Managing the US Defense Industrial Base: A Strategic Imperative

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From *Parameters*, Summer 1994, pp. 27-37.

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The United States government is hindered by the uncertainty which pervades nearly every aspect of domestic activity and foreign policy. Unanticipated political, social, and economic phenomena--disorder, globalization of national economies, and various regional attempts to integrate economic and national security policies--suggest the complexity of the environment in which US defense planning is being conducted. It is within this dynamic context that the defense industrial base must be managed to ensure that risks to national security--some old, some new, some merely unfamiliar--are not aggravated by failure to preserve and exploit our competitive advantages in technology and productivity.

It is difficult to isolate and analyze even the predominant factors that affect national security policy and national military strategy. Many of the defining policies, doctrines, judgments, procedures, and organizational relationships which once guided us in such matters have not been validated or reaffirmed since 1992. The division of labor among nations, within the federal government, and between our domestic public and private sectors is confused. We struggle to assign labels or devise enduring structures to deal responsibly with industrial and resource issues derived from dramatically altered threat assessments, military force structure decisions, and the required adjustments in national and military operational and logistical infrastructures. Much-abused paradigms and "New World Orders" emerge and are disavowed or discredited before the ink is dry. Most observers, and certainly many of the participants, accept the conclusion of the 1993 Naval War College Global War Games that "change itself has become the norm." We must seek to understand and manage this process of living with constant change if we intend to preserve our national interests.

We are replacing Cold War assumptions and concepts whose purpose was to ensure a robust and responsive military component of national security strategy. Four topics among the many that confront defense planners in this new environment deserve particular attention. All have in common a search for reasonable assumptions and affordable policies to exploit what is undoubtedly our greatest national strength: a highly competitive and technologically advanced industrial base which can be sustained largely by market forces independent of direct intervention by the federal government. The four topics

are the relationship between mobilization planning and the industrial base; the requirement to develop and assess resource preparedness options; the need to remain aware of how the defense technology industrial base is changing; and the Federal Emergency Management Agency's evolving role in managing US industrial preparedness.

Industrial Preparedness and Mobilization

One cannot consider mobilization without assessing the strategic implications of industrial preparedness. It may be fashionable to disavow the circumstances under which we would mobilize some or all of our production means. Nevertheless, we have to consider such admittedly worst-case circumstances when managing the defense industrial base. Any nation needs a credible mobilization capability to deal with an emergent threat which exceeds the capability of its active military forces and their means of sustainment. Public support for limited US mobilization capability, while reasonably assured, cannot be assumed to include industrial preparedness measures required to mobilize beyond peacetime levels of operation. Herein lies the nemesis of defense planners in and out of uniform and in and out of government: how to retain the organizational structure, human skills, and resource base needed in a crisis to balance requirements, response time, and essential production capacities.

Even those military planners most dependent on the adequacy of industrial preparedness falter when choosing between immediate operational capability and longer-term requirements. All the armed services have been sacrificing investment accounts since 1990 to maintain near-term readiness.[1] In the absence of compelling warning indicators it is easy to rationalize loss of production capability that is perceived to be in excess of immediate needs. Some might conclude that our current emphasis on swift victory seeks to make a virtue of necessity, substituting speed for the reduced ability to sustain the force.

Industrial preparedness requirements--plans for production surges, equipment modifications, and new systems--have not changed substantially since the end of the Cold War. It is still true that peacetime planning and funding will not sustain a significant military engagement or compensate for supply shortfalls during mobilization. If anything, the Bottom-Up Review (BUR) has widened the normal gap between peacetime and crisis readiness requirements. Industry must nevertheless be able to produce and sustain weapon systems that incorporate our technological advantages. Those systems use sophistication, rather than volume, to prepare the battlefield. They minimize infrastructure support requirements and they enable short-term power projection as a policy option. Industrial preparedness response in a crisis will have to be carefully tailored, becoming "smaller," quicker, and more sophisticated, if we are to remain dominant into the 21st century.

The planning, response, and recovery imperatives of this new era require a national industrial preparedness program that has the clear endorsement and full support of the President. We need to support an industrial preparedness planning system which would implement the National Security Strategy and be systematically updated, tested, and evaluated. Most important, an executive-level federal agency must be able to translate White House support, required to meet statutory and presidentially delegated responsibility, into effective programs that develop, maintain, and fund the activities

associated with national industrial preparedness planning. Periodic examination and presentation of industrial preparedness deficiencies would be integral to the agency's mission. That task presently belongs to the Federal Emergency Management Agency (FEMA).

