related data (e.g., the content of an intercepted signal) are closely held.

A NATO Grid needs compatible, commonly administered, and mutually trustworthy security features, such as encryption, authentication, filters, firewalls, reporting mechanisms, and anti-intrusion devices. Agreement on these features is hard enough to reach when allies have similar opinions on who can be

[21] Assume System A is strict about keeping unauthorized users out but gives authorized users great scope to read and write system files and System B is more penetrable by unauthorized users but restricts all users' ability to read and write system files. If the two systems are linked too casually, a hacker can wreak havoc by penetrating System B to appear to be an authorized user, and then use this authority to invoke programs on System A that permit reading from and writing to sensitive system files.

trusted and how much; and, as the differing U.S. and Italian perceptions of how to deal with Somalia's warlords showed, such agreement cannot be taken for granted.

## Creating Openness in a NATO Grid

For the United States to pursue the RMA track without paying attention to alliance needs up front may result in a magnificent U.S. System of Systems that must be laboriously disassembled and reassembled if it is to function for NATO. Or with the costs of conversion so large and deadlines for any given mission so close, the United States might forego the process entirely and thus lack the option of responding jointly with its allies even when common interests are threatened. Conversely, the earlier NATO needs are considered, the more the Europeans can feel that they have a stake in RMA success.

The components of a NATO System of Systems exist, but a fully integrated U.S. Grid, much less a NATO Grid, is in its infancy. The process of creating a NATO Grid will easily take a decade or more. In that time period, some interoperability problems (e.g., from divergent communications hardware, or language differences) may fade on their own. As new capabilities are developed, however, new incompatibilities may arise. Issues arising over system construction, content, access, and security are all potential barriers to free and easy access. All must be handled assiduously.

If the United States is serious about being able to broaden its Grid into something its allies can use, it must consider the ability to broaden the Grid as it weighs issues that will affect the Grid's architecture. It must ensure that the Grid is open, not only technically, but to accommodate allied operational preferences. Designers must be explicit about the key decisions, inform NATO allies of these, solicit their input, and give their opinions appropriate weight. Needless to add, allies will not always get their way. Accommodating their requirements may reduce capabilities, or add time and cost.

The Grid also must meet U.S. requirements in situations where NATO is not involved, and U.S. needs may not always match those of its allies. Nevertheless, a process that explicitly identifies the key design issues and lays out clear alternatives in their resolution at least makes clear what may be lost by building the Grid only to U.S. specifications, and thus makes more obvious what may be gained through sharing perspectives on global strategy, operational capabilities, and tactical doctrine.

Many features that make it easier to extend the Grid to the allies can also make it more robust, flexible, and adaptive:

- The more that commercial information technology equipment, software, and standards—both official and de facto—are used, the fewer the technical difficulties of systems construction and the more

affordably everyone can link in. At a minimum, an open market in information technologies is a must.

- A "plug and play" architecture makes interoperation easier. Also, breaking stove-piped systems into separately accessible sensors, processors, databases, and displays permits their contents to be accessed independently. Malleable systems can support coalitions more easily than hard-wired systems can.
- The lower and more uniformly information is classified, the more broadly it can be accessed. This means that the hard walls of compartments must be replaced by the soft bridges of mutual trust, a move made easier by a common strategic outlook.
- The cheaper and more ubiquitous the sensors attached to the Grid, or the lower in the hierarchy they are controlled, the more evenly the battlespace can be covered and the less that any one member will be discriminated against. The more the United States and Europe rely on being able to illuminate the battlefield with the total suite of sensors, the greater the impetus for convergence will be.
- The more rigorously software is purged of assumptions about warfare that reflect particular national bias, the more easily it can be adapted to the doctrines of all military units and nations. This will enable the United States to fight alongside European forces even as each holds differing views on exactly how to fight.

The need for openness is more than a technocrat's mantra. Even if the United States and Europe succeed in forging a common strategic orientation, and Europeans equip significant forces with RMA equipment employed according to RMA doctrine, as earlier chapters argue, the actual ability of the United States and Europe to go to war together will be vitiated if U.S. forces are on the Grid and European forces are off the Grid or on an incompatible one. Openness, in turn, offers a Grid to which U.S. and European manufacturers could contribute on an equal basis, the cornerstone for a free transatlantic defense market, the subject of the next chapter.

# CHAPTER 5

# Creating a Transatlantic RMA Market—The Fourth Tier

If the European allies are to pursue an RMA—Grid and all—they will need access to leading-edge defense systems and information technology. Since they cannot, for obvious political reasons, simply buy RMA capabilities from U.S. firms, they must strengthen their own. A European attempt to do so through government management and protection could leave their industry weaker, not stronger, and would in any case exacerbate the problem of incompatibility that threatens U.S.-European military cooperation. Instead, the allies and the United States should work toward open trade and investment in defense and information technology, creating a transatlantic RMA market.

## Strategy, Technology, and Markets

The information revolution is the result of intense pulling and pushing by users and creators to match a new device, program, or idea with a *strategic* need to improve performance. This is true in the civilian world, and it will be true in the RMA.

Although computers and digital communications had been around for some time, the dual explosions in the use and performance of information technology after about 1980 suggest the presence of revolutionary conditions. From then on, the information demands of customers—large companies, especially—became crucial for their businesses, and the levels of revenue in the information technology market began to climb steeply. Customers demanded "open," as opposed to proprietary, hardware and software, which further strengthened their hand and intensified competition. Rising revenues permitted expanded R&D; escalating competition demanded it. Smarter customers meant that in the information industry faster "friendlier" applications resulted from that R&D.

So fierce has been the competition among information technology providers that new products and services are now rushed to market in anticipation of demand. In the absence of regulation, especially of data network technologies and services, the market is virtually without impedance between user and provider. Perhaps the strongest proof that the information revolution has been market-driven,

if proof be needed, is the fact that where regulation has been least—namely, in the United States—the revolution has been most rapid and pervasive.

These observations will be obvious to many readers. We offer them to underscore that the RMA will not be exempt from the market-based character of the wider information revolution. This has several major implications for the task of closing the transatlantic gap in military capabilities.

First, the freer the market, the more likely and the quicker it will produce higher performance, lower costs, and innovative technologies, applications, and capabilities. Second, the demands of users with compelling and difficult strategic needs will challenge and extend the industry's leading edge and will define standards, both formal and de facto. Such leading customers will get the best technology the soonest. They will buy from the strongest suppliers, who in turn will become stronger still by serving the most demanding customers. Third, lagging customers can also benefit from the results of the pull-push between leading users and providers, *provided* they have similar requirements, accept standards set by the leaders, and enjoy unhindered access to the same market.

