

A proposal for the semiconductor crisis

by Marcia Merry

In February this year, the Defense Science Board called for the creation of a new Pentagon-backed consortium of semiconductor manufacturers, to advance the technologies and production levels needed to assure the industry will not fail to meet defense needs. The manufacturing base of the industry is shrinking at such a rapid rate, and simultaneously, the United States is falling behind so fast in technological leadership in the field, that the situation requires special government intervention for both the defense and civilian economy. The Defense Science Board recommendations came after a 10-month study of the industry, in relation to military and general economic needs.

This situation is dramatized by the late August news headlines about the MX missile. Half of the complement of missiles now complete, are missing their electronic guidance systems, contracted by Northrop Corp. These systems—without which the missiles cannot be guided—will not be ready until sometime next year. Congress is once again self-righteously condemning the “defense industry,” but they are blind to the fact that all of industry, defense included, is in an emergency state of disintegration. National government intervention is required. The Defense Science Board proposal for the semiconductor industry is applicable across the board.

Under the concept of the proposed semiconductor consortium, private companies would put in about \$250 million into a capital pool, supported by \$200 million a year in Defense Department contracts. The Semiconductor Manufacturing Technology Institute would use this for research, and for practical development of the technology base for manufacturing advanced semiconductor devices; and would provide the production facilities for the selected devices required by the Defense Department. The consortium would work for high-volume, low-cost manufacturing methods, and it would offer for sale certain quantities of the advanced products on the competitive market.

The initial priority would be to develop a 64-megabit dynamic random access memory (DRAM) chip, with 64 times the capacity of the present-day 1 megabit DRAM chip. Developing and utilizing the potential of the new discoveries in superconductivity could usher in incredible productivities.

Ten years ago, the United States had a virtual monopoly on DRAM chip production. Now U.S. manufacturers supply

only about 10% of the market, and defense procurement has been relegated to a relatively insignificant place in the beleaguered U.S. industry.

As of the 1980 Defense Science Board task force review of semiconductor support of military programs, coordinated by Jerry Junkins of Texas Instruments, the military semiconductor market was about 7% of the total semiconductor market. This has dwindled to around 5%. However, his review reported that, as of 1980, “some 80-90% of military semiconductors are assembled outside the United States, primarily in the Far East—Singapore, Korea, Hong Kong, Taiwan, Malaysia.” In addition, Japan makes most of the ceramic packages and a significant number of lead frames used in U.S. commercial production lines, in which military products are also run, which later receive special testing. The category of “type A” devices—JAN, JAN TX, etc.—must be assembled in the United States, and the profits on these are very low.

Defense electronics is key

The Defense Science Board’s February report emphasized that defense electronics is key to improving the performance and survivability of weapons systems. “Electronics technology is the foundation upon which much of our defense strategy and capabilities are built.” With their consortium proposal, they stressed, “electronics is the technology that can be leveraged most highly.”

Defense electronics spending is projected to increase over the next decade, even under the drastic cuts planned by the current Congress. However, the computer and electronics industry is deteriorating so rapidly that this alone cannot compensate for the absence of the inducements that would exist under a sound economy with proper government tax policies.

Under current projections, electronics’ share of the DoD research, development, test, and evaluation (RDT&E) budget will grow from 49% in 1987 to 54% in 1996, according to the Electronics Industry Association. They predict that electronics will take from 35% to 40% of the defense procurement over this time period. There needs to be increased use of electro-optics, lasers, fiber optics and infrared for countermeasures, as well as for target location, communications, and guidance. Larger capacity computers and processors are required for battle management and information. Most of all, radio frequency hardware needs to be developed for defense, weapons, and communications.

In the face of these demands, the computer and electronics industry is in financial and technological disarray. For the industry as a whole, 1986 was a “no-growth year,” characterized by mergers and shutdown of capacity. The semiconductor industry lost an estimated \$800 million during the year. AMD, Texas Instruments and Intel all reported large write-downs. The Commerce Department intervened to order Japan to refrain from selling its chips in the United States at

prices below "fair market value." Meantime, Motorola announced plans to build a joint plant with Toshiba in Japan, and exchange chip and microprocessor technology. Eaton and Varian announced cutbacks because of the lack of chip sales.

