NYU Wagner

Robert F. Wagner Graduate School of Public Service

RETHINKING DEFENSE PLANNING

December, 2007

Paul K. Davis
Principal Researcher, The RAND Corporation

Abstract

Defense planning is a form of strategic planning—at its best, one that prepares well for an uncertain world while operating within an economic framework. It aspires to do more than "muddle through," but it should be undertaken with a sense of stewardship and humility rather than naive expectations about the future unfolding as expected. The watchwords should be assuring flexibility, adaptiveness, and robustness (FARness) of the nation's defense capabilities. Accomplishing this while living within a budget that necessitates choice is facilitated by using a portfolio framework using multiple instruments for dealing with multiple objectives, risks, upside opportunities and costs. Taking this perspective over the next few years will be helpful as the United States rethinks national security strategy generally and long-term defense plans more particularly. Difficult choices lie ahead and Congress will have a big role in some of those.

The Legislating for the Future Project is an initiative of New York University's John Brademas Center for the Study of Congress and the Organizational Performance Initiative, and is co-sponsored by the Brookings Institution and the RAND Corporation. The project will examine the capacity of Congress to address long-term problems facing the nation, probe the public's attitudes towards Congress' ability to make long-term decisions for the 21st Century, and analyze specific long-term policy issues. The Legislating for the Future Project will convene experts for discussions of specific long-term issues, such as global warming, and seek to generate strategies to make Congress more flexible and adaptive to future problems. The Advisory Committee for the project is headed by Former Representative Lee H. Hamilton. The project is funded by the John Brademas Center for the Study of Congress, the Smith Richardson Foundation and the Carnegie Corporation. For more information, please visit: www.nyu.edu/wagner/performance and www.nyu.edu/brademas.

Introduction

The principles that should guide defense planning are in some respects mere common sense. As so often happens in real life, however, "common sense" is not always so natural, common, or easy—even at a personal level, and surely not within a complex government organization with multiple stakeholders, an organization answering to both the President and Congress.

To illustrate the disparity, consider that the Department of Defense (DoD) has in recent years embraced capabilities-based planning as a key theme. A definition is[1]

> *Capabilities-based planning is planning, under uncertainty, to provide capabilities suitable for a wide range of modern-day challenges and circumstances while working within an economic framework that necessitates choice.*

Naively, we might ask: "What could be more obvious? What planning would *not* be consistent with this definition." The reality, however, is that obfuscating uncertainty is much easier than taking it into account. Planning for a wide range of challenges is in many respects unnatural. It is difficult when strong-willed individuals believe that the trends are evident and that planning should instead put "first things first." It is difficult when the emphasis is on efficiency or optimization. And it is difficult when budget cutters in the Pentagon or Congress punish any manager unwise enough to admit to the existence of reserve funds. As for making choices within an economic framework, administrations often find it difficult to make and sustain choices when any effort to kill a well-funded program elicits a fierce reaction by Congress stimulated by the program's adherents. And, of course, administrations find the defense budget supplemented with Congressional earmarks, but not necessarily additional funds to pay for these items, which the Department did not want or wished to forego in preference to other items. Such challenging of DoD choices is merely part of the U.S. system and, on any given issue, the two sides typically have good arguments. The point is that choice is not easy.

Despite these problems, defense planning can and should accomplish a good deal. The remainder of the paper suggests some guiding principles, a framework for thinking, and some tough questions to be addressed in the years immediately ahead.

