GLOBAL ELECTRONICS

Issue No. 74 watchdogging "High Tech" March, 1987

MANUFACTURING CONSORTIUM

In February, a Defense Science Board task force headed by Martin-Marietta's President, Norman Augustine, issued a report proposing Pentagon support for the American commercial semiconductor industry. The Task Force on Defense Semiconductor Dependency found that the U.S. military, which relies heavily upon electronics in most weapons systems, cannot afford to have Japanese companies dominate the world semiconductor manufacturing business.

The Augustine report recommends, therefore, that the Pentagon start buying more commercial—as opposed to mil-spec—chips, fund more university research, and create a forum on semiconductor technology involving representatives of corporations, universities, and several government agencies.

Most important, it asks the Defense Department to provide $200 million a year to a Semiconductor Manufacturing Technology Institute (SMTI), a consortium of high-tech companies that would "develop, demonstrate, and advance the technology base for efficient, high-yield manufacture of advanced semiconductor devices, and to provide facilities for production of selected devices for [Defense Department] needs." Hearings are underway in Washington this spring to consider making funds available for this project. (The executive summary of the Augustine report was printed, without figures, in the **Congressional Record**, March 11, 1987)

The Augustine report's SMTI proposal dovetails closely with a similar project known as Sematech, to be proposed formally soon by the Semiconductor Industry Association. At the insistence of larger participants such as IBM and Texas Instruments, Sematech will not operate its own mass production lines.

On its face, the proposed SMTI differs from other earlier military chip programs because it is specifically designed to support high-volume production by the commercial sector. It would focus on manufacturing technology, not design.

Cooperative programs in chip-building technology may make sense, but in the rush to "beat the Japanese," policy-makers may overlook their shortcomings. First, there is no guarantee that jobs generated by such massive subsidies would be for American taxpayers. U.S.-owned semiconductor companies employ about as many people outside the U.S. as they do domestically, and unless conditions are built into SMTI funding, they are going to continue the practice.

Secondly, the consortium may freeze out smaller semiconductor firms. Historically, small firms have contributed a disproportionate share of new chip-design technology, but as currently proposed, the consortium is likely to be a combine of the country's largest computer and chip firms. However, since Congress must waive anti-trust rules to permit the formation of a consortium, provisions could be inserted into authorizing legislation to require that small companies be allowed access to the technology or even to the consortium's production facilities.

Third, the manufacturers of semiconductor equipment, which have always been important sources of new production technology, may be excluded. They appear supportive of Sematech and SMTI, but their interests are not the same as the chip houses. They too would like to see the subsidized development of new manufacturing technologies, but their business depends upon their ability to sell to the Japanese, Koreans, and Europeans. It is not clear at what level these firms will be able to participate.

Fourth, there has been no discussion of the social and environmental choices inherent in decisions to move ahead with particular production technologies. The further development of Gallium Arsenide, for example, could be environmentally disastrous even if it's a technical success. (See **Global Electronics**, January, 1987.) Any large program designed to further production technologies "in the national interest" should sponsor

(continued on page 2)

research and discussion on the impact of those technologies, and the forums established to evaluate progress should involve a wide spectrum of viewpoints, including labor unions, professional associations, and environmental groups,

Fifth, and probably most important, Defense Department participation is likely to encumber the work of any semiconductor manufacturing consortium. Despite the suggestions of the Augustine report, it is likely that Pentagon subsidies will be linked once more to the specific needs of the armed services. At this point, the military is unlikely to sponsor any research that moves the military sector further behind the commercial sector. In addition, it is hard to imagine a Pentagon investment in critical technologies without stringent controls over the sharing of information.

The recent historical record is fairly clear. If the goal of U.S. government policy is to strengthen the domestic semiconductor industry, then aid should be channeled through an agency that is not mission-oriented, such as the National Science Foundation. Many of the supporters of Sematech would prefer this approach, but they recognize that the Reagan administration is much more likely to increase Pentagon funding than support for the *NSF*.