Just like companies determined to take market share or increase earnings growth, nations facing strategic imperatives will demand much of the new technology, as the U.S. military is beginning to do. Suppliers that respond to these demands will gain a competitive advantage over suppliers who do not or have no such customers. Markets subjected to government intervention will produce slow and skewed results, to the disadvantage of customers, whether military or civilian. The nexus of strategic urgency and market freedom can yield unrivaled information technology and military applications, as it has done for civilian users. Understanding and addressing that nexus is central to any attempt to close the trans-atlantic gap.

It is no accident that the transatlantic gap in military capabilities is growing as information technology assumes greater importance in these capabilities. This tends to confirm that the differences between the U.S. and European information technology markets are part of the problem and must be tackled in the overall strategy. Indeed, as the RMA proceeds, this market gap could widen, making it hard to close the capabilities gap even if progress is made on the strategic, operational, and technical tiers.

Freedom in the commercial U.S. information technology market is helping the United States get the RMA off the ground. A powerful revolutionary force is gathering in the U.S. military information technology market, connecting strategic imperatives with technological ingenuity and promising breakthrough capabilities and enhanced performance, like the phenomenon we have witnessed in the civilian sector. Consequently, U.S. military needs are defining technical and operational standards and are being met with the best technology available, thus strengthening U.S. defense systems and information technology suppliers. From

the lab to the production line to the battlefield, the United States is becoming independent of its allies. Some Americans might welcome this; we do not.

This dynamic at the heart of the military information revolution is not evident in Europe. There, military customers are not demanding cutting-edge information technology because they do not have compelling strategic problems—such as those associated with projecting power against dangerous rogue states—for which this technology is essential. Nor could European industry provide the best information technology for military applications, even if it were demanded by European militaries. Selectively, the Europeans have some excellent defense and information technologies;[22] but overall they are lagging and will fall even further behind as U.S. industry responds to the demands of the RMA.

So, just when the United States is becoming strategically independent of its allies, the latter are becoming increasingly dependent on the United States, again, from the battlefield to the production line to the lab. Moreover, the United States is gradually setting operational and technological standards that the European militaries will have no choice but to follow if the transatlantic gap is to be closed—hardly the ideal way to construct a genuine partnership.

Asymmetry in strategy, technology, and markets is thus producing not only lopsided military capabilities within the NATO industrial base considered as a whole, but also a lopsided capacity to produce advanced military capabilities. Although this can yield some U.S. commercial advantages, a unilateral American RMA is bad for the alliance and, ultimately, for the United States, as we have argued from page one. Even as followers, European militaries could benefit from the American market dynamic, but only if they have access to U.S. technology and pose similar military requirements, which in turn depends in part on whether they have similar strategic motivations.

In essence, unless conditions change, the allies will not even be effective followers, let alone partners. The gap will widen, the alliance will atrophy, and the United States will be left with virtually complete responsibility—if indeed it continues to accept that responsibility—to defend common interests from the most dangerous threats. Yet, governments cannot (and should not try to) remedy this by managing the information technology market the way they could the old, industrial-age defense market. So, how can the U.S. and European governments, with the crucial policy goal of improving the operational compatibility of U.S. and allied forces, shape and exploit a revolution that is overwhelmingly market-driven?

The answer, simply put, is to strive toward an open transatlantic military information technology market—*a NATO RMA market.* To the extent that the United States and its allies can define a largely common set of military needs,

[22] As one example, a German software firm, SAP, offers enterprise integration products that address problems similar to those encountered in developing the Grid.

in the context of a largely common strategy, and also create an open market to satisfy these needs, divergence could end and convergence could begin. Opening this market on a transatlantic basis requires an understanding of the market's structure and dynamics.

## The Importance of the Commercial Market

During the Cold War, before information technology assumed a defining role in military power, the idea of transatlantic defense industrial cooperation was, in theory, straightforward. The U.S. and European governments, hoping to strengthen NATO military effectiveness and political cohesion, supplied the will. NATO machinery (e.g., the Conference of National Armaments Directors) provided the way. The arms industry, eager to support government policy, furnished the equipment.

Even then, however, the NATO "two-way street" of transatlantic procurement, co-production, and related programs to enhance interoperability yielded spotty results. Neither the American nor European defense markets were open, and European markets were compartmentalized along national lines. When it came to getting governments actually to buy hardware made by foreign workers, even from allied countries, good intentions often ran aground on the shoals of industrial politics. Because the U.S. military's selection of European-made systems was such a rarity, Europeans grumbled about the transatlantic "one-way street."[23]

When the alignment of political planets happened to permit collaboration, jointly produced systems typically cost more and took longer to build than purely national systems. They often resulted in multiple versions, thus defeating the purpose: improved coalition military effectiveness through standardization. Moreover, transatlantic defense industrial cooperation required heavy government intervention and supervision.

Even as NATO governments were trying to foster such cooperation, their support of and preference for national suppliers perpetuated barriers to cooperation. Thus, as some parts of government were trying to engineer transatlantic defense-industrial collaboration and reciprocal trade, other, often stronger, parts manned the ramparts of protection. This history is instructive even in these very different times, in that it suggests that governments should neither prevent nor try to direct a transatlantic defense market.

We hope to have shown by now that the goal of military operational compatibility remains as important today as it was during the Cold War, albeit for different reasons. But achieving the goal is now even harder. Advanced military systems are chock-full of information technology. Yet *non*military market segments dominate the information technology market. Defense contracts

[23] The ratio of European spending on U.S.-made defense goods to U.S. spending on European-made defense goods during the Cold War was as high as 10:1.

account for a mere 2 percent share of today's purchases of information technology.[24] The demands of large commercial customers—banks, multinational manufacturing companies, service providers—for business data networks define the market's edge. Militaries have come to be widely regarded as somewhat backward customers, unable to utilize standard products and stuck with a glacial acquisition process. To catch up and keep up, their best hope is to use the commercial market, which will require acquisition reform.

Understandably, many major information technology firms (AT&T, IBM, GE, and Unisys, for example) have shed their unexciting, tedious, low-margin military systems businesses. Most firms, including Microsoft, are happy to allow the defense establishment to purchase their commercial products and services, as long as they do not have to modify them or endure the rigors of government procurement and contracting, which is why they often sell through defense systems prime contractors.

Clearly, it will not be enough for government to provide the will and NATO the way, since the industry that produces the dominant technology is generally indifferent, even antipathetic, toward the government in general and unmoved by the particular policy goal of a transatlantic RMA. In other words, even if the challenges posed so far in this book—agreement on strategy, on military operational needs, and on the design of a NATO Grid—are overcome, the market for the key technologies will not obediently respond to the policy wishes of governments, European or American.