General Features of Modern Strategic Planning

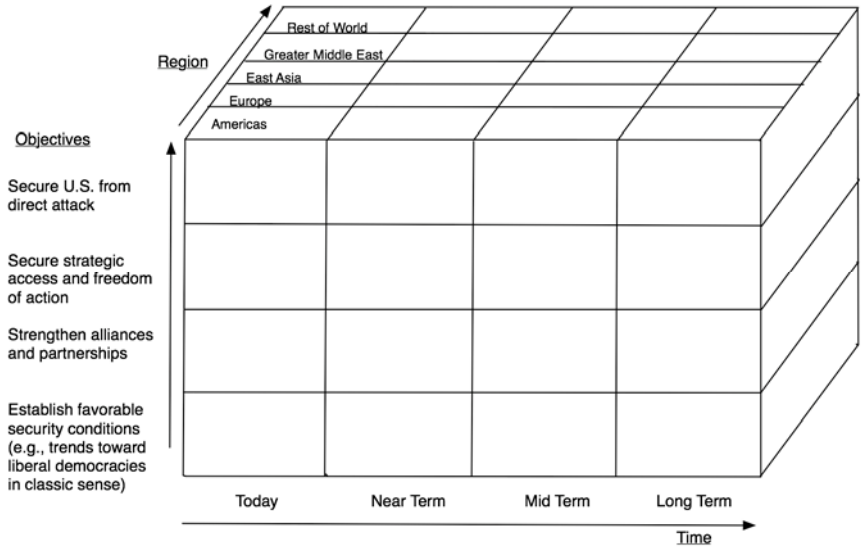
Multiple Objectives

A key problem that makes strategic planning difficult is multiple objectives. If planning were only a matter of maximizing expected utility, then everything would be much simpler. Defense planning, however, must deal

simultaneously with a number of worldwide interests and objectives. Moreover, it must do so not only for the here-and-now, but also for the mid- and long-term futures. Figure 1 is one depiction of the enduring problem space.

Successive administrations seek to put their stamp on the language of national security strategy and defense strategy, only to discover—sometimes belatedly—that aspects of the problem space that they had wished to ignore demand attention. Administrations have varied in the weight they place on *realpolitik* versus realism, on the degree to which they wish to emphasize alliances and partnerships, on their relative interest in the long- and near-term. Events, however, conspire against their choices. There is no escaping the breadth of the problem space.

Figure 1
The Enduring Dimensions of DoD's Problem Space



Considering the magnitude of the problem space, it is worth contemplating what the United States might conceivably think about accomplishing militarily. The U.S. population is less than 5% of the world's. Our Army and Marine Corps are currently tied down with operations in Afghanistan and Iraq, even though the populations of those states add up to less than 1% of the world's population. Perhaps if military challenges were always fought on the U.S.-preferred playing field and with U.S.-preferred rules, technological wizardry could prevail, but it has not taken adversaries long to recognize that other playing fields and rules are preferable. Great humility is appropriate, as distinct from the triumphalism that was so common only 5-10 years ago, on both sides of the political aisle.

Managing Risks and Opportunities Amidst Deep Uncertainty

If dealing with multiple objectives worldwide is one characteristic feature

of U.S. defense planning, another is the need to manage diverse risks. That might be regarded as subordinate to pursuing objectives, but thinking separately about risk-management is often very useful. Taking an even broader view, it is often important to recognize the "upside potential" that often exists in situations, a point too often omitted. *Thus, the idea in planning should be to pursue objectives, mitigate risks, and lay the groundwork for exploiting upside opportunities that might arise.*[2]

This brings us to the uncomfortable reality of ubiquitous uncertainty, often *deep* uncertainty. Anyone can calculate risks when playing a game with known rules and odds, but it is something else again to deal with risks (and potential opportunities) when neither the rules nor the odds are known (the defining characteristic of deep uncertainty). Perhaps the best way to remind ourselves of how uncertainty plays is to consider historical experience. Consider some of the many strategic shocks in international security affairs with which we are all familiar. They include the Korean War, Iraq's invasion of Kuwait, and September 11, but also changes of environment such as occurred with Sadat's trip to Israel in 1977 (a "good" shock), the fall of the Shah (1979), collapse of the Soviet Union and its empire (1985-1991) (another "good" shock) and the recent emergence of new nuclear powers or aspirants. Whether, in retrospect, they *should* have been shocks is another matter, but today's planners are no more prescient than those of earlier eras.

So also, there have been numerous shocks at the level of weapons and military operations. Who anticipated at the turn of the century that the US would shortly be projecting ground forces deep into Afghanistan in 2001 or, a few years later, be increasing ground-force structure markedly and placing a crash order for the heavy MRAP (Mine Resistant, Ambush Protected) vehicles intended to improve ground-force survivability in an extended counter-insurgency campaign? Indeed, many planners had called for reducing the army's size by another 20% and had envisioned a future that would be dominated by air power. After all, air power had shown its strength in both Desert Storm (1991) and the Balkan conflicts later in the 1990s. For the canonical defense-planning scenarios, it would seem that a further shift to airpower would be only logical. As for equipment, the emphasis as of the turn of the century was on rapid decisive operations and other manifestations of what was then discussed as transformation. The idea of buying a new generation of heavy armored vehicles was anathema. As of the turn of the century, advanced military thinking was increasingly focused on exploiting technological advantages and U.S. prowess in large-scale maneuver. The results were dramatic in the combat phase of Operation Iraqi Freedom—as good as the visionaries might have hoped. Unfortunately, the nature of the conflict then changed and U.S. forces and their doctrine were unprepared for what has ensued. They have been adapting over a period of four years, but that has come neither quickly nor easily.

