“Can We Afford a Revolution in Military Affairs?”
Cindy Williams and Jennifer M. Lind
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The Department of Defense and a wide array of scholars, analysts, and visionaries outside the military assert that the U.S. military is on the threshold of a revolution in military affairs (RMA). The revolution, sparked by rapid advances in information technologies and information processing capabilities, has the potential to transform the essential elements of the armed forces, favoring them with a decisive advantage in future warfare. Proposals abound for exploiting this revolution to ensure that the United States secures the benefits for its military and denies them to potential adversaries.[1]

Little has been said, however, about the long-term affordability of these proposals. How much will it cost to exploit a revolution? Where will the money come from? Of course, it is impossible to answer either of these questions with any rigor. Specific proposals for exploiting the revolution vary widely, and some of the more futuristic suggestions do not lend themselves to the harsh reality of cost estimation. And future defense budgets are difficult to predict with any accuracy. Yet an examination of just a few of the proposals on the table shows that capitalizing on the so-called revolution could add tens of billions of dollars to annual defense budgets a decade from now. Moreover, despite projections of huge and growing federal budget surpluses, finding the additional money will not be easy.

How Much Will It Cost?

Inside and outside the U.S. military, much of the discussion of a revolution in military affairs centers on the exploitation of information technologies to achieve information superiority on and off the battlefield. The technologies that underlie the so-called revolution are those related to command, control, communications, intelligence (C3I) and information. The prevailing view is that these technologies are cheap compared to the major weapon platforms that they support, and that they will be even cheaper as the military capitalizes increasingly on commercial off-the-shelf systems (COTS).

The truth is that these technologies, taken as a group, are not cheap. The Defense Department currently devotes 20 percent of its budget — up from 15 percent in 1985 — to C3I and information systems. Spending for these areas comes to about $54 billion in the fiscal year 2000 budget that President Clinton submitted to Congress in January 1999.[2] And the migration to COTS is not saving as much money as proponents once hoped. Using COTS lowers the price of individual components and software, but it raises problems of hardware and software integration and replacement cycles for which the government still finds it difficult to plan.

$54 billion a year is a lot of money by anybody's standards. It exceeds the entire defense budget of every country in the world with the exception of the United States and Russia. It is just $10 billion lower than Russia's total budget for defense.[3] At this price, if a revolution has not already occurred and been exploited to the fullest, then somebody ought to ask why not.

To be fair, not all of that money can be attributed to exploiting a revolution in military affairs. A good deal of it supports Cold War legacy programs that RMA supporters would call part of the problem rather than part of the solution. But it does pay for the information superiority that supporters say is the backbone of the revolution.

How much more would the U.S. military need to spend to exploit the revolution that advocates posit? It is not easy to determine an amount, in large part because the changes that people have in mind are far from well defined.

Advocates argue that much of the transformation they seek will come from changes in doctrine, operational concepts, organization, and training rather than through specific technologies or systems. They assert that a good deal of the technology needed is already at hand; exploiting it requires changes in culture and attitude more than additional investment in equipment.

It is difficult to estimate the costs of transforming culture and attitude. The Pentagon's advanced warfighting experiments and advanced concept technology demonstrations are aimed at exploring new operational concepts and changes in doctrine. The Defense Department will spend less than $1.5 billion a year on them through 2005.[4] If these experiments and demonstrations represent the main path to transforming the culture, then transformation is relatively cheap and already covered in the Pentagon's budget plans.

But, despite the lip service paid to cultural and doctrinal change, the transformation that many RMA advocates seek rests on a base of technology and systems. The Pentagon asserts that its current plans already support a transformation of the military by funding information technologies as well as a number of "leap-ahead" enabling technologies. Nothing needs to be added to exploit the RMA.[5] But to outside advocates, the technologies that the Pentagon cites as "leap-ahead" — the Comanche helicopter, the New Attack Submarine, the F-18 E/F and F-22 fighters — are just incremental improvements to Cold War systems. Real exploitation calls for significant additional investment.

Proposals for new systems run the gamut from the familiar to the completely new. Some of the more familiar concepts include precision guided munitions, new mobile vehicles to conduct more integrated C3I operations, and a battle management aircraft that would combine features of the Joint STARS ground tracking plane and the AWACS airborne warning and control system. Other ideas would add weapons to platforms that today are used for communications or sensing rather than as combat vehicles: unmanned aerial vehicles outfitted with conventional weapons, projectile weapons based in space. Still other proposals offer concepts that would be quite new to military arsenals, for example trans-atmospheric vehicles that carry precision guided munitions, combat vehicles that require no fuel or ammunition, directed energy weapons launched from platforms not yet invented, infrasonic weapons, and computer viruses used as weapons.[6]

Estimating the costs of items in the last category is a tricky business. The best cost estimates for a new system are based on a clear understanding of the system's design. They often incorporate comparisons with similar systems that have been purchased or at least attempted in the past. For the more futuristic concepts, the designs and their analogs for comparison are difficult to come by.

