

Whatever Happened to Defense Industrial Preparedness?

By IVARS GUTMANIS and JOHN F. STARNIS



U.S. Army

Normandy, 1944.

The basic American approach to international crises is nonmilitary, with resort to the use of force arising only when vital interests are directly endangered. This approach is reflected in the way the Armed Forces are armed and equipped. Traditionally, the United States has not procured war matériel from an extant dedicated arms manufacturing base. Instead, it has mobilized industry to produce the means to fight the Nation's wars.¹ Moreover, mobilizations have customarily been directed by civilians, with military officers playing a relatively minor role.

Mobilizing for War

Although World War II is the best known industrial mobilization of the past century, it is

only one of five episodes that offer lessons for policymakers and military planners. World War I taught that mobilization required sound planning and that a simple system of priorities can guide an effort until complex institutions are needed. In World War II the Nation learned that a rapid mobilization could not be achieved from a standing start without prior planning. Emergency organizations and controls must be in place. Korea was the first conflict that America fought without a declaration of war and for which it attempted to mobilize by expanding capacity. Then Vietnam demonstrated that in avoiding the short-term costs of mobilization readiness could be eroded. Finally, the Gulf War revealed that industrial preparedness must be considered in each and every scenario. Planning for the worst case does not assure readiness for lesser crises.

The concept of industrial mobilization used in World Wars I and II served the United States reasonably well but was found wanting after the ordeal of the Korean War. The major problem was

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Figure 1. Domestic Sources of Defense Matériel by Type

	1992	1996	2010
aircraft			
bombers	3	2	1
fighters	5	4	2
helicopters	4	4	2
related matériel			
ballistic missile defense	6	4	3
expendable launch vehicles	3	2	1
satellites	5	4	3
rocket motors	8	8	3
strategic missiles	1	1	1
tactical missiles	8	8	8
tracked vehicles			
tanks	1	1	1
armored personnel carriers	8	8	4
munitions			
small caliber	5	5	3
cannon caliber	5	5	3
scatterable mines	2	2	1
pyrotechnics	1	1	1
bombs	4	2	1
mortars	3	2	1
artillery caliber	4	4	2
propelling charges	2	2	1
fuses	22	13	8
dispenser munitions	2	2	2
naval guns	1	1	1
tanks	3	3	2
demolition, grenades, mines	8	5	2
rockets/warheads	4	3	2

Source: Defense Logistics Agency.

the breakup of the Soviet Union also has led to changes in DOD industrial mobilization policies and funding

the lead time required to get matériel to the field. Korea provided ample evidence of the problems with a mobilization-only policy. In late 1952 the Advisory Committee on Production Equipment (Vance Committee), recognizing the need for a more cost-effective industrial base than the policy of the day, recommended that “a larger productive capacity to produce military end items must be created . . . [so] that it can be quickly expanded in the event of an emergency by merely adding manpower and hours of operations.”² As a result, the Nation adopted a mobilization base concept that remains in force today. Under defense mobilization order

23 of November 23, 1952, the Director of Defense Mobilization defined that base as,

that capacity available to permit rapid expansion of production sufficient to meet military, war-supporting essential civilian, and export requirements in the event of a full scale war. It includes such elements as essential services, food, raw materials, facilities, production equipment, organization, and manpower.

The resulting DOD program was predicated on the idea that industrial mobilization planning had to identify potential capacity shortages and propose corrective actions. It had several elements which included mobilization requirements, lead time, domestic production, and commercial conversion.

Mobilization requirements. The need to mobilize assumed the possibility of war in Europe between the United States and Soviet Union. While operational planning was conducted for lesser contingencies, the NATO scenario—considered by policymakers to be the most demanding—was used for industrial preparedness planning. Whether influenced by circumstance or choice, it was thought that in preparing for the worst-case scenario all lesser scenarios would be accommodated.

Mobilization lead time. Transition from peace to war could occur in days instead of weeks or months. Thus the industrial base could do little to meet immediate demands for production.

Domestic production sources. The United States could only rely on domestic production. Industrial preparedness planners were required to establish domestic sources for critical matériel.

