Industrial Base: Vital to Defense

By

Donald J. Atwood
Deputy Secretary of Defense

[The following is a reprint of an article which originally appeared in *Defense 90*, January/February, 1990, pp. 12-16, and which is based on remarks presented before the National Forum Foundation, Washington DC, November 6, 1989.]

Our national security may be sustained by the outstanding men and women who proudly serve in uniform around the world, but it is built upon the foundation of our industrial infrastructure and supported by a well-educated work force. Any weakness in our manufacturing capability, in our engineering or research base, or in our educational system can quickly become a fatal flaw in our national defense.

The deterioration of America's industrial base is one of the most pressing issues facing the Department of Defense today. But it is not a new problem. In a 1980 report on industrial responsiveness, the Defense Science Board first raised the red flag. One year ago, the board published another study on the defense industrial base. It concluded that our industrial and technology base has further deteriorated and that a coordinated response by government and industry is needed before this decline diminishes the credibility of our deterrent capability.

And last year, a second advisory group to the department comprised of about 15 executive branch agencies published another report on the status of the industrial base titled *Bolstering Defense Industrial Competitiveness*, which focused on the problems that inhibit the competitiveness of American industries.

The Department of Defense is working diligently to correct the problems unique to it. Many, however, will require the cooperation of public policy makers throughout the executive and legislative branches. We recognize that the strength of the U.S. industrial base is a vital element of our national defense.

Now there is often confusion over what is meant by the phrase "the defense industrial base." It is usually interpreted as meaning only the large prime contractors for our weapon systems. The fact is that the defense industrial base generally comprises the same manufacturers that produce goods for the commercial sector. Although a number of companies rely primarily on the Department of Defense as their principal market, few total industries do. The department draws on virtually every sector of manufacturing for the products and services it requires every day.

In fact, the Defense Department buys manufactured goods from more than a quarter million firms, encompassing more than 215 industries. As a result, its legitimate interest in the defense industrial base is inseparable from its interest in the U.S. industrial base as a whole. They are indeed one and the same.

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
1990		**00-00-1990 to 00-00-1990**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Industrial Base: Vital to Defense	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Defense Institute of Security Assistance Management (DISAM),DISAM/DR,2475 K Street,Wright-Patterson AFB,OH,45433-7641**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES
The DISAM Journal, Spring 1990, Volume 12, Number 3, p.84-88

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**5**	

DECLINING U.S. BASE

Unfortunately, we are seeing many indications of widespread decline in the U.S. industrial base. In absolute terms, we see an erosion in the competitiveness of industries producing both capital and consumer goods.

The U.S. share of the world machine tool market, for example, is now less than half its 1980 level. Over the past 17 years, U.S. firms have lost two-thirds of the domestic market for machining centers. During this same period, foreign firms have captured almost all of the domestic market for stereo equipment, 90 percent of the color TV market, and nearly three-quarters of the market for telephones. Viewed in total, it's clear that American manufacturing is being overwhelmed at home and abroad by foreign competition.

The loss of U.S. leadership in a growing number of industries prompted Congress to ask the department to identify those technologies critical to the long-term viability of our national defense. Among the 22 technologies listed, microelectronics, computers, and composite materials were mentioned as especially vital in the design and operation of modern weapon systems. Let me say again, that it is not just the loss of our pre-eminence in a few technological areas that is the problem, but rather the overall decline in our industrial and technological base.

Microelectronics is a field pioneered by American firms, but for much of the past two decades, our position of pre-eminence has steadily eroded. Advances in miniaturization and microprocessors have contributed enormously to the effectiveness of today's weapon systems. For example, the F-16 fighter and the B-2 bomber are basically unstable aerodynamically, but with their sophisticated electronics systems they are easily controllable, making them the most effective aircraft of their types in the world.

Although this country is still the recognized world leader in application-specific integrated circuits and microprocessors, the Japanese now lead in memory-device manufacture. Current trends also suggest that we are losing ground rapidly in a growing number of related microelectronics fabrication technologies. These shifts in industry leadership are due in large part to the fact that while U.S. firms spend only 15 percent of their sales on semiconductor research, Japanese firms invest double that amount. Where their own research is insufficient, they invest in U.S. companies and in U.S. academic research to obtain technology. By the year 2000, the United States could be nearly totally dependent on Japanese supplies of key electronic components and equipment.