Contradictory lessons can be learned from these examples, especially those involving the war in Iraq. My point here, however, is that the circumstances in which U.S. forces found themselves were not those of best-estimate planners. Nor were the conflicts thought to be optional by those who ordered them.

Defense planning, then, is a challenging exercise. Seen broadly, such challenges are characteristic of strategic planning generally. How does one go about it? There is no single way, but the next section describes an approach developed at RAND that has been used for several recent projects for the Office of the Secretary of Defense, Joint Staff, and Air Force. It is a portfolio-management approach, one that is part of RAND's version of capabilities-based planning—an approach that has evolved over the last fifteen years.[3]

Strategic Planning as Portfolio Management

As a practical matter, portfolio management is using a mix of multiple instruments to pursue multiple objectives, mitigate multiple classes of risk, and look for various upside potentials while working within a budget that may be negotiable but is definitely constrained.[4] There is no single, discrete problem to "solve," much less solve optimally. Also, there are dimensions of risk and upside potential that cannot be easily measured "objectively." Squishiness and the need for judgment are inherent.

An analogy—more conceptual than technical—is with personal investing. An individual may invest in a combination of common stocks, bonds, and real estate in an effort to achieve long-term capital gains while avoiding excessive fluctuations in wealth. Buying a home is seen as prudent not only for reducing after-tax payments, but as a relatively painless way to invest in something with large upside potential. Investors talk about their "portfolio of investments" and the need to "rebalance them" from time to time so that they are investing appropriately for the long run while not overextending themselves.

To recapitulate, the basic concept in strategic planning is investing in diverse ways so as to effectively pursue multiple objectives, mitigate multiple classes of risks, allow for upside potentials, and control costs (both financial and otherwise)—all at the same time. Doing so is to engage in an *integrated* approach to planning.

To reinforce the nontrivial nature of doing so, consider the pressures over the years to focus on more narrow conceptions. During the Cold War, conventional force planning was always subject to obsession with the "Fulda Gap" scenario in which the Soviet forces would pour through the Fulda Gap sector in Germany in which US forces had responsibility. It was no mean feat—by a series of defense secretaries—to broaden the scope of planning to recognize the potential for other kinds of conflict, to plan capabilities

accordingly, and to gain Congressional support. As another example of the tendency toward single-mindedness rather than portfolio-style thinking, consider discussions at the turn of the century, when it was popular to over-focus on convenient war fighting scenarios in which air power could dominate, leading to pressures to reduce U.S. ground forces further. This strand of work also tended to stress the glories of information superiority, which—when it exists—can leverage airpower and reduce the size of ground forces needed for open combat. All of this work was important and invaluable in bringing about needed modernization, but it was guilty of excess, such as the tendency not to think about manpower-intensive battles in which adversaries would use terrain to defeat high-technology reconnaissance and surveillance.

One of the lessons from history is that the tendency to latch onto a single concept of "the" mission and "the" concept of operations for "the" future is terribly strong—afflicting brilliant minds and fine military organizations as well as the mediocre ones.[5]

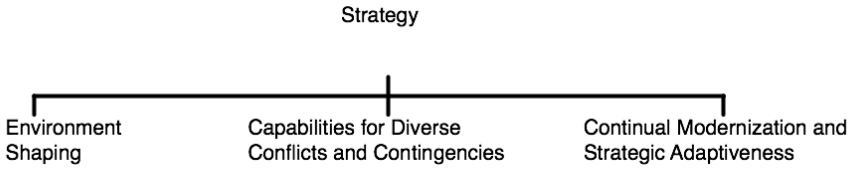
As a last, consider the emphasis placed over the decades by both defense planners and Congress on force-sizing. Should the force structure be sized for 2-1/2 wars, for 1-1/2, for two mid-size wars, or what? And should the wars be assumed to occur simultaneously? This *is* an important question, but it is a serious error to see it as more than one facet of defense strategy.