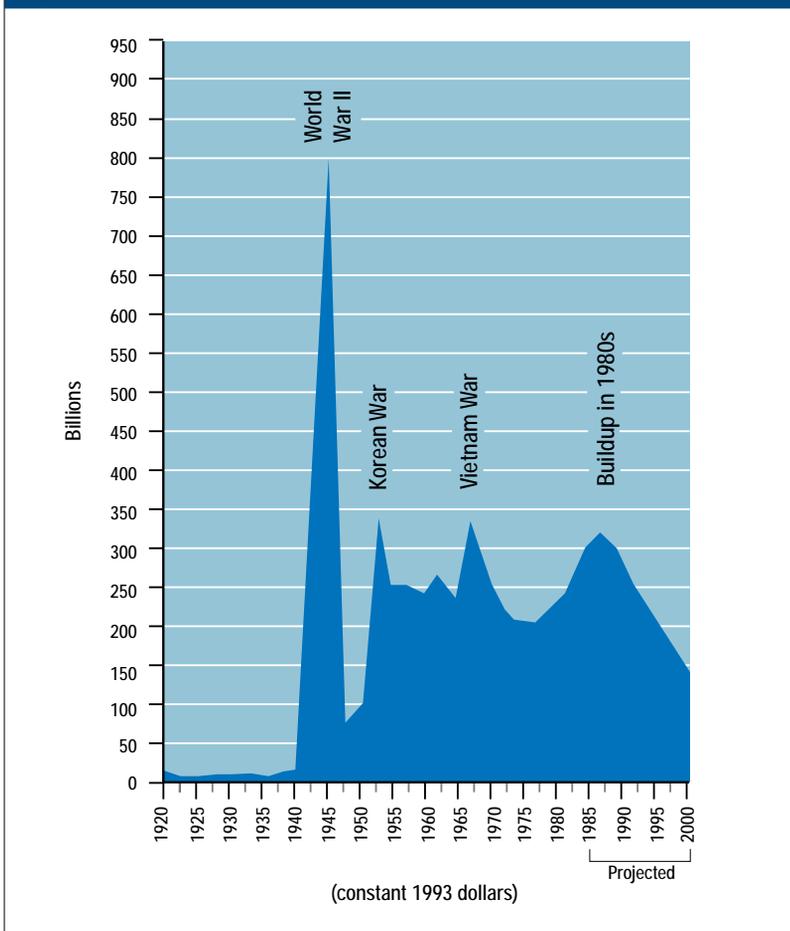
Commercial conversion. Demand for defense-unique matériel would require a large-scale conversion of commercial production to defense production.

The industrial preparedness program was the keystone of industrial mobilization and would remain in force with some modification until the early 1990s. It was maintained by civil servants in DOD and other agencies. The ultimate beneficiaries of the program—the Armed Forces—played only a marginal role in its operation.

Current Trends

The obvious but as yet incomplete collapse of Soviet military power has radically altered our political, economic, and defense policies vis-à-vis an arch-enemy of some fifty years standing. The breakup of the Soviet Union also has led to changes in DOD industrial mobilization policies and funding for industry-related activities and programs. As the Bottom-Up Review clearly stated, “the threat that drove our defense decisionmaking . . . is gone.” Indeed, the determining aspect of the current defense procurement environment is a reduced budget (see figure 2). During the 1980s an-

Figure 2. Annual Defense Expenditures, 1920–2000



Source: International Institute for Strategic Studies, 1994.

nual defense spending averaged some \$306 billion; in 1989, the peak year, it was \$327 billion. For FY97 it is estimated at \$274 billion, and further reductions have been debated in Congress and elsewhere. Conversely, some call for an increase of \$50–60 billion over the current \$39 billion.

Present and anticipated cuts in defense spending have precipitated changes in procurement, among them canceling development programs for new systems and reducing procurement. In fact reductions in weapons acquisition began in the mid to late 1980s. Since 1985 DOD has terminated over one hundred programs, including the Navy A-X attack aircraft and EA-6B electronic warfare aircraft, the Air Force F-16 fighter, the Army multiple launcher rocket system, and the follow-up early warning system. Moreover, procurement of other systems also has been reduced, including the Air Force B-2 bomber and F-22 air superiority fighter, the Army Comanche helicopter, and the Navy F/A-18E/F strike aircraft.

The effects of reduced budgets on procurement are also indirect. One may be abandoning the strategy to fight two nearly simultaneous major regional conflicts. Such a change is likely to come only after the completion of the Quadrennial Defense Review, but if adopted it could further reduce defense expenditures related to the industrial base.

