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INNOVATIVE FAB PROJECT

While Sematech gets all the publicity, the Air Force and Defense Advanced Research Projects Agency (DARPA) have awarded a five-year \$75 million contract to Texas Instruments (TI) for the Microelectronics Manufacturing Science and Technology program (MMST). TI will put up \$37.5 million of its own money, as well.

By 1993, TI is supposed to demonstrate a fully integrated pilot production plant to produce low volumes of as many as 1,000 chip designs per year incorporating .3 to .5 micron features. The facility is also supposed to work with alternative substrates, such as gallium arsenide, as well as silicon.

The MMST pilot plant will differ from conventional wafer fabrication in two significant ways: First, wafers will be processed individually, with each wafer subjected to a series of processes within the same machinery. Second, instead of placing equipment in super-clean rooms, the MMST plant will use equipment with internally controlled atmospheres—even vacuum chambers.

TI has promised the Pentagon to involve semiconductor equipment producers in the project from the start. (*Electronics*, January, 1989)

PRISON LABOR

A small group of young California prisoners has moved beyond license plates to high technology electronics Pine Grove Enterprises, a small printed circuit board assembler in Stockton—about 60 miles northeast of Silicon Valley—has hired at least seven assemblers at the DeWitt Nelson Training Center, a California Youth Authority prison for underage men.

Pine Grove pays the workers the minimum wage, and it leases a large workshop inside the prison for just \$500 per year.

A similar operation in Camarillo, in southern California, employs 44 prisoners who take overflow calls from TWA's telephone reservation center in Los Angeles.

California Governor George Deukmejian would like to implement such programs in the adult prison system, but private employment of adult

prisoners has been banned by the state constitution since 1879. (*San Jose Mercury News*, February 26, 1989)

SILICON SOUTH

• Supported by Georgia Tech University and its Advanced Technology Development Institute, the Atlanta area has become an important high-tech center. Statewide, Georgia (as of 1988) is home or host to 816 electronics companies employing 126,500, up from 305 firms with 61,500 workers in 1982.

Georgia Tech reportedly has the nation's largest electrical engineering school and substantial electronics research funding. For more than years, the late Joseph Pettit was Georgia Tech's president. Earlier, as Stanford University's Dean of Engineering, Pettit played an important role in the rise of Silicon Valley, and he appears to have put that experience effectively in Georgia.

Under Pettit, Georgia Tech established the Advanced Technology Development Institute, designed to incubate high-tech start-up companies. *Electronics* (January, 1989) reports, "Of the 100 companies that got their start through ATDI, 70 have stayed the precarious course to financial viability. They employ 1,100 people and tally combined annual revenues of \$110 million."

But much of the region's growth has occurred at the low end of the industry. When garment manufacturers went overseas, electronics assemblers took their place in the Georgia economy. *Electronics* quotes Ezra Mintz, the head of Colographic Communications, "Women who used to be sewing dresses are now stuffing boards."

• Meanwhile, North Carolina's Research Triangle Park has matured as a successful high-tech area, but its size does not match the extensive publicity it received as "Silicon Valley East" a few years back.

The 30-year old park and its environs are populated by several major electronics concerns, including IBM (10,000 employees), Northern Telecom/Bell Northern Research (8,200), Mitsubishi (380), GE (350), Data General (300), Sumitomo

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(300), Dupont Electronics (230), and GTE Government Systems (75). The park's initial occupant, the Research Triangle Institute, employs 1,400, while the state-funded Microelectronics Center of North Carolina has 150 on staff.

The Research Triangle has never attracted or stimulated much start-up activity, but now there are about 40 new ventures in the area. The Triangle now has its own incubator facility, called Bitech (for Business Innovation and Technology Center), and a small but visible venture capital community. (Electronics, March, 1989)

NATIONAL SELLS OUT

National Semiconductor has long been one of the most "patriotic" high-tech companies in the U.S., warning constantly of inroads by Japanese electronics companies. It has repeatedly sought U.S. government aid, such as tax incentives, Sematech funding, and subsidies for an American-owned high definition TV venture.