A Portfolio Analysis Perspective of Higher-Level Defense Planning

Top-Level Objectives

How does one go about defense planning under uncertainty, taking a portfolio-management perspective? There is no single answer because planning must occur at many different levels of the organization, with different emphases at different times. However, it is useful to think of the higher-level categories of objective as (1) environment shaping; (2) military capabilities for dealing with a wide range of conflicts and lesser contingencies; and (3) assuring future modernization and strategic adaptiveness. Similar ideas (i.e., environment shaping) can be found in the thinking of the 1992 Regional Defense Strategy issued by then Secretary of Defense Dick Cheney and a similar structure was used in the Secretary Cohen's strategy of *Shape, Respond, and Prepare Now.* Most recently, Secretary Rumsfeld referred to *Assure, Dissuade, Deter, and Defeat*, which again recognizes the range of functions to be accomplished.[6]

Figure 2
Components of Strategy in One Portfolio Approach



This breakdown does not mention risks or upside potential explicitly, but those are treated within each of the three components.

Environment Shaping

Figure 2 identifies environment shaping as a top-level objective, not merely something to be given lip service in essays. This stature did not exist before 1996. Much of what U.S. military forces actually *do* is about environment shaping—especially in times more normal than today. The ingredients of environment shaping include establishing "general deterrence" in important regions worldwide; developing and nurturing a rich and mutually beneficial network of relationships with other nations; and demonstrating to the world through a myriad of crisis-response actions and disaster-relief actions how the United States contributes to world security.

The value of such activities is not always recognized, in part because of the debates that come and go about whether the United States should do more or less "engaging" with troublesome countries (e.g., a country that supports terrorism or has a nuclear program). Another problem over the decades has been Congressional reluctance to consistently fund exchange programs and education programs involving military officers of foreign countries that are not behaving in desirable ways. When such programs dry up, it has many long-term negative consequences. Those on the scene, the combatant commanders, strongly support such interactions. Moreover, when conducting contingency planning exercises and war gaming, they consider their network of regional relationships (or the absence of such relationships) as *critical* to their ability to operate and project power. Nonetheless, sustained support for such activities has often proved difficult to obtain.

At yet another level, environment shaping is about improving respect and appreciation for the United States and its values. World opinion has shifted against the United States in recent years, but one of the few bright spots has been the positive spike in favorable attitudes in Indonesia and elsewhere that accompanied disaster-relief efforts in the wake of the 2003 Tsunami.

Capabilities for Diverse Conflicts and Contingencies

The most obvious top-level category of objectives in Figure 2 is having the

military capability for U.S. forces to deal effectively with diverse conflicts and lesser contingencies. This is the goal that underlies capabilities-based planning, which recognizes the folly of imagining that we can predict where, with whom, and under what circumstances, U.S. forces will be called into action. Some possibilities are far more likely than others, and we know with near certainty that deterring some conflicts will continue to be important for years, but details are impossible to predict and wild cards constantly appear.

The Department of Defense has come a long way in its planning for diversity. It now has a long list of stressful planning scenarios, approved by senior officials, which are used by all of the military departments in considering what capabilities they need to develop, acquire, or hone. This said, there are ample opportunities for such efforts to go awry. These include never getting around to working the more uncomfortable scenarios, focusing unduly on specific instantiations, avoiding "what ifs," and not addressing planning scenarios disregarded by policy makers (National Research Council, 2005). Such problems arise with operational planning as well as with long-term defense planning. During the Kosovo conflict, the U.S. military perceived a prohibition on doing detailed operational planning for a possible ground invasion if strategic bombing failed to bring about Milosevic's surrender, even though it was very important contingency planning that should certainly have been conducted. More recently, in the many months that preceded the invasion of Iraq, there was insufficient planning for the "Phase Four" (phase of stabilization) that key policymakers insisted would not be an issue, and that held no interest for the military itself.

In defense planning, the omissions that can easily occur relate to future adversaries finding ways to obviate major elements of U.S. strength (e.g., air defenses that defeat stealth, mechanisms by which to attack aircraft carriers, or weapon systems to attack networks and space assets). The Department has no lack of *worriers* (including at places like RAND), who do indeed consider such matters, but how well such worrying is used varies a good deal over time.