Information technology moves in lightning-fast markets. The cost-performance ratio of microelectronic devices improves by a factor of two every couple of years, and new services vie frantically for customers. As noted, it is difficult enough for national defense establishments, with their ponderous procurement processes, to buy the latest, best cost-performance information technology. Multinational—thus, multibureaucracy!—collaborative defense programs will lag far behind the technology frontier.

Governments on both sides of the Atlantic must accept their inherently weak position in the broader information technology market. Any attempt by governments to manipulate that market, however worthy the cause, would be futile and counterproductive. The U.S. Government has come to understand that the U.S. edge in most information technologies can be credited in part to its own absence—deregulation of the telecommunications industry and nonregulation of the computer industry.[25] While some European governments, such as the United Kingdom's, also understand this imperative, most need to reduce, not increase, their intervention in this market.

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[24] Institute for Defense Analyses, *Research Summary* 3, 2 (1996).

[25] This is not to say that the U.S. Government is or should be indifferent if it sees market forces being distorted in the information industry. This, of course, is the concern about Microsoft's alleged monopolistic position and/or practices.

At the same time, the traditional defense systems industry will remain important even as the RMA proceeds, not only in producing *non*-information-technology goods—ships, planes, vehicles, launchers—but in adapting and integrating information technology for military applications. Obviously, governments still have a major role in the defense systems market—as buyers, owners, and protectors in Europe, and as buyer in the United States. The degree of competition and collaboration in the transatlantic defense systems market will also be important in closing the gap and creating a militarily stronger alliance. Wise government policy, not interventionist government policy, toward this industry can improve market conditions in support of an Atlantic RMA, even if governments have little ability to exert a positive influence over the broader information technology market.

How can the divergence between U.S. and European defense information technology be reversed? Is it not a contradiction to ask governments to stay out of the defense and information markets while urging them to pursue more intimate transatlantic cooperation? How can governments share technology over which they have little control? The answers will affect whether and how the American RMA can be expanded into an Atlantic RMA. And the solutions will be found in the strengthening of market forces on a transatlantic basis in both the defense systems and the information technology markets—the creation of an open transatlantic RMA market to support a NATO RMA.

## Improving the Defense Systems Market

While many new military systems, especially the RMA sensors, networks, and the Grid software, consist mostly of information technology, they are packaged—designed, engineered, integrated, marketed, and supported—by traditional defense contractors, or "primes." This is especially the case now that most information technology companies have gotten out of the customized defense systems business. The remaining defense firms specialize in constructing weapons, platforms, sensors, and other complex military systems, which depend increasingly on microelectronics, data networking, and other information technologies. These firms do not, for the most part, invent or manufacture core information technology. Yet they know how to apply it and are important, sophisticated customers of it.

Of course, the primes also know well the defense market—the needs of military customers, the ways of defense procurement, the economics of long-life-cycle, short-production-run, "big-ticket" defense systems. As the information revolution crowds out the mechanical age in military systems, defense contractors will have a narrower but indispensable role: translating the potential of information technology, which they understand, into the RMA, which they also understand.

They are increasingly playing this role in the United States, where information technology is at last being successfully integrated into military capabilities

despite the distance between the Pentagon and the information technology industry. Although U.S. defense primes are not, for the most part, the original source of the RMA technology, they are providing it to the military in applications and systems that are enabling the RMA to proceed.

While U.S. and European defense system contractors are similar in kind, the American ones are fewer, larger, and, generally speaking, technologically fitter than those of Europe. If the governments of the United States and its European allies were determined to close the transatlantic RMA gap, they would obviously need to take account of this disparity in U.S. and European defense industries. But this does not mean that replicating the structure of the U.S. defense systems industry is all the Europeans must do to have strong firms able to harness information technology for their military customers. The strength of market forces, within Europe and across the Atlantic, matters at least as much as the number and size of firms.

Through a series of mergers and acquisitions, the American defense systems industry has coalesced into several dominant entities—Boeing-McDonald-Douglas, Lockheed-Martin, Raytheon-Hughes, and Northrop-Grumman. With the exception of Boeing, which is also the world's leading commercial aircraft maker, these firms depend mainly on military contracts. In turn, the U.S. military establishment depends heavily on these few, large companies to provide most of its advanced platforms and weapon systems.

Because most major European nations have maintained their own favored defense firm or firms, these nations have not enjoyed the economies and benefits of competing in the European market as a whole. Whereas roughly half of the $80 billion in U.S. spending on defense procurement and R&D goes to the top few consolidated defense contractors, each large European nation might have several contractors, all of whom together are supported by less than half of that amount, $38 billion, in total allied procurement and R&D spending. Consequently, factors that depend on scale—basic research, large-scale capital investments, allocated overhead costs, support capabilities, unit production costs—suffer in the European case.

One of the most frequently cited advantages of the highly concentrated U.S. defense industry is that it lowers costs. The overhead costs of European defense firms are higher than those of U.S. firms, and shorter European production runs result in higher unit costs. The Europeans have the worst of both worlds: small high-cost national firms that face little price competition because they are supported and protected by governments. They therefore charge high prices but cannot afford adequate R&D, so their customers often pay premium prices for second-rate products—which they must do because they are political hostages.

The European structural disadvantage is further aggravated by the fact that the U.S. Defense Department emphasizes defense research more than the Europeans do. The U.S. R&D budget is 14 percent of its total defense budget;

the European combined defense R&D budget is barely 6 percent of total defense spending, allocated to many more firms. The RMA gap cannot be closed as long as the Europeans underinvest in technology and also spread that investment too thin.

Europeans increasingly believe they could keep up with the United States in military technology if only their own defense industry were consolidated the way the U.S. defense industry has been since the end of the Cold War. While Europeans view the problem mainly as one of scale, an American diagnosis of the weakness of the European defense firms would stress that they remain under the wing of government in areas such as management control, subsidies, and protection. Such support is meant to shore up European defense industry but instead may be sapping its competitive strength and impairing its agility. No corporation forced by government to maximize employment will be competitive in price, quality, or innovation.

Thus, the reported recent progress among the German, French, and British governments toward consolidating their defense-aerospace industry, by merging several firms with Airbus, could be viewed with skepticism. If the result is a much larger, pan-European, defense systems entity that remains under the control of and beholden to the state, this is not progress. Continued government oversight and support, combined with the absence of market price pressure, could neutralize whatever economies of scale such a move might yield.