Cost estimates for types of systems with which the military already has some design experience are more feasible. For example, one RMA supporter recommends that the military explore technologies for precision weapons, smaller and more mobile computers and communications systems, information warfare, stealth, unmanned vehicles and robots, and space-based systems, including weapons in space.[7] Technologies on this list lend themselves to cost estimation, using analogs like the canceled Brilliant Pebbles program that would have put weapons into space under President Reagan's Strategic Defense Initiative.

The author of that list urges boosting research and development spending by $100 billion over the coming decade to explore the technologies on the list. That $10 billion a year would be a major increase over the $34 billion that the Pentagon currently plans to spend on R&D in the coming decade. It would indeed pay for significant levels of technology exploration. But to assume that none of this exploration will lead to engineering and manufacturing development and then to procurement would be completely disingenuous. And as programs mature beyond the exploration phase, their costs rise. If just one program in each of those areas makes it into engineering and manufacturing development and then production, costs could rise an additional $15 billion a year by 2010. Moreover, operating and support costs for the new systems will be far from free.

In short, it is hard to pin a specific price tag on exploiting a revolution in military affairs. The Pentagon would have us believe that it is virtually free, that is, already included in its planned programs. One recommendation offered by an advocate outside the military calls for $10 billion a year above current Pentagon plans, but focuses on exploratory research and development. Over time, programs that grow out of that exploration could add another $15 billion a year in acquisition and more for operation and support. Thus a conservative estimate for a sustained program of technology exploration and force modernization based on just a few of the new technologies comes to $25 billion a year by the end of the next decade.

Where Will the Money Come From?

The Defense Department's most recent budget comes to $263 billion in fiscal year 1999 and even higher amounts later in the decade. At first blush, it would seem that the Department could pay for any transformation it wants out of that amount of money.

But the truth is that defense dollars do not go as far as they used to. On the acquisition side, weapons costs continue to grow, both from generation to generation and from initial estimates to actuals. The F-22 fighter will cost at least twice as much per airplane as the F-15 that it replaces and 20 percent more than the Air Force currently admits.[8] On the support side, per-troop spending for operation and maintenance has grown in real terms by an average of more than three percent a year over the past 25 years. O&M now eats up more than 37 percent of the Defense Department's budget, compared with 28 percent in the mid-1980s.[9]

The Clinton Administration instituted a major round of procurement reform and several initiatives aimed at bringing the Department's operating and maintenance costs under control. These efforts have failed to achieve the promised savings.[10] New weapons cost increases are on the way, and O&M spending will shoot to 39 percent of the budget for fiscal year 2000. The

upshot is that retaining the current force structure at current levels of readiness, and equipping it as the Defense Department currently plans, will cost as much as $40 billion more each year in the coming decade than we are paying today.[11]

It is possible that Americans will be willing to pay that much. Projections of the U.S. federal budget surplus are huge — $107 billion this year and more than $350 billion by 2009.[12] But that surplus depends on continued favorable conditions in the economy and on adhering to the spending limits spelled out in the 1997 balanced budget agreement — limits that would hold defense spending for several years at about last year's level in real terms.

Also, defense is only one of the claimants for the surplus. Social Security, Medicare, and tax cuts are all potential beneficiaries of the windfall. And with baby boomer retirements starting around 2010, pension and health care programs may dominate priorities for the marginal federal dollar in the coming decade.

If Americans are not willing to boost defense spending significantly, then the gap between plans and money will have to be closed the other way by reducing defense expectations. The main choices for reducing defense plans can be grouped into four categories: reprioritize and reduce existing programs in the areas of C3I and information technologies, constrain other modernization plans, slice military force structure, or cut back on military infrastructure.

The Pentagon has tried for several years to get the owners and acquisition agents of so-called "legacy" command and control systems to migrate to newer systems. The legacy systems, some in operation and some still being acquired, were conceived during the Cold War. Many of them were designed in what the military refers to as a "stove-pipe" fashion to handle a single function within a single military service or command. As a result there are numerous systems, and their functions often overlap. Moreover, some of them are quite cumbersome to use. Since they were designed years ago, the technology that they incorporate is generally not up to date.