On the other hand, a diminished threat certainly has not rendered military power obsolete. Nor has threat reduction created harmony within the community of nations. On the contrary, actual and potential conflicts among both small and large nations have escalated. Such situations threaten our security interests and increase the likelihood of military operations. A few years ago there was little or no indication of U.S. troops being deployed to Bosnia. Clearly superpower confrontation has been replaced by a nebulous mix of nonspecific contingencies—in a word, uncertainty.

The White House and Pentagon have taken initiatives to maintain a defense industrial base in the face of spending cuts and policy changes. In June 1993, the Under Secretary of Defense for Acquisition articulated four policy objectives for the defense-related industrial base:

- supplying and equipping the force to meet national security objectives, policy guidance issued by the Secretary of Defense, and the future-years defense programs
- sustaining production, maintenance, repair, and logistics for military operations of various durations and intensities
- maintaining advanced R&D to ensure technological superiority
- reconstituting within a reasonable period the capabilities to develop and produce supplies and equipment to prepare fully for a war, national emergency, or mobilization.

To assure compliance, DOD made two radical changes that have resulted in a new procurement paradigm: regulatory reform and dual-use policy. These changes will directly involve the military in defense procurement and related decisions.

Another equally important development—external yet impacting on defense acquisition—is the technological transformation of areas such as design, engineering, prototyping, and production of weapons systems and equipment. Taken either individually or collectively, these developments will impose new and crucial procurement-related responsibilities on the military.

Regulatory Reform

Many impartial experts charged that the defense acquisition process is cumbersome and that DOD contract management and administration

costs could be significantly reduced. The Pentagon has concurred in this judgment and implemented a major effort to reform procurement. To do this, DOD has changed policies and issued regulations that include personnel from outside procurement circles with experience in employing fielded weapons and equipment into the acquisition process. For example, the Secretary of Defense issued guidance in 1995 that requires procurement activities to be conducted by integrated product and development (IPD) and integrated product teams (IPTs). These teams include military personnel—the actual or ultimate users of the matériel being procured. In the Secretary's own words, "In the oversight and review process . . . IPTs would be vertically integrated in that they would be comprised of members from various staff and line levels."³

A number of specific initiatives will place the military squarely in the procurement process. One requirement calls for using so-called nondevelopment items (NDI).⁴ Under NDI procedures the role of the military in acquisition is substantially increased. Another requirement involving the direct participation of military personnel rather than acquisition

specialists in procurement comes about with increased use of a multiple award schedule. This requires the military to select the most appropriate items from a catalog of commercial goods to meet their operational needs. In the past military personnel represented only 6 percent of the over 178,000 engaged in procurement.

Such initiatives will greatly increase both the presence and role of the military in the defense acquisition process. However, the policy that demands the most active participation by both staff and line warriors is the dual-use technology and production concept.

Dual Use

The dual-use technology and production concept is one of the prime goals of procurement reform. As stated in the DOD "bible" on dual use:

The DOD's acquisition reform effort seeks to bring about a simplified commercial-style procurement system that gives priority to acquiring commercial products and processes, and wherever possible eliminates those unique contracting, technical, and accounting requirements that form a barrier to greater military/commercial integration. Toward that end, on February 24, 1994, Secretary of Defense Perry set forth a dramatic vision for simplification of the way the Pentagon buys military systems.⁵

F/A-18E.