Resource Preparedness Options

Federal agencies and industry, many of the latter having surged production during the Gulf War, have analyzed the lessons from that war to validate current industrial requirements, identify production problems, and define potential new requirements and associated preparedness problems. In support of this work, the Institute for Defense Analyses (IDA) has used the Critical and Strategic Materials Stockpile planning process to design and assess a number of future national security resource preparedness options. Follow-on work, which builds on macro and micro economic analysis procedures used by the Defense Department and civil agencies, demonstrates the need for a systematic industrial assessment methodology, one which incorporates key planning assumptions including the important dimension of time.[2]

The end of the Cold War and the outcome of the BUR have not done away with the requirement to examine the changing nature of potential threats and US capacity to respond to them. The required assessments can be illustrated with two cases that are similar to the two major regional conflicts (MRCs) portrayed in the BUR. The results demonstrate how, given minimal planning assumptions (such as approximations of defense guidance and the Joint Military Net Assessment scenarios), we can anticipate industrial base problems and related constraints that would impede, if not prevent, execution of national security strategy in response to BUR-like scenarios.

The methodology uses existing federal agency models to represent relationships--within specific critical industrial sectors--of prime contractors and their essential sub-tier producers and vendors.[3] The methodology assumes that the time required to identify and evaluate potential industrial bottlenecks and related shortfalls in peacetime is as valuable to policy formulation as the time it will take to produce new end items and components in a crisis. In anticipation of their use in contingencies, the models can and should be run regularly to support research projects and exercises. The models can also be used routinely to explore peacetime resource options, measuring and assessing investment risks.

Within the limits of the assumptions that underlie the models, the illustrative cases identify the 15 US industrial sectors that could not recover from two MRCs without government intervention. The models can estimate the nature of manufacturing shortfalls and the time required to recover from first one and then a second MRC. The models also take into consideration graduated mobilization response options to suggest how each of the 15 problematic industrial sectors might be managed to prevent shortfalls. This capability suggests how we might operate successfully within the fragile confines of the "two MRC" scenario. When coupled with a mobilization planning system, this assessment capability would suggest ways to prioritize policy options. It could also indicate when we ought to temporize during a developing crisis via diplomatic or economic responses.

The research goes beyond examining emergency preparedness options. It could be used to guide the process of apportioning depot maintenance work between public and private sources; to establish capability thresholds for the 1995 Base Closure and Realignment process, and to suggest appropriate divisions of labor with allies and potential coalition partners in any contingency.

The models provide only general indicators of industrial sector difficulties. Nevertheless, they can show us where to look for specific industrial base problems that, if left undiscovered until a crisis, could degrade readiness or constrain military response options. Such information, used with tailored intelligence assessments of the capabilities and limitations of an adversary, could focus on the flexible and sustainable industrial preparedness needed to manage a crisis or to prevail on the battlefield. The models could become essential management tools in political and military command centers, and increasingly in corporate board rooms where key industrial response decisions will be made in future crises.[4]

Evolution Within the Defense Technology Industrial Base

The defense technology industrial base (DTIB) is adjusting, or being adjusted, to compensate for changing defense requirements and significantly altered civilian and government business opportunities. Defense budgets have fallen nearly 40 percent since 1985.[5] This decline has curtailed independent research and development activities as industry adjusted to shorter production runs and short term contracts. It has led to consolidations as prime contractors focus on core competencies, and to erosion of the critical sub-tier of industrial contractors and vendors.

Two groups, with motives not necessarily in harmony, are fully engaged in adjusting the DTIB. Members of Congress and the Administration are attempting to change the business environment, including the culture within which the defense industry must operate, while protecting their constituents. Conversely, individual corporations and defense suppliers, driven by the changed defense market, are facing the dilemma of refocusing on core competencies that may have little, if any, relevance to known or anticipated defense needs.

Diversification has been proposed as a panacea for industries seeking alternatives to defense contracts. While it has become apparent that diversification is generally not a useful option for major defense producers, the experience of the past four years has produced some alternative strategies. These include continued low-level production to preserve a "warm" production base; constructive international interdependence; expanded dual-use and commercial practices and capacity; and "prototyping" to develop advanced weapon systems, keep the technologies current, and defer full production. While each alternative offers some promise, none of them meets all requirements. Preservation of a warm base, while easily the preferred solution, loses its appeal when overhead costs and prohibitively high unit costs must be justified to constituents and shareholders.