Migrating to newer, joint systems would cut the costs of operating and building multiple systems with overlapping functions and could free up some of the money that advocates of transformation would like to see spent on new technologies. But pulling the plug on legacy systems that support critical ongoing functions when the new systems are not ready has not been easy. Until new systems are in-hand and working, the military has little choice but to continue using the old ones.

Some advocates of revolution have suggested that the money to pay for change should be taken from the Pentagon's ongoing modernization programs. They argue that most of these programs are left over from the Cold War and represent yesterday's technology rather than tomorrow's.

The most lucrative single modernization cutback would come from canceling all three of the military's new fighter aircraft programs: the Air Force F-22, the Navy F-18E/F, and the multi-service Joint Strike Fighter. The combined procurement costs of those three programs will be about $12 billion annually over the next two decades. But the fighter airplanes in the force structure today are rapidly reaching the end of their useful service lives. Unless the United States is ready to go without fighter aircraft altogether, canceling the three programs would require

adding new funds to extend the service lives of existing planes or to build new ones using existing production lines. Either choice would eat into the savings achieved through cancellations.[13] As a result, the net annual savings achieved by canceling all three new airplanes might be between $4 billion and $6 billion.

Other expensive modernization targets include the Marine Corps' V-22 transport plane, the Navy's New Attack Submarine, or the Army's Comanche reconnaissance and attack helicopter systems that the Pentagon classes as "leap-ahead" but that were largely conceived during the Cold War. Canceling any of these systems would free up money for new programs, but as with the fighter programs, the savings would be significantly offset by efforts to extend the lives of the systems that they are intended to replace.

Fitting new procurement programs into the defense budget when the Pentagon's purchasing accounts are already squeezed is not easy. The fiscal year 2000 budget for all of the military's weapons purchases comes to $53 billion. In contrast, the procurement bill for the modernization scheme that the Defense Department has already embarked on comes to more than $70 billion a year during the next decade. The Defense Department wants to boost spending for procurement significantly in the coming years. But its hopes for future procurement increases have been dashed time and time again in recent years as it has confronted its must-pay bills for operation and maintenance.

Some proponents of revolution argue that the right combination of air power, precision munitions and information superiority will be so effective by themselves that the United States can significantly reduce its force structure — particularly Army force structure — thereby saving billions of dollars a year. They may be right. But significant sums will not be saved without massive force structure cuts and wholesale reorganization. For example, eliminating three of the Army's ten active-duty divisions would save only $4 billion a year in direct and indirect costs — far short of the $10 billion that one RMA proponent would like to add to R&D just to get things started.[14] Saving more would require significant cutbacks in the so-called institutional Army — the schools and other parts of the Army that would not deploy in wartime. And of course those savings and much more may be needed just to stay within likely defense budgets.

The final alternative for reducing defense plans is to cut back on military infrastructure. Examples that have been examined by the Pentagon or others include closing an additional 50 military bases; closing most of the military's hospitals and providing military families with access to the health insurance program that covers government civilians; eliminating the family housing at military bases in the United States and supplementing the troops' housing allowance to make private-sector rents affordable; or dropping the taxpayer's subsidy to military grocery stores in the U.S.[15] Taken together, these changes might save $5 billion to $6 billion a year. But each of them is extremely unpopular with some sector: communities that might lose the bases or hospitals, advocates for military families and retirees, and to some extent the Congress.

One thing is certain: the Administration's plan for trimming at the edges of military infrastructure by outsourcing routine jobs like handling the military payroll or clipping the grass on military bases has not yielded the promised savings. To save money on military infrastructure other than

through base closures, the Defense Department will have to cut back significantly on services and functions that it is reluctant to part with.

Summary and Conclusion

It appears that transforming the military to capitalize on any revolution in military affairs will be affordable only if American attitudes toward defense spending in the post-Cold War period undergo a sea change, or if the wholesale downsizing of the military and its modernization programs continues through the next decade.

The U.S. military already spends a significant portion of its budget on the technologies and programs that support information superiority. Some advocates of exploiting an RMA would like to add more to explore new technologies. The extra annual acquisition costs incurred if just a few of those technologies lead to procurement programs could exceed $25 billion. Operating costs will add to the budget pressures. Given that the current defense program already faces a potential shortfall in the neighborhood of $40 billion a year, any new RMA-related project will face formidable competition for funds.

Money for new programs could come from adding to the defense budget, reprioritizing within the C3I category or reducing other defense programs. Despite large projected surpluses in the federal budget, freeing up new money for defense will be difficult. Even if additional money is poured into defense, it will likely be consumed just to maintain the status quo and shore up the widening gap between the Defense Department's hopes and its likely budgets. Taking the money from infrastructure or from Cold War C3I programs makes good sense, but has been difficult for the Pentagon to carry out. That leaves tradeoffs against force structure and other modernization programs; a solution that appeals to advocates of change but is frightening to the Services, which are deeply concerned at the prospect of giving up forces or modernization programs in exchange for unproven technologies.