For that matter, there is room for debate about whether the United States has discovered the ideal model. Critics have argued that none of the giant U.S. defense corporations face sufficient competition—even from each other—in developing and producing new military systems. Until the proposal to merge Lockheed-Martin with Northrop-Grumman ran into trouble, the U.S. Defense and Justice Departments were satisfied that there would be adequate competition on major modernization requirements; so mergers were approved with selective divestitures. The U.S. Government has lately demonstrated its refusal to become dependent on a single provider of certain key platforms or weapons; dependence would be a concern if consolidation goes too far.

Overall, the consolidation of the U.S. defense industry has been necessary and beneficial, so far. That said, it has yet to be demonstrated, at least to our satisfaction, that having a few huge firms actually produces lower prices. It is hard to overlook the fact that price improvements in defense systems have lagged those in other sectors producing comparable complex systems, such as computers and telecommunications equipment. This is partly a result of the lengthy and expensive government procurement gauntlet that defense firms must run. But there is also some room to question whether price competition can be strong in a market with only a provider or two of each type of system.

The concentrated structure of the U.S. defense industry is not necessarily a crucial advantage, especially as the United States embarks on the RMA.

The size of the primes matters less to the degree that the systems to be integrated are built from commercial information technologies provided by their subcontractors. The most important conditions for success will be competitive pressures on defense systems firms and a reformed defense acquisition process to ensure that the U.S. military benefits from free-market forces.

Since it is not obvious that a highly concentrated structure is critical for the U.S. RMA, it is reasonable to ask why it would be for a European RMA. Nevertheless, Europeans will surely try to consolidate their defense industry in order to be more competitive with U.S. defense industry. Even if this were to improve the efficiency and competitiveness of European industry, it will not close the gap and could widen it if it excludes American participation. The consolidation prescription wrongly views pan-European cooperation as a better course than transatlantic cooperation. This overestimates the importance of scale and underestimates the value of access to American defense systems know-how and information technology.

On balance, a restructured European defense systems industry—a reduced state role, fewer companies, each with access to the entire European defense market cooperating with U.S. firms—would be progress but not a panacea. A more important transatlantic difference is that European military customers are not sufficiently seized with the operational tasks that demand advanced information-based systems—power projection, information dominance, fast maneuver, and precision strike—along the lines suggested earlier. Moreover, restructuring Europe's defense systems industry would not strengthen Europe's information technology industry, a step crucial to the RMA in general and to building and exploiting the Grid in particular.

Yet, as noted, the defense systems industry will play an important, if redefined role as the information revolution now sweeps into the military realm. What form of transatlantic defense industrial cooperation would most help close the gap? In view of the growing importance of microelectronics, software, design, and other "high-tech" content of RMA-era military systems, joint *production* is of less value than joint *development* (presumably followed by joint production). The best way for governments to encourage joint development and production is to remove all barriers and disincentives, allow the firms to structure the collaboration, and not try to supervise it.

If European and American firms are prepared to enter into equity relationships, joint ventures and mergers could yield major benefits not only for the firms but also for the cause of closing the gap—two-way market access, sustained R&D cooperation, and greater commonality in meeting U.S. and European military requirements. Equity relationships have played a key role in spreading the information revolution domestically and internationally; perhaps they can do likewise in spreading the RMA across the Atlantic.

Equity investment can foster both transatlantic defense collaboration and competition, even if some trade barriers remain. Everyone stands to gain from U.S.-European defense systems ventures, particularly if they provide more value-added than simply spreading manufacturing jobs. U.S. firms will have an avenue to enter the European defense market—the world's second largest. European firms will get access to American technology and, through their American partners, to the U.S. military market. European militaries will have more options and, in the end, better capabilities. The United States will have allies with stronger militaries. And the alliance as a whole will have a stronger, broader, technological-industrial base. There are significant obstacles to transatlantic defense equity ventures, including national security restrictions that will not readily be discarded. But the expansion of such cooperation should at least be examined.

An alternative is to press for transatlantic free trade in defense systems, doing away with the many formal and informal market barriers that persist on both sides of the ocean. This would be desirable but politically difficult. The Europeans would worry that their smaller firms would be trampled by the likes of Boeing and Lockheed-Martin. The allies are not keen to increase competition *with each other,* so they are hardly ready to open their market to defense imports from the United States. Moreover, Congress would be very suspicious of any attempt inspired by the Executive Branch and NATO to "buy European" in the name of closing the transatlantic gap. Some U.S. legislators would not even agree with the desirability of closing the gap, believing instead that the RMA gives the United States all the military power it needs without relying on friends. The purchase of high-profile defense systems, over which Congress and parliaments have considerable say, is highly political. The best evidence of this is that the United States, otherwise a quite open market, still has a largely protected military market.

In sum, fostering transatlantic equity investment in high-value-added defense systems could produce the greatest benefit with the least political resistance. Some Europeans will view this as a Trojan Horse, preferring instead to go all-European. Some American may not be keen to see U.S. defense industry share its technology with the Europeans. Europeans and Americans alike will get their backs up over ownership, management control issues, and market rights. But from the vantage point of exchanging know-how, closing the gap in military capabilities, and strengthening the alliance, improving European defense industry *and* opening up the transatlantic defense systems market are needed. Pursuing either one but not the other will fail to strengthen coalition capabilities.

## The Information Technology Industry

As already noted, the firms that make semiconductors, software operating systems, computers, and data networks are increasingly important to military capabilities in general and to the RMA especially, even though most of this technology is not sold by them directly to the defense establishment. So it is

essential that their technology be readily accessible to defense systems contractors, and through them to the military services, on *both* sides of the Atlantic. Otherwise, given the strength of U.S. information technology, merely consolidating European defense industry will yield paltry results, for Europe and the alliance. Yet because the military market is relatively uninteresting to these companies, their attitude about technology sharing, joint development, and other collaboration will not be much affected by government goals, much less military needs.

The information technology market is never more fiercely competitive than when it comes to protecting proprietary innovations. Getting new products to market ahead of competitors can be a matter of corporate life or death. Information technology firms are therefore wary of giving others access to their labs, whatever government might wish. Indeed, they are constantly on guard against espionage. Do not count on U.S. firms to be at all responsive to the desire of governments, including their own, to share their key technology, even via licenses. The U.S. Government itself does not develop or control information technology and it is in no position to make it available to allies. Moreover, the idea that the U.S. military services, defense contractors, or information technology firms should transfer or sell crucial innovations, designs, and techniques to their European counterparts—why share *non*-crucial ones?—would treat symptoms rather than the cause of the gap in defense information technology.

A bolder yet more practical approach, which would not exclude sharing, would be to permit both U.S. and European defense contractors to shop for the finest information technology, without barriers, penalties, or restrictions. Able to incorporate leading-edge technology, whether U.S. or European, Europe's defense companies would be better able to provide their customers with RMA-type capabilities at competitive prices. They would also be better able to compete and to cooperate with U.S. defense firms for business on both sides of the Atlantic. As it is, European defense companies are at a disadvantage not only in regard to their own content, for the reasons explained above, but also in regard to the growing information technology content of the systems that they build.