Retention of excess capacity, even for national defense purposes, will be a hard sell as the defense industry moves toward marketplace business practices. The *Seawolf* submarine program and subsidies to

shipyards capable of producing aircraft carriers will remain rare exceptions. Consequently, without excess capacity we may not be able to surge in order to sustain two MRCs, let alone recover quickly from their combined effects on stocks of munitions, end items, major subassemblies, and repair parts. Plans based on unexamined assumptions--about the duration of an operation or the sustainability of committed forces--can be confounded by opponents willing to accept protracted engagements to ensure that the United States achieves neither its military nor its diplomatic objectives.

International cooperation under the best of circumstances, such as the carefully nurtured standardized and largely interoperable NATO environment, presents many difficulties. Even at the peak of the Cold War, NATO agreements were profoundly influenced by differing national approaches to defense procurement. Traditions of government intervention or direct support to industry, and national political, social, and economic demands, frequently proved more compelling than national security. Not unlike members of Congress, Western European parliamentarians see most industrial preparedness initiatives and co-production schemes through a different prism than civil and military resource planners. Tangible short-term gains must be readily apparent, while long-term advantages have to be highly leveraged to build and nurture fragile international commitments to defense production.

Dual-use and commercial applications, even with relaxed specification and procurement guidelines, are quickly depleted as one moves up the subcontractor hierarchy to the few prime contractors that serve as system integrators. Military-unique and technology-specific capabilities will continue to be found exclusively within the very small family of prime contractors. The unprecedented commitment of DOD and the Congress to remove acquisition constraints which have prevented some defense contractors from exploiting defense-funded programs in civilian applications is encouraging, as long as expectations remain realistic. Flexible manufacturing and other innovative measures to shorten production cycle time and improve responsiveness could significantly enhance the value of this alternative.

Finally, prototyping, like the others, offers some relief by creating options which preserve unique manpower skills, retain a warm base, and foster continuing product enhancement and technology integration. However, costs associated with prototyping limit applications of this alternative.

The challenge for government and industry alike is to guide the evolution of the defense technology industrial base to exploit the advantages of each of the four alternatives described here. None of the four is entirely satisfactory. Overhead costs, vulnerability to alliances and coalitions when involved with offshore production and procurement, unrealistic assumptions about diversification and dual use concepts--all challenge industry and government to find ways to reduce the burden of defense spending. Nor should we forget that companies are in business to make money; they will not be able to bear a disproportionate share of the costs of any of the alternatives. Perhaps maintaining the essential features of the defense technology industrial base is part of the insurance policy that Americans expect their government to establish for them.

The Role of the Federal Emergency Management Agency

The Federal Emergency Management Agency (FEMA) is completing its reorganization from a traditional, hierarchical vertical structure to a more horizontally oriented, functionally aligned organization emphasizing teaming and program delivery.[6] It remains to be seen how the agency plans to meet its national security emergency preparedness obligations while creating a government mechanism that works better and costs less than its predecessor.

A number of changed circumstances will define the choices available to logisticians, industrialists, and national decisionmakers in responding to crises. Peacekeeping, whether under the UN or with coalition partners, response to domestic or international disasters, crisis management, and other demands on national resources can no longer be considered lesser included requirements of planning for a global Cold War. Focused planning is now required for each of the potential types of operational requirements that the nation faces.

As we depend increasingly on dual-use and commercial elements of the industrial base to meet national security requirements, our view of preferred ways and means to intervene in a crisis may also change. In many instances it will be civil--rather than defense--industrial resources and capabilities that will determine the strategy employed, allowable recovery time, and affordability, political as well as economic.

New emergency management roles and the optimal organization to fulfill them can go well beyond current experiments with functional structures and matrix management to fulfill agency responsibilities. The "agile manufacturing" concepts now evolving in industry offer an inherently more fluid and flexible approach to crisis response and management. The Iacocca Institute at Lehigh University has worked closely for the past three years with American business leaders, many of whom have played essential roles in defense preparedness, to develop a vision of an "agile enterprise." Such an enterprise will compete aggressively on the strength of its employee skill base, a horizontal and flexible management structure that empowers individuals and teams, and flexible content, process, and communications technology that gets the right information to the right person at the right time.[7]

One source defined the concept of agility as follows:

> Agile manufacturers of the future will be characterized by cooperativeness; rapid production of high-quality, customized goods; decentralized decision-making power, and an information infrastructure that links customers, manufacturing, engineering, marketing, purchasing, financing, sales, inventory, and research. Speed in responding to market will be the principal virtue of agile companies, which will produce-to-order rather than stock-and-sell.[8]

To get to the envisioned three-day cycle for automobile manufacturing (from customer order to ready for shipment), agile manufacturing must begin with government acquiescence to its first characteristic: cooperativeness. The "agile" approach is intended to carry over into other product lines and industrial sectors, including those essential to national security.