NOTES:

[1] See for example William S. Cohen, Annual Report to the President and the Congress, (Washington, D.C.: Department of Defense, 1999), Chapter 10; William S. Cohen, Report of the Quadrennial Defense Review (Washington, D.C.: Department of Defense, May 1997); Transforming Defense: National Security in the 21st Century (Washington, D.C.: National Defense Panel, December 1997), pp. iii, 28, 37, 40-48; Future Visions for U.S. Defense Policy: Four Alternatives Presented as Presidential Speeches (Washington, D.C.: Council on Foreign Relations, 1998), Speech Two: An Innovative Defense; Andrew F. Krepinevich, "Keeping Pace With the Military-Technological Revolution," Issues in Science and Technology (Summer 1994); Michael G. Vickers, Warfare in 2020: A Primer (Washington, D.C.: Center for Strategic and Budgetary Assessments, 1996).

[2] Intelligence spending estimates are drawn from the Federation of American Scientists World Wide Web site, http://www.fas.org. Fiscal year 2000 spending is assumed to mirror that for 1998, the last year of the Federation's data. C3 and information systems estimates for fiscal year 2000 result from a March 1999 telephone interview with the responsible analyst in the Office of

Secretary of Defense. Historical estimates of spending for C3 and information systems are from Donald C. Latham and John J. Lane, "Management Issues: Planning, Acquisition, and Oversight," in Managing Nuclear Operations (Ashton B. Carter, John D. Steinbruner, and Charles A. Zraket, editors, Washington, D.C.: The Brookings Institution, 1987), pp. 649-655. 1985 figures may slightly understate spending in that year, since they do not include a specific category for "information systems."

[3] International Institute for Strategic Studies, The Military Balance 1998/99 (London: Oxford University Press, October 1998), pp. 295-300.

[4] The Department of Defense's Advanced Concept Technology Demonstrations (Washington, D.C.: Congressional Budget Office, September 1998); Col. Wilt Ham, "Army Digitization Office," briefing, January 1999; May 1998 briefings on advanced warfighting experiments from U.S. Air Force and United States Atlantic Command.

[5] William S. Cohen, Quadrennial Defense Review.

[6] Briefings by James Blackwell and Robert Bunker at the International Conference on the Future of Military Doctrine, 16-18 March 1999, Caesarea, Israel.

[7] Future Visions for U.S. Defense Policy: Four Alternatives Presented as Presidential Speeches, Council on Foreign Relations, pp. 31-32. A similar but more comprehensive list can be constructed from the boxes labeled "The Panel recommends" on pp. 23-42 of Transforming Defense. On p. 59 of that report, the National Defense Panel also recommends inserting an "annual budget wedge" of $5 billion to $10 billion to fund initiatives in intelligence, space, urban warfare, joint experimentation, and information operations. (The panel was mandated by Congress to address the future defense and security needs of the United States and was strongly committed to seizing the benefits of the RMA.)

[8] A Look at Tomorrow's Tactical Air Forces (Washington, D.C.: Congressional Budget Office, 1997), pp. 3, 5.

[9] Paying for Military Readiness and Upkeep: Trends in Operation and Maintenance Spending (Washington, D.C.: Congressional Budget Office, September 1997), P. 5; Historical Tables of the Budget of the United States Government for Fiscal Year 2000 (Washington, D.C.: Government Printing Office, 1999), pp. 50-78.

[10] Although advocates throughout the Cold War promised costs savings from procurement reform, the results have been invariably disappointing. See Thomas McNaugher, "Weapons Procurement: the Futility of Reform," in Michael Mandelbaum, America's Defense (New York: Holmes & Meier, 1989).

[11] "Plans for Defense: Will it all fit? Preliminary Results," Briefing by Congressional Budget Office to Senate Budget Committee Staff, November 1997.

[12] The Economic and Budget Outlook: Fiscal Years 2000-2009 (Washington, D.C.: Congressional Budget Office, January 1999), Table 2-1.

[13] A Look at Tomorrow's Tactical Air Forces, p. 32.

[14] Structuring the Active and Reserve Army for the 21st Century (Washington, D.C.: Congressional Budget Office, December 1997), p. 44.

[15] These and other cost-saving measures have been suggested in annual volumes of Reducing the Deficit: Spending and Revenue Options, Congressional Budget Office. Also see, "Achieving an Innovative Support Structure for 21st Century Military Superiority," Report of the Defense Science Board 1996 Summer Study (November 1996).