The story of the U.S. automobile and steel industries in the 1960s and 1970s is instructive. Detroit was a large and effectively captive customer of government-protected American steel manufacturers. While the "Big Three" had many shortcomings vis-a-vis Japanese automobile manufacturers, they were also victimized by the U.S. steel industry's poor price-competitiveness. Hemorrhaging market share to Japanese imports, the U.S. auto industry finally demanded the chance to buy German and Korean steel. The subsequent end of protection for U.S. steel helped restore the competitiveness of the U.S. auto industry vis-a-vis Japan. The big loser, of course, was U.S. steel, which, enfeebled by decades of protection, collapsed when its shield was removed. (Once released from government's shelter, the U.S. steel industry made a comeback, albeit as a smaller, higher-value, specialty industry.)

The European information technology industry is not protected as tenaciously as American steel once was, and it is not the fossil that American steel became. It would not only survive more open competition with the U.S. information technology industry but would eventually benefit from it. The Europeans have demonstrated time and again the ability to produce world-class science and systems. There is no inherent reason why Europe cannot produce information technology on par with the United States under equivalent market conditions. But the European information technology market still has many trade barriers, such as tariffs and "type-acceptance standards," that require foreign firms to modify their products. The telecommunications limb of its family tree consists of state-run or state-supported national monopolies. Europe's computer industry is characterized by comparatively heavy reliance on government support and by small domestic markets.

What the European information technology industry needs most is not more government support but more market pressure. To some extent, this is already occurring due to the European single market, the Uruguay Round GATT agreement, and other trade-opening measures. The inclusion of information technology in U.S.-EU trade-opening negotiations would help produce healthy pressure on the European information technology industry.

Open transatlantic trade in telecommunications and computers, microelectronics, hardware and software, products and services would help close the gap in military capabilities. It would satisfy the need for defense firms in both Europe and the United States to have unhindered access to an Atlantic pool—ocean?—of information technology, thus improving the prospects of an Atlantic RMA. It would also produce broader economic benefits for Europe, helping users of information technology immediately and the industry itself over the long term. Surely, objections to free trade in information technology would be raised in some quarters. Our purpose here is to argue that it would help reverse the strategic-technological divergence between the United States and its allies.

If European information technology firms had to compete head on with Intel, Motorola, Oracle, and other U.S. information technology leaders, they would grow stronger or go under. With full utilization of the products and services of the U.S. information technology industry, European firms would be better equipped to deliver advanced RMA systems to European militaries. They would also be better able to compete and to collaborate with the likes of Lockheed-Martin and Raytheon. In time, the improvement in European information technology would benefit not just Europe but the entire alliance.

The benefit of creating open access to an Atlantic pool of information technology is even more apparent when considering the need for a NATO Grid. If such a Grid is to be built, its military users and defense systems integrators would be helped enormously by having access to the same technology. Because of the prevalence of open systems architecture in hardware and software, the removal of

all transatlantic barriers to trade in information technology would contribute to the plug-compatibility between the United States and Europe, including U.S. and European forces. Technical standards would be reinforced, equipment would have more in common, and joint systems would be easier to develop.

In sum, an open market in information technology can help make possible a NATO Grid, designed to satisfy the common $C^4$ISR needs of U.S. and European coalition forces, and operating according to NATO RMA doctrine. Because the Grid is an instrument to serve convergent military requirements, flowing from a convergent strategic viewpoint, the linkages among strategy, market, and technology that are driving the U.S. RMA can begin to work for the alliance.

# CHAPTER 6

# Conclusions

Having dwelt on the importance of open markets in fostering both transatlantic competition and cooperation, it is worth returning to the issue of what those with public duties can do to help close the gap—for that is where this buck stops. Therefore, this chapter examines the role of national governments, the military services, and NATO by suggesting a set of principles to guide their efforts and by sketching an implementation plan.

## The Role of National Governments

With political support from heads of government, U.S. and European foreign and defense ministries should concentrate on the task of forging a common view of the main dangers to U.S. and European interests, in and beyond Europe, that could require military action. Only those who are politically accountable for national security can do this, for security depends on representing the public interest and on making solemn judgments about when force should be used and when casualties are justified. Governments can contribute far more toward closing the gap with this as their mission than by attempting to supervise defense industrial collaboration or direct technology sharing.

Chapter 2, "The First Tier," suggests a broad view of international security interests to which the United States and most European countries ought to be able to subscribe. The determination of the United States to maintain the ability to project power anywhere its interests might be threatened, while keeping casualties low, is the prime motivator of the RMA. Because Europeans are at last becoming more attentive to threats to their interests outside of Europe—e.g., energy security, WMD, rogues in the Middle East, turmoil in Africa, instability in Asia—their strategies and priorities should begin to dovetail with the global security perspectives of the United States.

To accelerate this process, a patient and purposeful high-level effort is needed to produce a common U.S.-European strategic outlook. As suggested earlier, the "new strategic concept" that NATO is formulating is one opportunity that must not be missed. If the new concept fails to underscore the need, arising

from the globalization of shared interests, for the alliance as a whole to be able to project power, the RMA gap is more likely to widen than to shrink. If the new concept captures the idea that common interests need to be protected jointly, it will give a clear signal to U.S. and allied militaries to get on with the task of defining common military tasks and improving the operational capability and compatibility of forces.

It is also the responsibility of the U.S. and European governments to take occasional political risks and heat in order to advance transatlantic defense industrial and technological collaboration, which necessarily will involve controversial technology sharing and purchases of equipment with foreign content. In the context of declining military procurement, infrastructure, and jobs, governments will find it easier to clear away obstacles to transatlantic equity investments, joint development, and subcontracting than to approve high-profile defense systems imports. The U.S. Government should be prepared, in principle, to license RMA technology for transfer to NATO allies. European governments must be willing to encourage and approve U.S.-European defense systems ventures instead of exclusively European mergers and consortia.

Finally, the United States and the EU should make the information technology sector a high priority in the trade-opening process on which they are embarking. An open Atlantic market for military information technology would be a major contribution to closing the gap. Because of the strength of U.S. information technology firms, resistance is more likely to come from European governments. But the growing importance of information technology in virtually every business sector suggests that Europe can no longer afford less than full competition in this technology, quite apart from the need for a transatlantic RMA.