Congressional Opportunities

The Congress can play a role in insisting that the cases considered by responsible worriers be given adequate attention and that hedge capabilities be developed. In doing so, it can pay attention to reports by the Office of Net Assessment, the Defense Science Board, and the DoD's think tanks.

Congress can also encourage, rather than discourage, creative thinking about future threats and circumstances. This may seem an ill-timed suggestion given the conflict in Iraq that was significantly motivated by what in retrospect was non-existent threat of weapons of mass destruction, and continuing tensions with Iran in part about a nuclear-weapon program that was apparently terminated in 2003. Still, over the long run, the greater danger is in *not* anticipating future challenges. Our potential adversaries do things with as much

secrecy as possible and are highly familiar with U.S. intelligence systems. There is nothing in recent history to suggest that the United States can count on early detection of developments. Nonetheless, there are long-standing pressures—from Congress particularly—for DoD and the intelligence community to emphasize intelligence on what has been "seen" rather than what may reasonably be predicted to exist, whether or not as yet detected.

What can Congress do to avoid the errors of extremism on both sides: paranoia and the postulating of threats on one end, and failure to anticipate things that can reasonably be predicted but have not yet been seen on the other? My suggestions are as follows:

- Protect and promote contrary-view analysis by high quality individuals and organizations. As a related matter, protect and promote *independent, objective analysis* (i.e., analysis that is not subject to conflicts of interest or a profit motive).
- Require that assessments address both observed and inferred adversary capabilities, but do so separately and rigorously.
- Draw clear distinctions between funding hedge capabilities and taking precipitate and irreversible actions.
- Seek more rather than less sunlight (i.e., open, public debate) in discussion of national security issues.

Continuing Modernization and Strategic Adapativeness

The last component of Figure 2 refers to continuing modernization and strategic adaptiveness. It exists in recognition that the future is not yet written, but will likely be different from recent history: U.S. adversaries will diligently pursue how to gain advantage (or reduce their disadvantages) over the United States; technology will sometimes help them and sometimes hurt them. The international environment will change, as will alliances and associations. The challenge is for the United States to maintain its dominance where that is possible and to adapt as necessary so as to deal with new environments, threats, and tactics. If the United States merely maintains what it has, adversaries will assuredly find ways to defeat or obviate them.

Every analyst has his own particular concerns, but I will mention a few that illustrate the need for dynamism:

- Will the United States be able to project naval forces close to shore in the years ahead, or will its fleets be forced to operate from greater and greater standoff ranges with its tactical aircraft becoming less and less effective?
- Will the United States be able to project ground forces into hostile countries to protect its interests, or will such forces be highly vulnerable as a variety of states and non-state actors acquire modern precision

weapons (e.g., precision mortars), as well as the low-technology devices such as improvised explosive devices that have caused so much trouble in Iraq?

- Will the United States be able to operate its forces effectively amidst major efforts to attack, confuse, or otherwise negate the space systems that are so critical currently to U.S. command and control, precision attack, navigation, surveillance, and defense?
- Will the United States be able to defend the homeland and its interests abroad from missile attack—ballistic-missiles from diverse directions and ranges, and also from attack with lower-technology cruise missiles?
- Will the United States be better able to project forces as far and deep as necessary to confront terrorist threats where they have sanctuary today?
- If the U.S. homeland is struck severely, perhaps even with weapons of mass destruction, will the U.S. be able simultaneously to operate its forces abroad (despite severe dislocations in the homeland and supply chain) and support state and local authorities if they are overwhelmed?

Some Core "Portfolio" Issues for the Next Round of Strategic thinking

If we use the strategy components mentioned earlier as we look forward to the upcoming debates about where U.S. defense strategy should go, I can offer some suggestions about core issues. All should be of interest to Congress.

1. *The General Nature of the U.S. Approach to the Threat of Militant International Islamism*. We should assume that the "long war" will indeed be long and serious. The threat of militant jihadis with intense hatred of the West (and, at some point, perhaps with weapons of mass destruction) will not easily go away. It is unclear, however, whether the appropriate strategy for combating it looks more like proactive direct military involvement in counter insurgency activities; like extensive foreign aid and security assistance and training for local states to use in such efforts; or something even more restrained. A related issue is whether the long war is seen as dominated by local nations and law-enforcement activities, or whether the U.S. military should have a substantial role.
2. *The Nature of the Total Force*. The U.S. "total force structure," which includes active and reserve-component forces, was designed decades ago and has served the nation well. Over the last five years, however, it has proved quite inadequate to the tasks that the military has been asked to do. As a result, reserves have been used very much like active forces and with tours that have been extended, and extended again—causing great difficulties for those involved. Moreover, many force types crucial to the operations have been in exceedingly short supply. Aside from special operations forces, which will always be difficult to field in large number while maintaining desired attributes, there have been