As for the Pentagon, it is likely to support such a massive undertaking as SMTI or Sematech only if it benefits directly. That is, the Defense Department will fund a manufacturing research consortium only if the program helps the military regain the control over the semiconductor industry that it lost nearly two decades ago.

PENTAGON ROLE HAS DECLINED IN SILICON VALLEY

In the first two decades after World War II, military contracting dominated the high-technology industries of Silicon Valley. However, the sharp decline in aerospace spending around 1970, coupled with the rise of important new commercial products like the microprocessor and microcomputer in the early 1970's, thrust the commercial sector into the lead.

During the Reagan years, new military programs—particularly the "Star Wars" Strategic Defense Initiative—threatened to reestablish Defense Department hegemony, while the protracted slump in computers and components weakened the Valley's commercial side.

Still, most high-tech production in Silicon Valley is for the civilian marketplace. And, although Defense Department contractiing in the Valley remains high, there is no way that military spending can rise quickly enough for the Pentagon to keep pace with the anticipated new boom in commercially marketed high-tech products.

It is difficult, with available data, to get an exact measure of the Pentagon's role in Silicon Valley. The trends, however, are unmistakable. Below, we compare Pentagon figures on Santa Clara County prime contracts with annual manufacturing shipments totals from **Sales and Marketing Management** magazine.

We make the comparison only in general terms. The Pentagon figures are for contract awards, not shipments, and they are by Federal fiscal year (which changed in the late 1960's). They include work that may have been subcontracted out of the area, but not work subcontracted in. They do not include very small contracts (below $10,000 or $25,000 depending upon the year) or Energy Department (nuclear weapons) contracts. They do, however, include non-manufacturing activity such as software, computer services, and university research.

The shipments figures are from **Sales and Marketing Management**'s own surveys of establishments with 20 or more employees, published annually in the magazine's table, "Top 50 Counties in Manufacturing Activity." In recent

GLOBAL ELECTRONICS

edited by Lenny Siegel

Issue No. 74

published monthly by the

Pacific Studies Center
222B View Street
Mountain View, CA
94041 - USA
415/969-1545

US ISSN 0739-0416

subscription rates (12 issues)

United States: $12.00
Canada and Mexico: US$14.00
Overseas: US$17.00

all back issues are available

years, Santa Clara County has ranked fifth in the U.S., after Los Angeles, Cook (Chicago), Wayne (Detroit), and Harris (Houston) counties. We could not locate the **S & MM** figures for 1979, 1980, and 1981, so those numbers here are interpolations.

Year	Military Contracts (US$ millions)	Shipments (US$ millions)	Ship./Contr.
1966	807.0	3,304.9	24.4%
1967	930.8	3,654.7	25.5%
1968	1,088.4	4,009.6	27.1%
1969	1,219.8	4,201.8	29.0%
1970	1,003.0	4,026.6	24.9%
1971	847.0	4,036.9	21.0%
1972	964.0	5,084.9	19.0%
1973	1,107.0	6,261.8	17.7%
1974	1,344.6	7,669.0	17.5%
1975	1,440.4	7,577.5	19.0%
1976	1,577.3	8,943.0	17.6%
1977	1,734.2	11,339.0	15.3%
1978	2,105.2	13,238.4	15.9%
1979	2,036.5	14,385.	14.%
1980	2,392.8	15,531.	15.%
1981	2,946.2	16,677.	18.%
1982	3,888.2	17,823.0	21.8%
1983	3,893.2	22,014.0	17.7%
1984	4,630.6	25,544.0	18.1%
1985	4,552.1	29,505.7	15.4%

VALLEY TRENDS

1. Developers can't extend Silicon Valley simply by putting together industrial infrastructure within driving distance of the Valley's historic core near Stanford University. The southern Santa Clara County city of Gilroy, known for years as the world's garlic capital, has begun foreclosing on the 180-acre Las Animas Technology Park, for failure to pay taxes. The project's bankers have also initiated claims against the developers, for construction loans. The park only has six buildings, three of which are empty, and four occupants, only one of which is high-tech. (**San Jose Business Journal**, March 16, 1987)

Perhaps the project's timing was bad, since developments in San Jose and the core of Silicon Valley are also suffering from the extended high-tech industrial slump. But it is also likely that Gilroy's rural image did not appeal to the professionals that are the lifeblood of the electronics industry, discouraging firms from setting up shop there.