A healthy U.S. computer industry is also vital to our security interests. Over the last 30 years, the average speed and capability of a computer has increased on average by 50 percent each year, giving us computers that can execute 10 billion operations per second. And this capability has been delivered with little increase in system price. These cost-performance improvements have yielded more capable weapon systems, as well as more efficient command, control, and communications systems. Further improvements in parallel processing and superconductivity promise to dramatically increase the capabilities of future systems even more.

However, despite our acknowledged leadership in software development, U.S. corporations are no longer finding it profitable to underwrite advanced computer research. Instead, the research in this field is left to large, vertically integrated foreign companies. We have recently witnessed the demise of ETA, a Control Data Corporation subsidiary working on supercomputer technology, as well as the dispersal of a strong and innovative Cray supercomputer research team. Leading U.S. computer companies are turning increasingly to traditional product lines and not pursuing innovative computer architectures because of the large investment and the lengthy period needed to get a decent return on that investment.

PIONEER OF COMPOSITE MATERIALS

Another era pioneered by the United States but under increasing pressure from foreign competition is composite materials. Like microelectronics and computers, composite materials are becoming an essential part of almost every new weapon system. Whereas the F-15 fighter has less than 5 percent of its structural weight made up of composites, the B-2 bomber is made almost completely of composite materials. Development of composites has reached the point where application is moving rapidly into all sectors of the aerospace industry. This raises the expectations for revolutionary methods of airframe construction that will considerably exceed the potential of most present-day equipment.

Composite materials involve a broad field encompassing machine tools, basic materials, specialty materials, and petrochemicals. The United States needs to maintain a viable domestic manufacturing capability to guard against important advances that continue to be made by other countries. The Japanese, for example, have a well-organized industrial program under way aimed at achieving a dominant position in structural ceramics.

The industrial supremacy of the United States is extremely important to the Department of Defense. Our national security is based on a strategy of deterrence. We cannot match our adversaries soldier for soldier or bullet for bullet. Instead, we must maintain a degree of technological superiority sufficient to overcome our numerical disadvantage. A strong, internationally competitive industrial base is absolutely necessary if we want to sustain the effectiveness of our deterrent capability. The greatest destabilizer today would be the disintegration of the U.S. industrial and economic base.

With the prospects of an economically unified Europe just around the corner in 1992, the international defense industry is likely to grow even more competitive. European firms are already our biggest competitors in arms production. A more unified Europe is likely to produce a more competitive European defense industry. We are already seeing the first signs. The acquisition of Messerschmitt-Bolkow-Blohm, the dominant West German arms and aerospace firm, by West Germany's leading engineering company, Daimler-Benz, has created a much stronger worldwide competitor. In addition, the proposed sale of Great Britain's Plessey to Siemens of West Germany and General Electric of Great Britain would yield two international electronics powerhouses.

But foreign competition is not the only threat to our industrial self-sufficiency. There is another factor that has contributed to the erosion of our defense industrial base: the adversarial relationship that exists between the Defense Department and its contractors. This cannot be blamed on others, because it is a problem of our own making.

IMPROVING RELATIONSHIP

We are taking steps to improve this relationship be reinstating the proper risk-return balance in the defense business. It is important that we acknowledge that it is proper for industry to make an equitable profit. We want to give our suppliers the incentive to make the necessary investments in the high-technology equipment and facilities needed to develop and produce today's sophisticated weapon systems.

One action we have taken is to do away with fixed-price, cost-sharing contracts in the development phase of new weapons systems. Such contracts provide few incentives for contractors to invest in new technologies or advanced manufacturing processes early in a program. By fully funding the development phase, contractors will be more inclined to make the appropriate investments up front, and we will get better products that cost less to produce.

In addition, we are also working to put in place a contractor-performance review system that will recognize factors other than cost in the source-selection process. Our goal is to promote contracting relationships with our best-performing suppliers and to reward that performance accordingly.

The department can be a strong partner in a coordinated attack on industrial problems by promoting research in new manufacturing technologies. For example, independent research and development funding should be used for exploring new manufacturing processes as well as for developing new products. Japanese firms spend approximately twice as much on process development as they do on product development, while for American firms it is just the reverse. Our goal is to maintain a stable level of funding in independent research and development over the long term.