Throughout its flag-waving, National's leaders rarely mentioned that the company's National Advanced Systems (NAS) subsidiary marketed Hitachi-made IBM-compatible mainframes in the U.S. In fact, when Hitachi was caught stealing IBM design secrets, it turned out that NAS employees had played a key role.

Admittedly, National backed into the business of marketing for its supposed adversary when San Francisco-based leasing, sales, and service company Itel (not Intel) went bankrupt in 1979. (Itel had marketed both National and Hitachi products). But NAS's sale of Hitachi machines has since accounted for a major share of National's revenues, particularly in down years for the chip industry.

National has also stood up against foreign purchases of U.S. high-tech companies. For example National officials reportedly opposed the sale of French-owned Fairchild Semiconductor to Japan's Fujitsu, and when the U.S. government effectively blocked the sale, National picked up Fairchild at a bargain price. More recently National execs reportedly protested the sale of Monsanto Electronic Materials to Germany's Heuls AG, but the Bush administration approved the transfer. (See Global Electronics No. 90.)

This year, however, National put NAS on the block. First it disclosed that it was selling half the subsidiary to Dutch-owned Memorex Telex, but it found a more desirable buyer in a new joint venture, 80% owned by Japan's Hitachi and 20% owned by Electronics Data Systems (EDS). EDS,

now owned by General Motors, is H. Ross Perot's former company. Hitachi and GM agreed to pay nearly \$400 million for all of NAS.

Following that agreement, Hitachi and EDS announced plans to sell the European operations of NAS to Comparex, a joint venture of two German-based multinationals, Siemens and BASF.

NAS is Hitachi's largest distributor of mainframe computers. It employs 2,200 people, including 1,200 in the U.S. (San Jose Mercury News, February 28 and March 3, 1989)

KOREAN LABOR UPDATE

The treatment of Motorola union activists in South Korea has not improved since our last report (Global Electronics No. 89). Korea Update (January-February, 1989) reports that the company suspended 52 union members, including the acting union chair, at the beginning of the year, for an indefinite period. Those suspended workers who showed up for work were beaten.

On January 8 of this year about a thousand Korean police prevented two hundred Motorola and IBM workers from marching on the US Embassy to protest their employers refusal to negotiate in good faith.

On January 13, however, IBM settled with its striking employees, but at Motorola *kusadae* thugs continue to attack union supporters.

Carl Lindholm, Motorola's vice-president for International Operations, claims that the company has negotiated in good faith with the union, and he writes, "at various times during the last several weeks, certain individuals, many of whom are

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"better late than never"

not Motorola employees, attempted to interfere illegally with the company's operations." Lindholm says Motorola has complied with Korean law, and he condemns violence in any form.

THE ADVENTURES OF VENTURE CAPITAL

Boosters of high-tech industry have long promoted subsidies to the venture capital industry, arguing that the availability of money for risky new ventures has been critical to the development of new companies and new technologies. This has been a major argument in favor of reductions in the capital gains tax, even though changes in regulations governing the investment of retirement funds have probably generated more cash for venture capital investment.

Increasingly, however, venture capitalists are buying into existing high-tech ventures. There is now an apparent shortage of capital for growing, but established firms, and an excess of venture capital over the needs of attractive high-tech start-ups.

• For example, Thomas Perkins, a partner in San Francisco-based high-tech investment leader Kleiner, Perkins, Caulfield, and Byers is organizing what he hopes will be a \$1 billion fund to invest in publicly traded high-tech companies that are undervalued. The *San Jose Mercury News* (March 6, 1989) reports, "the fund aims to acquire 5 percent to 15 percent stakes in five to seven companies."

One of the fund's prime goals is to create a block of stock friendly to management. Perkins has circulated a list of potential holdings, including Genentech, Tandem Computers, and Acuson—three companies where he serves as Board Chairman. Such blocks, suggests the *Mercury News*, would make it difficult for foreign competitors to carry out hostile takeovers.