2. In the last issue, we reported that Ford Motor's old auto assembly plant in Milpitas was not going to make it as a high-tech office park. Now, it turns out that Ford's high-tech subsidiary, Ford Aerospace, is trying to buy a large, unoccupied office complex not too far away in San Jose. Ford Aerospace's Western Development Labs are currently based in Palo Alto.

The 540,000-square-foot Golden Triangle Corporate Center, nearby in north San Jose, was built for Atari Inc. before the game- and computer-maker imploded. Owned by a partnership including Warner Communications, which owned Atari at the time ground was broken, the Center has been vacant since it was completed in 1985. Larger than most developments in the area—known as the Golden Triangle because it is bounded by three highways—the Corporate Center has been a symbol of the Valley's industrial real estate glut. The Center has been difficult to lease or sell because the city of San Jose insisted that it be occupied by one, large firm, not several small ones. (**San Jose Mercury News**, May 7, 1987)

If Ford moves in, city officials will be vindicated for sticking to that criterion. It is likely, however, that Ford officials missed an opportunity to convert their own surplus real estate because auto and aerospace execs didn't communicate.

Meanwhile, there has been a quiet change of leadership in Silicon Valley's most influential local and regional lobbying body, the Santa Clara County Manufacturing Group. Peter Giles, the former H-P exec who headed the group since its formation in the late 1970's, recently took over reins at Silicon Valley's still-in-planning high-tech museum. He has been replaced by Gary Burke, manager of community and government affairs at IBM's San Jose complex and a 30-year veteran at Big Blue.

The Group is a coalition of the Valley's largest manufacturers, and IBM ranks with H-P and Lockheed as a top employer. The Valley may be a leading center for high-tech start-ups, and many Valley success stories may still be considered upstarts. But IBM is one of the leaders, even in Silicon Valley.

KOREAN WAFER FAB

The artificial price floor imposed upon Japanese manufacturers of memory chips has given South Korean chipmakers a new lease on life. Korea's major conglomerates had forced their way into the state-of-the-art random access memory (RAM) market just as overcapacity was turning RAM product lines into money-losers.

As late as 1985, as much as 80 percent of South Korean semiconductor production consisted of discrete components (transistors and diodes) and linear IC's for South Korean consumer electronics goods, but in 1986 South Korean producers sold significant amounts of RAM chips.

Today, three of South Korea's largest industrial groups—Lucky-GoldStar, Hyundai, and Samsung—are taking part in a government-sponsored project to mass-produce a 4-megabit read-only memory (ROM) chip by 1990. Other, related projects are designed to further Korean design technology, build up support industries, and produce 4-megabit RAM's. (**Electronics**, April 2, 1987)

This approach is costly. To compete at the leading edge of semiconductor technology, the Koreans will not only need to subsidize projects to catch up with American and Japanese firms, but they will need to divert massive financial resources from other sectors if they are to match the growing subsidies provided the semiconductor industry in the U.S. and Japan.

There is an alternative approach, pioneered by Lucky-Goldstar: alliances with American chip producers. John Lazlo, Jr., an analyst at Morgan Stanley & Co., expects cooperation to increase. He suggests, "Moreover, we believe there is a good chance that [South Korea's] semiconductor companies will establish stronger ties with U.S. producers, and effectively act as low-cost wafer foundries for American suppliers. Such a strategy would enable the Korean producers to fill their vast plants with products and give the U.S. suppliers very competitively priced devices without any capital risk." (**SEMI Outlook**, Second Quarter, 1987)

Such alliances may indeed increase, but they too require subsidies. There is a tendency, even among industry insiders, to think of South Korea as a land where everything costs less. In fact, labor and conseqently labor-intensive goods costs less in South Korea, but labor is a minor expenditure in state-of-the-art semiconductor fabrication.