## The Role of Military Services

As suggested in Chapter 3, "The Second Tier," U.S. and European military planners should work toward an agreed view of the most critical operational military challenges and requirements they face. Insofar as political authorities succeed in forging a shared strategic outlook, the ability of the militaries to play their role will be enhanced. For example, if the U.S. and key European governments could agree that the security of Persian Gulf petroleum supplies is an interest that might warrant combined military action, military staffs will be more apt to agree that acquiring the capability for forcible entry and employment of coalition strike forces against a WMD-armed adversary of the sort found along the Persian Gulf is a high-priority operational goal.

At a minimum, political authorities ought to give their military leaders enough latitude to agree on operational military problems, even if higher agreement on strategic priorities remains elusive and vague. Thus, if American and European military officers could agree on the need to be able to conduct RMA-style maneuver-and-strike operations while minimizing the exposure of coalition

troops to WMD counterattacks, politicians should offer quiet encouragement, even if they cannot explicitly agree that, say, Iran might one day be at the receiving end of such operations. Military officers are generally quite skilled at formulating meaningful operational guidance while under ambiguous strategic direction, provided they are given the freedom to do so.

Taking our example a step further, if U.S. and allied military strategists agree on the need to be able to attack adversary forces and infrastructure in the face of WMD dangers, they would have to consider, together, such options as theater missile defense, standoff operations, and time-urgent strike.[26] Such convergent thinking on key operational requirements would improve the odds that R&D and procurement priorities on both sides of the Atlantic would begin to harmonize. Because the $C^4$ISR and precision-guided munitions needed to meet such requirements are key features of the RMA, regarding them with a common sense of urgency would remedy one of the reasons a transatlantic gap exists, namely, that the United States and its European allies have not been on the same page in the book of military strategy.

Of course, not every ally would set the same *national* procurement needs. Multiple theater missile defenses and $C^4$ISR networks, for example, would at best be wasteful and at worst harmful to compatibility. But all allies would recognize the *coalition's* need to conduct strikes while protecting against WMD counterattacks. If this recognition were backed up by a shared strategic outlook at the political level, as prescribed earlier, the chances would be better still for addressing this particular need as allies instead of separate actors.

Chapter 3 suggests how U.S. and allied forces might fit together into a coalition utilizing RMA doctrine and capabilities. To the extent the Atlantic allies can agree on respective military roles—an essentially political task, for which the military services will require political blessing—the coalition's amalgam of needs for systems and technology would be rationalized, and the prospects for closing the gap would improve. The transatlantic RMA market described in the previous chapter will function far better as U.S. and European military tasks and acquisition requirements converge.

Chapter 4 explains how this process of building an effective coalition is facilitated by developing a combined $C^4$ISR infrastructure—the basis of the Grid—by joining the sensors, networks, and databases of the United States and its allies. The U.S. military should broaden its efforts to permit European military users and European equipment to be on the Grid—or better, to build a NATO Grid. Europeans, for their part, should work with the United States to ensure that the Grid is not only technically interoperable with their own equipment but compatible with how their forces would fight.

[26] The importance of these particular tasks increases if one is determined to shoot down attacking missiles carrying WMD, remove one's own forces from their range, or hit mobile launchers before their missiles can be launched.

## The Role of NATO

The right venue for exchanging U.S. and European military views on operational challenges and coalition solutions is NATO itself. Such work was, after all, the bread and butter of NATO back in the Cold War. Of course, there was little disagreement then, at political or military levels, over the nature of the threat. Differences did exist over exactly how to counter it. In particular, the Germans favored a stalwart "forward defense" and the threat of swift escalation to strategic nuclear strikes, while the Americans favored a more "flexible" defense and the threat to use battlefield nuclear weapons. Yet these differences were ironed out, or papered over, within NATO, so that allied militaries could develop complementary war plans and procurement priorities.

Precise and rigid threat-based planning, Cold-War-style, is no longer useful, whether in NATO or on a national basis: there is too much flux and uncertainty in the international system and in plausible military scenarios.[27] Thus there is all the more reason for NATO military planning, like national planning, to focus on operational challenges that might have to be confronted, wherever and whoever the *threat du jour* might be. While this focus could include problems associated with the defense of allied territory (e.g., Poland), it is more pressing that NATO address problems connected with projecting alliance forces to defend alliance interests outside Europe. If it does not, NATO will remain out of synch with U.S. defense planning; closing the gap will be impossible—and eventually unnecessary, as the United States goes it alone.

Agreement on key military problems associated with power projection could cue the traditional NATO defense planning system. That system, which specifies force goals for every member, in effect has been idling since the disappearance of the Soviet threat. Its revival would have two salutary effects: First, it would hold members accountable to their allies for maintaining adequate defense budgets, which would help stop the skid in European capabilities. Second, it would reinvigorate NATO as a military coalition with the capacity to defend its members' interests—a coalition whose national forces are tailored and prepared to operate together effectively. These effects would be important steps toward an Atlantic RMA.

The CJTF concept that NATO instituted a few years ago, mainly to plan and mount operations other than to defend allied territory, could be useful in presenting NATO authorities and, through them, national governments with shared views on key military tasks and the roles of various allies in accomplishing them. U.S. joint commanders and staffs are clarifying operational needs from a joint perspective within the U.S. planning and programming system. Similarly, the CJTFs can specify the combined and joint capabilities NATO requires and its

[27] See Paul K. Davis, David Gompert, and Richard Kugler, *Adaptiveness in National Defense: The Basis of a New Framework* (Santa Monica, California: The RAND Corporation, 1996)

members should provide. To the degree that the CJTFs apply pressure on governments, via the NATO force planning system, to build and furnish the forces needed to conduct effective coalition operations, this will help close the gap. It is therefore critical that CJTFs not only plan and mount operations, but also have a major role in establishing NATO force needs. The CJTF concept will have to extend beyond providing a theoretical capacity for the Europeans to operate outside NATO integrated command structure but with its support. Future CJTFs will need to include all coalition partners for specific missions, including U.S. forces. Some of them may operate outside the integrated command. The goal is to create a versatile set of military plans and forces to handle the full spectrum of challenges ahead.

At present, CJTFs are intended to plan and mount lesser operations, such as peacekeeping or crisis intervention in and on the perimeter of Europe. This was a sensible place to start. However, if NATO is going to help rebuild a U.S.-European military coalition capable of common defense of common interests, CJTFs should be used for the entire spectrum of operations (other than border defense), including large-scale power projection and high-intensity conflict. The requirements identified and transmitted by CJTF planning can help immensely in guiding an Atlantic RMA.