Furthermore, we need to expedite the transfer to U.S. industry of leading-edge technologies produced in our defense and national laboratories.

Recently, there has been a lot of discussion about having the department fund "key" emerging technologies. I don't think we can retain our manufacturing, technological, and scientific leadership if we selectively support particular sectors of industry. The obvious question becomes which of them we target—electronics, communications, steel, computers. Because almost every manufacturing industry contributes to our national defense, to unfairly favor one over another demands an arbitrary judgment regarding their relative importance.

DOD'S PROPER ROLE

The proper role for the Department of Defense is to develop policies that encourage competition among different technologies as well as among individual companies. If we treat all contractors fairly and offer the proper incentives, those technologies and those companies that generate the most value for the investment will naturally dominate. We need to create a level playing field so that fledgling industries can survive predators from outside the country. But we should not protect companies from competition, because that only produces outdated and inefficient industries.

As I said before, the Pentagon can do only so much to improve the performance of American industry. Many U.S. manufacturers have directly contributed to their own competitive problems. Too many have created inflexible manufacturing processes, established poor quality control systems, paid insufficient attention to customer service, failed to design their products for producibility and quality, and, in general, adopted a short-term horizon.

The results of this failure are in evidence today. Companies need to re-emphasize the basics of good practices in their daily operations. That means dedicating themselves to producing quality products on time and within budget. Firms must also adopt a long-term business strategy and look beyond the immediate bottom line. Industry is not investing the dollars in research that will keep us competitive in the fields of microelectronics and computers. This must change because industry, as well as government, has a major responsibility in helping America retain its technological advantage.

It seems likely that tight defense budgets will be with us for the next several years. Together with the increasing overseas competition, we are probably going to see the U.S. defense industry go through a period of restructuring that will leave fewer, perhaps more specialized, firms. Large companies should consider entering into industrial partnerships with small, entrepreneurial companies to ensure their survival and continued ability to work on leading-edge problems. With an acquisition budget at DOD of more than $100 billion, there is plenty of room for efficient, well-managed firms to survive and prosper.

STEPS TO REMAINING COMPETITIVE

American companies possess a wealth of knowledge and experience that cannot be duplicated readily by any foreign company. American firms must concentrate on those things they do well and use their strengths in conjunction with those of other firms in the industry, by forming teams or joint ventures, to remain competitive in the 1990s and beyond.

The erosion of the U.S. industrial base also demands the attention of the Congress. Legislative and regulatory barriers must be reviewed as part of the process to restore U.S. industrial competitiveness. Congress can help in several ways. First, our tax system at all levels of government should be studied to relieve any tax burden on American industry that is not shared by foreign firms that sell their products here. There must be incentives for long-term investment for industrial modernization and technological development.

Anti-trust policy is a second area that needs Congressional review. As American industries are increasingly pitted against foreign government-sponsored consortia, restrictions imposed by a host of anti-trust laws can hurt the international competitiveness of American industry. Laws and regulations that impede cooperative research by U.S. firms into both process and product technology are particularly harmful. The barriers currently in place that discourage joint manufacturing efforts are penalizing the potential for U.S. industry cooperation.

The efforts of Congress and the Executive Branch to strengthen our technological and industrial base must not be politicized. The threat to our economic posture and national security is as real as any military threat.

Finally, I want to emphasize one last, but critical, area that deserves the immediate attention of the Defense Department, the defense industry, and Congress. One major cause of the decline in our economic competitiveness is the decline of our educational system. The strength of our industrial base can be sustained only if we educate the scientists, engineers, and skilled technicians needed to support advanced manufacturing requirements. We cannot hope to forge a world-class manufacturing environment in the defense industry or in any other industry unless we place more emphasis on improving our educational system.

In conclusion, America's deterrent strategy depends on a healthy industrial base—one that is efficient, technologically advanced, and flexible enough to respond to any crisis. Unless we reverse the fortunes of American manufacturing, our national security may soon be in jeopardy. The challenges are enormous, but the opportunities are equally great. We must work together to retain all of the greatness this country represents.