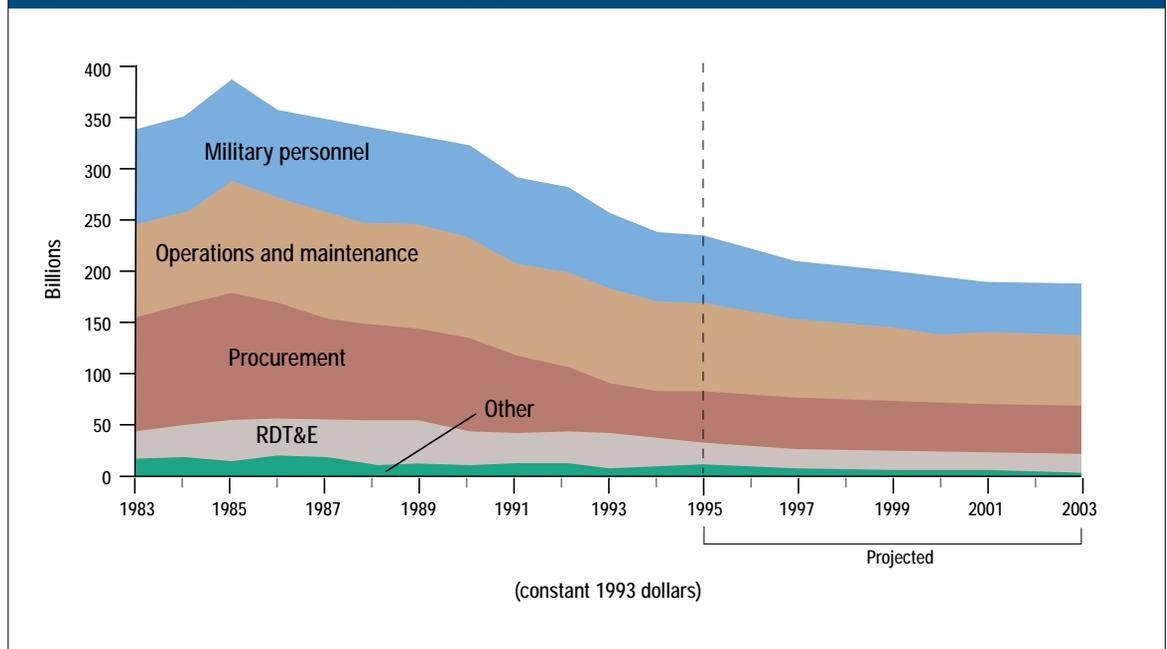
McDonnell Douglas



Multiple launch rocket system.

DOD (Helene C. Slikke)

Figure 3. DOD Budget Forecast by Category, 1983–2003



Source: *The New York Times* and International Institute for Strategic Studies.

As part of the mandate, on June 29, 1994 the Secretary directed the services to use performance and commercial specifications and standards instead of military ones unless no practical alternatives exist. Those rare cases would require explicit approval, a reversal of prior practice.

Applied to dual-use strategy this innovation represents a new way of doing business. DOD intends to remove the barriers between commercial and defense industries and institute compatible development and acquisition processes. An integrated national industrial capability that achieves “world-class” benchmarks for cost, quality, and cycle time will allow the Pentagon to exploit the rapid rate of product development and the market-driven efficiencies of commercial industry.

Commercial manufacturing processes will lower product costs through economies of scale resulting from mass production as well as economies of scope from repetition of processes across families of lower-volume products. Moreover, if advanced technologies are adopted and improved by commercial firms, military systems will also benefit. Finally, by strengthening those elements of the economic infrastructure on which DOD depends, successful commercialization of defense technologies can increase the likelihood that they will be accessible and affordable for military use.

Dual use, with its accompanying benefits, calls for technical judgments on the applicability of items to defense needs. In fact an item has not

become dual-use until such a decision is rendered. For some major dual-use procurement the previous acquisition process will be applied. For a large portion of goods and services procured under the dual-use provisions the purchasing activity will take place in the field, and the responsibility for accepting or rejecting such items will rest with military personnel. The possible workload for such activities under the dual-use policy is great. This may be seen from the anticipated level of DOD procurement shown in figure 3.

The concept of dual-use in defense-related production, services, and procurement presents attractive policy because of advances in the agile manufacturing technologies. These gains render the dual-use policy exceptionally applicable to future defense needs for matériel and services.

Agile Manufacturing

The rapid increase in the technology and use of agile manufacturing allows DOD to acquire matériel when needed and at a reasonable cost. Agile manufacturing is a generic term for a number of competition-enhancing initiatives that include lean and flexible factories, networked information systems, and cross-boundary communications throughout and among various value chains.⁶

The vision was first described by the Agile Manufacturing Enterprise Forum held in 1991.⁷



B-2s under construction.

agile manufacturing can overcome emerging problems in an era of uncertainty and reduced funding

Agility is the capacity to flourish in periods of uncertainty, unpredictability, and recurrent change, and agile manufacturing is the integration of technology, management, and workforce resources in a coordinated, interdependent system. Under such a system information

flows seamlessly among manufacturing, engineering, marketing, purchasing, finance, inventory, sales, and research units. It also courses unbroken between agile manufacturers and their suppliers and customers.

Agile manufacturing assists defense planning as well as the procurement of defense-related goods. In addition, it can overcome emerging problems facing procurement management in an era of uncertainty and reduced funding.