We should consider how to apply the precepts of "agility" to bureaucratic structures to improve government coordination and responsiveness by drawing upon all available resources in a crisis. The concept emphasizes the key strength of agility, the ability to thrive in an environment of continuous and unanticipated change.

One breakout proposal for applying "agile" manufacturing functions to bureaucracies is through a "virtual organization." Such an entity would exist as a communications forum for managing ongoing, task-focused, customer-oriented temporary emergency response arrangements. Each civil resource agency as well as DOD would participate in the forum. This concept of teaming on resource issues would offer two advantages. First, it would build on the core competencies developed within FEMA and the other civil resource agencies during the Cold War. More important, the virtual organization would be independent of the structural framework and overhead associated with Cold War emergency planning processes and procedures. Many of those cumbersome organizational relationships and check-and-balance procedures were created for worthy bureaucratic purposes which have been long forgotten. The virtual organization concept can thus redefine the major components of national security emergency planning.

To manage national security emergency planning through a virtual organization, participants would concentrate on four functions which, while similar in name to more conventional processes in established bureaucratic structures, would differ significantly from them in concept and execution. The four functions are warning time, mobilization, response, and information management.

Warning Time

It would be one of the tasks of the virtual organization to monitor warning data, synthesizing it into information required to develop policy options in the four categories. The agile principle would maintain an information infrastructure that links customers, research, and all of the related intelligence activities in a forum through which any member of the virtual organization could contribute to policy-development and problem-solving processes. This modified concept of what we mean by warning would lead to defining "actionable warning" times appropriate to each of the four categories.

Mobilization

"Agile mobilization" discounts the value of overt mobilization measures used in the past, whether to signal national resolve, to help manage an emerging crisis, or to enhance the credibility of our deterrent posture. The agile environment suggests that "stealthy mobilization" may be required to mask operational constraints or resource shortfalls which could reveal our capacity to sustain current operations or to deal with a second major military contingency. New scenarios suggest instances when selective and tailored surge or mobilization efforts might send the wrong signal to potential allies, coalition partners, or adversaries. Awareness of resource vulnerabilities, shortfalls in critical end items, and the absence of compensating reserves or augmentation options could encourage competitors and adversaries to take calculated risks that would have been unthinkable during the Cold War. We may find

that this potential need for covert industrial preparedness limits the extent to which we can exploit certain dual-use and commercial manufacturing options. It could also compound problems that we already have with getting access to data and to intellectual property rights.

Response

In "agile response," flexible mobilization response should replace graduated mobilization response to deal with the increasingly prevalent concern for short-notice operations. Short-notice deployments can become vulnerable because they require us to rapidly mass in a distant location the units and the supplies essential to decisive victory. Gradualism, politically safer and certainly less traumatic for the economy, may become a luxury that we cannot afford. Management of response time may now be more important than marshaling and husbanding the resources that could improve the odds of success or ensure operational sustainability. To take full advantage of all available resources, military and civilian leaders will have to adjust strategy, campaign planning, and perhaps even tactical decisions to keep safely within the limits imposed on resources by managed warning time, industrial mobilization, and limited response options.

Information Management

Information is the enabling technology for agile operations. Hence the prospect of "information wars" involving command, control, communications, and intelligence (C3I) creates a new dimension in any potentially hostile environment. The media's role in crisis management and the associated fragility of public opinion must be considered, not just for the broad issues, but also for the details of day-to-day operations. Unless constructively managed within our constitutional framework, national commitment and resolve in a crisis may prove to be an elusive asset. It would not be difficult to design a comprehensive gateway system within the emergency preparedness community on which the virtual organization would be based. Industry is already far out in front of government in many aspects of applying automation technology to solving problems. The Iacocca Institute's developments in agile manufacturing and data exchange systems, already operating within key industrial sectors, are helping us to learn how to use information in new ways.