To cope with what Wall Street calls "overcapacity" in semiconductor production, companies are cutting capital outlays, at a time when the economy and defense needs require more technology and capital improvements. To make matters worse, Reagan's "tax reform," means accelerated depreciation will now be canceled out by the loss of the investment tax credit.

The median earnings per share in the semiconductor industry last year were -35.3%. Their five-year average earnings per share were -4.2%. The combined computer, electronics, and semiconductor all-industry median earnings per share fell 0.9% as an average over the past five years. Over this period, of the top semiconductor suppliers to the Defense Department, Motorola (39th in the list of 100 largest defense contractors) had a -10.6% five-year average earnings per share. Motorola's 1986 earnings per share were up 8.5%; the company is characterized by very low earnings stability.

So far the Pentagon—heavily involved in battles with Congress on the overall budget, the Persian Gulf deployment, and the SDI funding—has not acted on the recommendation of the Defense Science Board for the semiconductor consortium. However, Robert B. Costello, assistant secretary of defense for acquisition and logistics, has expressed support for the proposal. Many logistics experts have testified to Congress this summer on the need for expanding the board's recommendations to the rest of the defense industry. This, in turn, would lead to overall defense procurement cost reductions and supply guarantees, instead of high costs, bottlenecks, and the risks entailed in foreign source supplies.

Adm. Bobby Inman (ret.), former director of naval intelligence, CIA deputy director, and now chief executive officer of Microelectronics and Computer Technology Corp. has repeatedly stressed the need for ending the 1960s "cost-effectiveness" approach to Defense Department procurement, and instead, working with industry to further a broad base of high-technology applications in the economy. Inman predicts, for example, that the emerging very high speed integrated circuits being developed by the Japanese, will be far more affordable than those being developed by U.S. companies expressly for the Defense Department. He says that investment must go into Pentagon-sponsored research, and to university and industry research, but there must be the broadest possible applications of the results in the general economy. This implies a growing economy.

According to Inman, "If we don't have viable marketplaces for much of the technology, the cost to defense is going to be astronomical. We can buy a lot of chips and stockpile them. But we can't stockpile manufacturing capability."

Security emergency in fastener sector

by Joyce Fredman

Early in July, officials of the Pentagon announced that the Armed Forces are so short of spare parts that they are being forced to cannibalize existing machinery. In addition, cheaply made, imported fasteners (nuts, bolts, screws, and rivets) have been found to be defective on a wide scale and now threaten the capacity of some of the military's most important weaponry.

Evidence of industrial sabotage has recently beset the B1 bomber, a principal strategic weapon already besieged by a year of parts difficulties. The problems of the decline in U.S. military industrial readiness are made apparent by the fall in U.S. exports. U.S. military sales to other countries fell from \$14.8 billion in 1980 to \$7.1 billion last year.

Production capacity not utilized for export is being shut down, rather than converted to meet U.S. normal or "surge" requirements. During 1981-82 alone, close to 40 major fastener manufacturing plants shut down. The situation has taken on such dramatic proportions as to bring into the limelight a sector of industry badly in need of attention. These disasters may be a blessing in disguise if they force a reversal of a heretofore suicidal policy.

Cannibalism

The practice of cannibalizing for parts is something that is normally only done in combat circumstances. Now, it is commonly used, and even worse, on multimillion-dollar advanced items, as opposed to cheaper hardware that is less advanced technologically. Not only does this practice erode military readiness, but it is a blatant waste of energy, money, and time. The reason it is occurring reveals much about the nature of the U.S. "recovery."

In 1982, Defense Secretary Caspar Weinberger attempted to alert this country to the consequences of its deindustrialization. He wrote in a letter to the late Commerce Secretary Malcolm Baldrige:

"Most of our critical weapons systems, equipment, support items, and industrial production facilities require large quantities of various types of fasteners. There are currently significant import penetrations (over 50%) for items produced by the U.S. industry. . . . We must not be placed in a sole source foreign dependency situation for our mobilization