What NATO authorities, in turn, *do* about the needs identified by CJTFs is also critical. During the Cold War, the force goals set by NATO, while not imposed on the members, had a major influence on national force planning and thus helped give NATO adequate and complementary forces. If NATO leaders could agree that force goals will be taken seriously and members will be held accountable to each other to meet them, a mechanism will exist to connect the new strategic concept, the CJTF needs, and national force plans and instruments. This step would definitely help close the gap.

As always, NATO planning should be augmented by bilateral or multilateral military planning among the United States, France, Germany, and the United Kingdom—the countries with most of the alliance's forces and most of its defense industrial and technological capacity. If they can fashion a shared view of critical military problems and requirements, the rest of NATO will come along, or at least the job will get done by them alone. While it remains as desirable as ever to get as many allies as possible to join in the alliance's new missions, the key is that progress among the four or five largest alliance members should not be held hostage to the consent of all.

## Principles of Collaboration

While governments cannot dictate changes in market behavior to reduce the transatlantic RMA gap, their role in setting common strategy, specifying compatible military needs, and clearing away market barriers is crucial. Their efforts could benefit from a set of principles of collaboration to guide policy and

measure success. If the U.S. and European governments could agree on the following principles, the prospects for reducing the gap could brighten:

1. ***In carrying out the Atlantic RMA, the United States and its European allies should each have significant and comparable responsibilities for defending shared interests and confronting military challenges.*** According to this principle, the European allies would combine with the United States in addressing the full range of the Atlantic coalition's needs, including command and control, mobility, and precision strike. This is the concept of "operational complementarity" suggested in Chapter 3, which calls not for identical U.S. and European forces but similar and compatible ones. Granted, tight defense budgets make it important to avoid unnecessary duplication. But it is unrealistic to ask the Europeans to forego capabilities where the United States is now superior. Conversely, the United States cannot expect to be excused from "muck and bullets" assignments—such as peacekeeping in the Balkans.

This principle would reject three alternative division-of-labor concepts: first, that Europeans would handle European security crises and the United States would respond to non-European contingencies; second, that Europeans would handle low-end tasks (e.g., peacekeeping and support services) while the United States would be responsible for high-end tasks (e.g., deployment, maneuver, and strike); third, that Europeans would provide ground forces (and casualties) while the United States would handle the lift, command and control, and standoff strike (sans casualties). None of these concepts would be politically acceptable, strategically sound, or consistent with the principle that the risks of defending common interests should be fairly spread throughout the alliance.

This principle has implications for the nature of transatlantic defense industrial and technological cooperation. If it is a mistake to separate U.S. and European forces into high-end and low-end missions—or simply to allow inertia to produce, *de facto,* such a separation—it follows that European industry should not be relegated to low-tech work while American industry supplies the RMA. Therefore, this principle requires that efforts be made to bolster the ability of European defense industry, to expand transatlantic industrial cooperation, and to open defense systems and information technology markets.

2. ***The United States and Europe should bear equal responsibility for closing the gap.*** It is fruitless for Americans to suggest that catching up is Europe's problem, and just as fruitless for Europeans to urge the United States to slow down its RMA. Other unhelpful postures are, on the U.S. side, to claim that nothing can be done until the Europeans show the political grit needed to consolidate and emancipate their defense industry, and, on the European side, to suggest that American companies should just hand over to the allies the fruits of their R&D in order to close the gap.

Mutual responsibility means that both the United States and its allies must recognize the need to restore strategic coherence and compatible capabilities to the Atlantic military coalition. That will not happen without initiative and sacrifice on both sides. In particular, the United States must be willing to show confidence in European forces and defense technology, entrusting important military missions to the former and being willing to utilize the latter. The Europeans must be prepared to take more responsibility for the defense of common interests and to open their defense and information technology markets to greater competition. The actions required of each side would be made politically easier by the good-faith actions of the other.

3. ***The goal of the Atlantic RMA should be enhanced coalition military effectiveness.*** Europeans are right to want the strongest possible providers of defense systems. However, more robust European defense firms might or might not contribute to a stronger Atlantic coalition, depending on the degree of transatlantic military, industrial, and technological cooperation. Europeans cannot expect the United States to accept that the purpose of closing the gap is to enable European industry to win more business at the expense of American industry.

If the European militaries are being asked to look more like the U.S. military, a reasonable quid pro quo is that the United States build its Grid so that the Europeans can be on it. The key to the RMA is information technology, and the Grid that underlies it is the glue for tomorrow's warfighting capabilities. U.S. forces that are on the Grid will not be able to fight effectively alongside Europeans off the Grid—even if they are comparably equipped.

To be effective, NATO needs a NATO Grid, not merely a wire to the U.S. Grid. This means that difficult issues over the construction, time-phasing, content of, access to, and security over the Grid must all be worked out with allies in mind—or better yet, with them at the table. At the least, designers of the U.S. Grid must leave enough placeholders for allied participation that accommodate the possibility that allies may not look at war exactly as U.S. forces do.

There is a narrow but stubborn strain of European thinking that defense cooperation with U.S. firms undermines the purposefulness, independence, and cohesion of European efforts to become more competitive. This argument has grown weak, even irrelevant, as American and European companies have benefited from working together in other sectors. But it is still used to claim that cooperation within Europe is a preferred alternative to transatlantic cooperation, and that the latter would weaken, not strengthen, European defense industry. The fallacy of this view, when applied to defense, is that the divergence between the United States and its European allies could continue to grow even if European defense industry were beefed up. Unless the partners on both sides of the Atlantic are working with essentially the same technology,

standards, architectures and, doctrines, they will grow apart. Each might be strong, but their alliance would become weak.

The practical implications of this principle are important. Instead of attempting to strengthen its defense industry by protecting it from American competition, Europe should do so by allowing American participation. Instead of encouraging exclusively intra-European joint development and joint ventures, Europe should welcome transatlantic collaboration. By the same token, the U.S. military should not discriminate against European providers and should encourage transatlantic ventures.

4. ***RMA technology should, in general, be shared with allies.*** The United States cannot expect Europeans to share U.S. strategic perspectives, military tactics, technical standards, and architectures, and even a model of government-industry relations, only to declare its sensitive RMA technologies off-limits. There will be instances when paramount national security concerns warrant exceptions; private industry will only share when and what it makes good business sense to share. But the presumption of government policy should be to trust one's allies with U.S. technology and to foster sharing.

The United States has long provided extremely strategic assistance to the UK and France, as well as other critical technologies to many allies. Today, it is as important for the United States to share sensitive RMA technology with its allies. If the Europeans believe they are being denied U.S. technology, they will either head off on their own or be content to become free riders on U.S. RMA capabilities. The United States has an interest in having allies willing and able to fight shoulder-to-shoulder against common adversaries. If the Europeans show that they are willing to accept the risks of confronting rogue states that possess WMD, the U. S. Government can hardly take the position that sharing RMA technology with those allies is too risky.