Since the end of the Cold War, the United States has struggled to define the dimensions of the future threat. Absent a specific enemy or zone

of conflict, mobilization planners do not know whether to focus on desert, arctic, or tropical warfare. Nor do they know whether they will need battalions or corps. Since agile manufacturing solutions are designed for such uncertainty, they are ideally suited as the framework for evaluating industrial responsiveness.

One aspect of agile manufacturing is virtual enterprise, which brings together personnel and equipment from several companies to design and manufacture a product. Suppliers, contractors, and customers work together. Lead times are cut by the order of magnitude. Another contributor is information technology, which permits rapid exchange of requirements and capabilities among vendors on all levels of the supply chain.

Since agile manufacturing strives for highly customizable products and rapidly configurable production processes, it erases distinctions between the defense and commercial industrial

bases. Current dual-use strategy states that “future weapons systems must be consciously designed to use state-of-the-art commercial parts and subsystems and to be built in facilities with integrated military and commercial production lines.”⁸ Advocates do not claim that armored vehicles and commercial trucks will be manufactured on the same production line; but they believe components of military-unique items such as engines can be produced in conjunction with commercial equivalents. But the dual-use vision is limited to a stationary manufacturing process which, even when augmented by flexible systems, operates within a relatively narrow range of product options. The agile solution extends the bounds of dual-use strategy by creating a production environment that permits rapid metamorphosis of manufacturing resources where individual tools and workstations can be resized and regrouped to respond to customer needs in near real time.

The defense industrial base has played a critical role in national security strategy because of its ability to design, develop, and manufacture technologically superior weaponry which provides the Armed Forces with formidable capabilities. As budget cuts affect force structure, they will also impact on the defense industrial base. The Clinton administration has taken steps to maintain an adequate industrial base in the face of declining budgets. Some will change long-established rules and patterns of defense procurement, especially regulatory changes and dual-use policy.

To a significant extent, success in acquisition reform depends upon the active participation of military personnel in procurement. This is possible only with an understanding of new policies and elements of this reform. Equally critical is familiarity with radical advances in manufacturing technology as well as agile manufacturing and its relationship to another key element of acquisition reform, the DOD dual-use policy. Agile manufacturing seeks to reduce response time and increase manufacturing flexibility so that every customer order can be satisfied. Ultimately it would mean that the industrial base would never have to be mobilized. The potential of agile manufacturing will only be fully realized with the participation of the users—the Armed Forces. **JFQ**

NOTES

¹ Industrial mobilization is defined as “the process of marshaling the industrial sector to provide goods and services, including construction, required to support military operations and the needs of the civil sector during domestic or national emergencies. It includes the mobilization of materials, labor, capital, facilities, and contributory items and services.” See DOD Instruction 5000.2, *Defense Acquisition Management Policies and Procedures*, February 23, 1991, p. 15–7.

² Office of Defense Mobilization, Advisory Committee on Production Equipment, *Production Capacity: A Military Reserve* (Washington: Government Printing Office, January 1953), pp. 1, 29.

³ Memorandum from the Secretary of Defense, “Use of Integrated Products and Process Development and Integrated Product Teams in DOD Acquisition,” May 10, 1995.

⁴ For a further discussion, see P. David Leech and Ivars Gutmanis, “NDI Procurement Accounting and Tracking: Options and Implementation Plan, for the Office of the Deputy Assistant Secretary of Defense (Production Resources),” report TR-5856-E (Arlington, Va.: The Analytical Sciences Corporation, December 1993).

⁵ Department of Defense, *Dual Use Technology: A Defense Strategy for Affordable, Leading-Edge Technology* (Washington: Government Printing Office, February 1995), p. 16.

⁶ Michael E. Porter, *Competitive Advantage* (New York: The Free Press, 1985). Porter uses the term to describe a way to disaggregate a firm into its strategically relevant activities to understand the behavior of costs and sources of differentiation.

⁷ Agile Manufacturing Enterprise Forum, volume 1, *An Industry-Led View: 21st Century Manufacturing Enterprise Strategy*, and volume 2, *Infrastructure: 21st Century Manufacturing Enterprise Strategy* (Bethlehem, Pa.: Lehigh University, 1991).

⁸ Under Secretary of Defense for Acquisition and Technology, *Dual-Use Technology: A Defense Strategy for Affordable, Leading-Edge Technology* (Washington: Department of Defense, February 1995), p. 4.