shortages in: military police, public affairs officers, engineers, and trainers. Traditionally, such units have been largely in the reserve component, but they have been needed consistently in recent times. Yet another issue involving the total force is the matter of the all-professional military. Depending on the type of total force sought, this might have to be rethought.[7]

In deciding such matters, strategic considerations will, of course, play a major role. In addition, a major factor should be realistic appraisal of what U.S. core strengths are and are not. My own view is that the United States is poorly suited by its history, values, and institutions for a military approach optimized for occupation and stabilization activities, counter insurgency, and other nation-building. At the same time, it seems illogical to be resisting a restructuring toward a portfolio with more capability in these areas after so many years of experience indicating their need. It can be argued that *some* of the conflicts have been "optional" (most notably Iraq), but others have not.

3. *Preparing for the Next Major-Power Competition*. The other primary issue is what should be done now to posture the United States well for the strategic adaptations that I believe will be necessary 10-20 years from now (not 20-40) as China emerges as a great power, as developments occur as well with Russia and India especially, and as many nations obtain moderately high-tech capability.[8] The items mentioned in the last section all apply here.

Some of the weight for preparing options for future adaptation will fall on the research and development community, including DARPA, but what I envision as necessary will be major changes of structure, not *just* the next generation of technological magic that the United States will also need. Since any such restructuring takes many years, it seems important that that United States be doing more rather than less experimentation with new types of military units and systems—with full recognition that only some of these will "prove out," and that some of the failures will be embarrassing.

My suggestion to Congress is that it should reject single-image solutions and insist on diversity of experimentation, to include prototyping of both equipment and units. Also, it should insist on worked-out contingency plans for accelerated deployments of new systems if the need for them arises. Military strategic adaptation, when the time comes, may need to be rapid and will be impossible without serious preparations.

A final suggestion to Congress follows directly from this concern about the need for continued innovation and experimentation. The current DoD process for development and acquisition of capabilities is severely flawed. Many of its problems are well known, but I would like to end by noting a point on which Congress has some culpability. This is the artificial separation, created as an

interpretation of Goldwater-Nichols legislation, between "requirements" and "acquisition." As discussed elsewhere,[9] what history tells us about the "great" developments is that they have arisen from a dynamic interaction among those concerned about strategy, warfighting, technology, and affordability. Those interactions involved civilians and military officers working together, not at arms length in artificially sequential processes. The Department has recently made suggestions about how to reform the capabilities-development process to reinstitute such integration and dynamism, and to insert a much higher degree of first-rate system engineering and systems analysis at the front end—as a cooperative effort between the Joint Staff and OSD—so that more effort goes into approving or disapproving developments at the concept stage. In my view, this would encourage greater innovation, quality, and fiscal responsibility. I hope that the proposal and its descendants are considered seriously and supported by the Congress.

About the Author

Paul K. Davis is a Principal Researcher at the RAND Corporation and a professor of policy analysis in the Pardee RAND Graduate School. His recent books address defense planning, capabilities-based planning, resource allocation, implications of modern decision science, and strategy for counter terrorism. Originally educated as a chemical physicist (Ph.D., MIT, 1971), he has worked subsequently at the Institute for Defense Analyses, State Department, Office of the Secretary of Defense as a Senior Executive, and RAND. He has served on numerous studies for the National Academy of Sciences and Defense Science Board. Dr. Davis has lectured on defense planning in Western Europe, Taiwan, South Korea, and India.

References

Bonomo, James, Giacomo Gergamo, Dave Frelinger, John Gordon, and Brian Jackson, *Stealing the Sword: Limiting Terrorist Use of Advanced Conventional Weapons*, Santa Monica, Calif.: RAND, 2007.

Cheney, Secretary of Defense Dick, *The Regional Defense Strategy*, DoD, Washington, D.C., 1992.

Cohen, Secretary of Defense William, *Report of the Quadrennial Defense Review*, DoD, 1997.