Conclusion

These concepts provide glimpses of powerful forces at work within the US technology and industrial base. The forces have helped to identify significant emergency preparedness deficiencies and to suggest doctrinal, analytical, and organizational remedies. To profit from change, and to ensure acceptable levels of national security, we need a perspective on national security emergency preparedness that acknowledges the inherent limitations of peacetime production. We need to assess repeatedly and accurately our present response capabilities, to discern trends, and to identify associated resource consequences for policymakers. We need an awareness of options shared with--and already being pursued by--government and industry. We need a more or less permanent process for examining national emergency preparedness to retain freedom of action with constrained military and civilian assets.

Success with the four topics examined here--mobilization planning and the industrial base; the requirement to develop and assess resource preparedness options; the need to remain aware of how the defense technology industrial base is evolving, and the evolving role of the Federal Emergency Management Agency regarding industrial preparedness issues--will take us a long way toward meeting the challenges of managing civil and military emergency response requirements in the years ahead.

Time remains our greatest vulnerability and yet potentially our greatest strength in managing the US defense industrial base. As we become accustomed to living with change, integration of time considerations into management of defense industrial base resources will become the yardstick by which we measure the need for--and the adequacy and affordability of--our industrial preparedness.

NOTES

The author acknowledges contributions to this article by John Brinkerhoff, Dr. James Thomason, Dr. Ivars Gutmanis, and Dr. James Blackwell.

1. John M. Collins, "Military Preparedness: Principles Compared with U.S. Practices," *Congressional Research Service Report for Congress*, 21 January 1994, pp. 27-30.

2. This work reflects a three-year IDA effort with FEMA to make military and civilian industrial analysis methods mutually supportive and to actively engage industry in the assessment process through a series of resource preparedness seminars. See James S. Thomason, "Designing and Assessing National Security Resource Preparedness Options for the Post-Cold War Era," *Institute for Defense Analyses Paper P-2847*, June 1993.

3. The sectors are defined by the Standard Industrial Codes (SICs) widely used by industry and the Department of Commerce which take advantage of the extensive data collected by the Census Bureau. The federal government spends hundreds of millions of dollars each year to collect this data which drives a wide range of assessments and forecasts. In several cases the critical sectors identified, such as aircraft, represent an aggregate of several SICs to capture the business activity of the broad industrial sectors and their critical sub-tiers. The IDA and FEMA models concentrate on the 400-plus sectors that are most important to defense industrial base planners. Dr. Thomason's work captures the most critical sectors as a consequence of anticipated DOD budget activity in response to projected military operations for specific major regional conflicts. Bridge tables or other tracking codes can be used to link the SICs to DOD budget activity.

4. As we learn to exploit fully dual-use industrial base capability and commercial products, industrial planning and business decisions will grow in importance. The inherent loss of control as we shift away from heavy reliance on government owned or controlled production facilities can be offset if we can still keep track of residual capability and production options. It will be essential to have fully compatible

measurement standards and benchmarking methods that can support both civilian and military planning and extend into the rapidly growing domain of flexible manufacturing.

5. Data prepared for the draft 1994 *Joint Military Net Assessment* on DOD Budget Authority Trends shows a cumulative real decline from 1985 to 1997 of 41 percent.

6. FEMA has important coordination, assessment, and reporting responsibilities under the National Security Act of 1947, the recently updated Defense Production Act of 1950, and Executive Order 12656, which governs National Security Emergency Preparedness. The all-hazard focus of the current threat environment does not weaken the relevance of these key sources of preparedness guidance.

7. The agile manufacturing initiative was launched by the Iacocca Institute at Lehigh University with DOC and DOD encouragement to enhance inherent American strengths in technology. The initiative moves beyond lean production, just-in-time inventory management, and total quality control, to an even more competitive, customer-oriented approach. After three intense years of effort the program--a dynamic partnership with industry from the start--gained congressional and White House recognition as well as sustained funding. It has been transformed into an industry-led corporation, the Agile Manufacturing Enterprise Forum, with the Iacocca Institute now playing a supporting role. Heavy emphasis is being placed on translating the concept into production cycle and market integration experience that will further refine the process and make its precepts available to a larger segment of US industry including small business. For additional background information see the two-volume report, "The 21st Century Manufacturing Enterprise Strategy," available from the Iacocca Institute.

8. *Machine Design,* 20 February 1992, p. 32.

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Reviewed 5 May 1997. Please send comments or corrections to Parameters@carlisle.army.mil.