Though Perkins is well respected in high-tech industry and the investment community that supports and profits from it, the fund may not succeed. One analyst told the *San Jose Business Journal* (March 6, 1989) that the proposed fund was too large—that is, too difficult to manage profitably. The analyst asked, "What's the difference between what he is doing and a mutual fund?"

• Meanwhile, three venture capital firms are buying control of Microchip Technology, which makes programmable logic chips, from General Instrument Corp. Sequoia Capital is buying 40%, while J.H. Whitney and Morgenthaler Ventures are purchasing about 35% between them. Microchip

managers and employees are expected to buy the rest.

Though General Instrument is publicly traded, Sequoia and its partners expect to keep Microchip in private hands for about five years.

Based in Chandler, Arizona, Microchip also has operations in Taiwan. It employs about 450 people. Last year Microchip earned about \$4 million on sales of \$100 million, and its performance is expected to improve. (*San Jose Mercury News*, March 17, 1989)

MORE SUN

While Sun Microsystems dickers with East Palo Alto—on the sociological fringe of Silicon Valley—over the construction of a headquarters "campus," (see *Global Electronics* No. 90) it is moving ahead with plans to establish a million-square-foot, 86-acre manufacturing complex in Newark—on the geographic edge of Silicon Valley—just across the Dumbarton Bridge from East Palo Alto.

The Newark development should be completed much sooner, because it is already zoned industrial and it does not involve the legal and bureaucratic obstacles inherent in redevelopment planning. The Newark plants may eventually employ 4,000 people, many of whom are likely to be transferred from currently leased sites in nearby Milpitas. (*San Jose Mercury News*, February 16, 1989)

TV PRODUCTION

Global Electronics plans to regularly cover the debate about the proper government role in the development of high definition television (HDTV) for the American market. Though we do not consider HDTV itself to be critical to the U.S. economy (see *Global Electronics* No. 87), it appears that the treatment of this highly visible technology will set the precedent for U.S. high-tech industrial policy in the Bush era and perhaps beyond.

This installment briefly describes the current status of the color television receiver production industry in the U.S. Though only one manufacturer of color televisions and two major component producers are U.S.-owned, a large number of foreign companies produce or assemble sets in the U.S.

The two largest employers, French-owned Thomson and Dutch-owned Philips, entered the U.S. market by acquiring the somewhat integrated operations of U.S.-owned producers, such as
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RCA and Magnavox. Most of the Asian-owned producers, however, only do assembly in the U.S. They established U.S. plants in response to anti-dumping proceedings brought by their U.S.-owned competitors and unions representing American electrical workers.

Unlike the computer and chip industries, the TV production industry is largely unionized. The unions, as well as the two U.S.-owned component suppliers, have resurrected COMPACT, the Com

mittee to Preserve American Color Television. Originally formed to press anti-dumping cases, COMPACT represents American workers in the debate over HDTV. The chart below is based upon information submitted by COMPACT this February to the House Subcommittee on Telecommunications and Finance. The employment total for a firm is highlighted if the bulk of its U.S. production employees are union members.

U.S. Employment in the Production of Color Televisions

Company	Nation of Ownership	Color Television Production in U.S.	Employees
Thomson	France	Components, Cabinets, Tubes, Glass, Assembly	7920
Philips	Netherlands	Parts, Cabiners, Tubes, Assembly	6700
Zenith	United States	Parts, Tubes, Assembly	4500
OI-NEG	United States	Glass	1825
Toshiba	Japan	Tubes, Assembly	1600
Sony	Japan	Tubes, Assembly	1500
Matsushita	Japan	Tubes, Assembly	1200
Harvey Industries for Pioneer & Curtis Mathes	Japan	Assembly	900
Mitsubishi	Japan	Assembly	850
Sharp	Japan	Assembly	770
Corning Asahi	U.S. and (?) Japan	Glass	650
NEC	Japan	Assembly	400
Sanyo	Japan	Assembly	400
Gold Star	South Korea	Assembly	400
Samsung	South Korea	Assembly	250
Orion	??	Assembly	250
JVC	Japan	Assembly	100
Hitachi	Japan	Assembly	90
TOTAL			30,215

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