Davis, Paul K., Michael Egner, and Jonathan Kulick, *Implications of Modern Decision Science for Military Decision Support Systems,* Santa Monica, Calif.: RAND Corporation, 2005.

Davis, Paul K., "Protecting the Great Transition," in Paul K. Davis, *New Challenges in Defense Planning: Rethinking How Much is Enough,* ed., Santa Monica, Calif.:RAND Corporation, 1994a,

Davis, Paul K., *Analytic Architecture for Capabilities-Based Planning, Mission-*

System Analysis, and Transformation, Santa Monica, Calif.: RAND Corporation, 2002a.
Davis, Paul K., "Integrating Transformation Programs," in Hans Binnendijk, *Transforming America's Military,* ed., Washington, D.C.:Center for National Security Policy, National Defense University Press, 2002b, Chapter 7.
Davis, Paul K., "Defense Planning and Risk Management in the Presence of Deep Uncertainty: Lessons From Risk Management & Risk Assessment," in Paul Bracken, Ian Bremmer, and David Gordon, *Managing Strategic Surprise,* eds., Cambridge, 2006,
Davis, Paul K., ed., *New Challenges for Defense Planning: Rethinking How Much is Enough,* RAND Corporation, December, 1994b.
Davis, Paul K., David Gompert, and Richard Kugler, *Adaptiveness in National Defense: The Basis of a New Framework,* Santa Monica, Calif.: RAND Corporation, Issue Paper IP-155, 1996.
Davis, Paul K., and James P. Kahan, *Theory and Methods for Supporting High-Level Decision Making,* Santa Monica, Calif.: RAND Corporation, TR-422-AF, 2007.
Davis, Paul K., Russel D. Shaver, and Justin Beck, *Analytical Methods for Assessing Capability Options,* Santa Monica, Calif.: RAND Corporation, forthcoming.
Defense Science Board, *Strategic Technology Planning, Volume III of 2006 Summer Study on 21st Century Strategic Technology Vectors,* Washington, D.C.: Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, 2007.
Fitzsimmons, Michael, "Whither Capabilities-based Planning," *Joint Forces Quarterly*, Vol. 44, No. 1, 2007.
General Accounting Office, *Best Practices: An Integrated Portfolio Management Approach to Weapon System Investments Could Improve DoD's Acquistion Outcomes,* Washington, D.C.: GAO-07-388, 2007.
Krieg, Kenneth, *Defense Acquisition Transformation: Report to Congress*, Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, DoD, Washington, D.C., 2007
National Research Council, *Naval Analytical Capabilities: Improving Capabilities-Based Planning,* Washington, D.C.: National Academy Press, 2005.
Rumsfeld, Secretary of Defense Donald, *Report of the Quadrennial Defense Review*, DoD, Washington, D.C., 2001, 2006,
Steele, Brett D., *Military Reengineering Between the World Wars,* Santa Monica, Calif.: RAND Corporation, 2005.

End Notes

[1] Although originally my definition (Davis, 2002a), this has also been adopted by many others.
[2] The psychological literature provides considerable insights on this matter (Davis, Egner, and Kulick, 2005; Davis and Kahan, 2007)

[3] See Davis, 1994b; Davis, Gompert, and Kugler, 1996; Davis 2002a; Davis, Shaver, and Beck, forthcoming.

[4] See also a recent report by the GAO (General Accounting Office, 2007).

[5] This has been discussed elsewhere, drawing lessons from the 1920s and 1930s that paint a different than usual picture of who was and was not prescient before WW II (Steele, 2005; Davis, 2002b)

[6] Zalmay Khalilzad, currently Ambassador to the United Nations, was the lead in preparing the Regional Defense Strategy in 1991 (Cheney, 1992). Edward (Ted) Warner was the lead in preparation of the strategy of *Shape, Respond, and Prepare* Now (Cohen, 1997). RAND contributed ideas to both (Davis, 1994a; Davis et al., 1996). The current strategy of *Assure, Dissuade, Deter, Defeat* (Rumsfeld, 2001) reflects another iteration of the enduring themes.

[7] See Bernard Rostker, "Steady Under Fire: All-Volunteer Force Proves Its Resilience, So Far," RAND Review, Fall, 2006.

[8] See discussion of such issues in Bonomo, et al. 2007.

[9] See Davis, Shaver, and Beck (forthcoming) and Defense Science Board (2007).