5. ***Reliance on free markets is central to the solution.*** It is now accepted that private enterprise, unfettered by government regulation and unaided by government support, has been the locomotive of the information revolution. While government obviously has the responsibility to provide national security and to strengthen the Atlantic alliance, it is on *policy* that government should focus, not on trying to manage markets or cooperative projects. Without suggesting that only the United States has figured out the ideal roles of government and markets, a sound premise for pursuing an Atlantic RMA is that industry should perform whatever functions government cannot perform better. Thus, the types of reforms now being pursued to improve defense procurement in the United States and elsewhere—the Revolution in Business Affairs mentioned earlier—should be applied in the effort to reduce the transatlantic gap.

The sheer impossibility of governments corralling the information technology industry into a NATO RMA initiative means that reliance on and

strengthening of market forces is the only alternative. The reason the United States is able to make good use of its excellent information technology, despite that industry's disinterest in government business, is the high degree of freedom in the information technology market and the wealth such freedom brings.

We are convinced that convergence in the *demand* for RMA technologies combined with free and open *supply* can close the gap. By forging common coalition strategy, U.S. and European governments can foster convergent demand. By ending trade barriers and discrimination, they can create a single market. In sum, an Atlantic RMA requires an Atlantic military strategy and an Atlantic market in defense and information technology.

## Establishing Practical Forms of Collaboration

We therefore suggest several pivotal forms of collaboration from both the top down and the bottom up.

***Top-down.*** Transatlantic government-supported cooperation programs can play a limited, though useful, role in this strategy. Large-scale industrial projects, where major platforms or other systems are produced by multinational teams, have an unhappy history, and there is nothing about today's conditions to suggest that the cost, schedule, technical, and political problems that have plagued them are necessarily things of the past. At the same time, if U.S. and European defense firms decide to form teams to go after systems contracts in the United States and Europe, or common programs sponsored by NATO, governments should offer encouragement and even inducements.

But government should not attempt to direct, structure, or supervise such cooperation. Again, if the U.S. and allied defense ministries and militaries can begin to effect a convergence in strategic and operational perspectives and needs, industry will face greater incentives and fewer obstacles to work together on both sides of the Atlantic. That, in turn, will make transatlantic teaming a natural, even necessary method of doing business. Such teaming, as it becomes increasingly market-driven and organic, will produce more valuable sharing of ideas, designs, practices and other forms of technology than any government-mandated sharing program could hope to achieve. If, as well, barriers to transatlantic government procurement, defense and information technology trade and investment can be removed, market vectors will begin to point toward convergence rather than divergence. Ultimately, the same sort of equity deals that have restructured U.S. defense industry should be possible on a transatlantic basis.

***Bottom-up.*** Just as the information revolution has decentralized work, authority, and initiative, the RMA can and should be a largely bottom-up phenomenon. Within the U.S. defense establishment, a thousand decisions by a thousand actors—R&D program offices, joint and unified command staffs, advanced military education institutions, off-line "cells" of unorthodox thinkers

within the armed services, iconoclasts in the civilian bureaucracy, outside defense intellectuals—will carry out this assault on the status quo. Of course, they need to be sanctioned and, if threatened, protected from the top. Incentives will grow for the services and other institutions seeking a piece of the action—and their share of the budget—to move with the RMA flow.

So it should be with regard to making the RMA an alliance endeavor. Proven forms of combined planning and exercises should be reinvigorated and applied to new missions, thus engendering convergent operational doctrine. Other concrete activities also would help: officer exchanges; professional mixed training; multinational simulations, games, and field experiments; transatlantic research on technical and doctrinal aspects of the RMA; a non-stop dialogue on architectures and standards; and open intellectual competition.

NATO could assist by sponsoring such activities, while resisting the temptation to steer them. At the same time, bilateral contacts can be highly productive. The United States could benefit from intensified military-to-military and technical discussions with the UK, France, and Germany, each of which brings something a bit different to the table.

Such a disorderly, surely slow process might be inadequate if the Atlantic RMA were needed urgently. But this will be a paced revolution, even in the United States. The new international security conditions demand the RMA—especially as WMD proliferate—yet are currently tranquil enough to permit it to proceed from the bottom up, with governments there to remove obstacles and nurture revolutionary spirit and action.

Everything need not be done at once. For now, the priorities ought to be fostering convergent operating doctrine and requirements, high-leverage RMA systems and a NATO Grid architecture. Some of the bigger challenges—e.g., restructuring and recapitalizing U.S. and European forces—can and undoubtedly will come later.

## Reiterating the Basics

The thesis of our argument has been that the United States and its European allies need to "mind the gap" by getting aboard the RMA train and working together on the journey. Unless they do so, the Atlantic Alliance is headed toward serious trouble—in both its internal cohesion and its ability to protect common security interests in the coming years.

We have suggested that they promote a "Transatlantic RMA," to achieve greater transatlantic strategic collaboration and military compatibility. To help achieve this goal, we have put forth a multi-tier strategy to build common motivations, capable forces, integrated information systems, industrial markets, and joint approaches in the form of government planning and the use of commercial forces.

The aim of policy—at least the set of policies advocated here—should be to get the *direction* right. There is no question that the United States and its European allies are drifting apart, from the strategic level down to the technical level. It will take years to close the gap. But what it will take to begin to close it can be done immediately. The challenge is well within the means of the Atlantic partners. The United States has allies of exceptional ability; it should extend an offer of partnership in making the RMA a transatlantic endeavor.

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# *Mind the Gap: Promoting a Transatlantic Revolution in Military Affairs*

Signs posted in the London underground caution riders to "mind the gap" between the train and the platform. Appropriating this injunction, the authors of *Mind the Gap* warn of the growing disparity between the United States and its European partners over the exploitation of the revolution in military affairs (RMA). If this trend goes unchecked, the consequences of this transatlantic rift could undermine NATO.

## From *Mind the Gap*

"In sum, the United States is moving not only at a different velocity but also in a different direction, with different priorities, based on a different philosophy than its allies in modernizing its forces to exploit the new technology."

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"The option . . . is for U.S. and European forces to be able to perform together all the operational tasks required by current U.S. military strategy: power projection, information dominance, decisive maneuver, and precision strike—tasks that drive the U.S. RMA and could also drive a NATO RMA."

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". . . the United States and its European allies are drifting apart, from the strategic level down to the technical level. It will take years to close the gap. But what it will take to begin to close it can be done immediately. The challenge is well within the means of the Atlantic partners. The United States . . . should extend an offer of partnership in making the RMA a transatlantic endeavor."

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