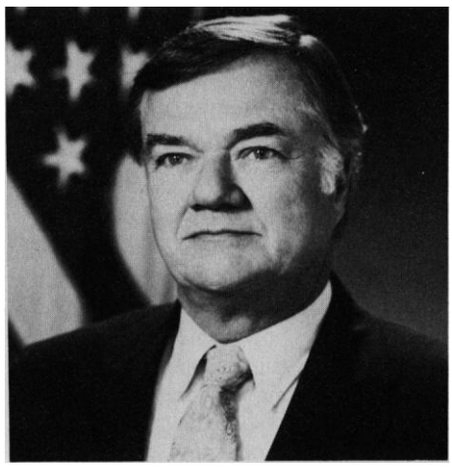
Reformers Seek Broader Military Role in Economy

Isolation of defense contractors from marketplace seen as detrimental; direct Pentagon support for struggling industries and reform of procurement regulations are being pushed



Robert Costello. *Sees opposition to reform measures virtually everywhere he looks—in Congress, industry, and the Pentagon itself.*

WITHIN THE PENTAGON, a few top officials are plotting what they call a cultural revolution in the way the Defense Department designs and buys its weapons. Although they say it is not their intent, their campaign may effectively turn the Defense Department into the federal government's central agency for keeping key high-tech industries competitive.

The incipient revolution is being planned by Robert Costello, under secretary of defense for acquisition, who came to the Pentagon from General Motors in 1986. It is taking place on two broad fronts. Costello is seeking more use in weapons of components that are available commercially, rather than items that are manufactured in small quantities to rigid military specifications. He is also pushing the Pentagon to find ways to provide support to industries that are critical for defense production but are under siege from foreign competitors. Both these thrusts would make the Pentagon a more direct force in the civilian economy.

It will be a tough fight, however, for Costello is facing entrenched opposition practically everywhere he looks—in Congress, industry, and the Pentagon itself. He wants to throw reams of regulations dealing with ethics and accounting procedures into the trash. But as government investigators pursue allegations of corruption in the Pentagon's procurement system, Congress may be in the mood for more regulation, not less.

The Pentagon's traditional contractors are not pleased at Costello's efforts to buy more commercially available components. "Some people in industry don't want us to change some of our specifications, because that's the only reason they're in business—they have a production line going that no one else would ever have," said Costello in a recent interview with *Science*.

And within the Pentagon, controversy has greeted efforts to aid struggling U.S. commercial industries. In July, Costello's office released a report on "Bolstering Defense Industrial Competitiveness," but getting the report out, he said, was "a hell of a fight." Many Department of Defense officials believe that the health of U.S. industry "is not our business," said Costello.

Increasingly, however, Pentagon officials have turned their attention from the balance of military forces to the balance of trade. The decline of key American industries is seen as a military threat, because in wartime, dependence on foreign suppliers could prove crippling.

Since the Defense Department is too small to keep an entire industry alive, it has to figure out a way to help that industry succeed in the commercial marketplace. Firms that produce components for the military will survive only if they also succeed in manufacturing large volumes of less sophisticated products for the commercial market, notes Jacques Gansler, senior vice president of the Analytic Sciences Corporation, a Pentagon consulting firm.

Costello recently met with representatives from companies that produce advanced composite materials used in military aircraft—an industry near the top of the Pentagon's list of those that may need help to survive. "I told them very bluntly that I didn't see how they could provide the technological leadership in our very sophisticated applications unless they also were competitive making golf clubs, tennis rackets, and skis," said Costello.

Thanks to Costello and his Pentagon allies, the Defense Department has taken the lead within the federal government in studying ways to support U.S. industry. Last year, it put in place a system for monitoring the performance of 215 individual industries. Using this system, said Costello, the Pentagon should be able to tell not only which industries are doing poorly, but why. "You have to know the basics of an industry," said Costello. "In steel, you need to know how many Btus per ton, how many man-hours per ton, how many pounds of oxygen per ton."

And the Pentagon will offer more than advice. "We're taking the position with the Department of Commerce and others that if an industry can come to us with an aggressive program to improve technological competitiveness, then we need to help them," he said.

The first major test of the Pentagon's ability to bolster a beleaguered commercial industry is now taking shape in Austin, Texas, where the Semiconductor Manufacturing Technology (SEMATECH) consortium is building its plant. The Defense Department will pour up to $500 million into this project over the next 5 years, matched by funds from 14 companies that have joined the consortium. The member companies have agreed to pool their resources in a joint effort to develop and test better techniques for manufacturing semiconductors.

After months of delay, SEMATECH announced on 27 July that Robert Noyce, founder of the Intel Corporation, would become the consortium's chief executive officer. SEMATECH officials hailed Noyce's selection, but some observers noted that the long delay in filling the position probably meant that Noyce was reluctant to accept it.

According to Sanford Kane, an IBM division vice president who chairs SEMATECH's executive committee, DOD officials and SEMATECH's industry executives were able to hammer out pathbreaking agreements that could serve as models for future Pentagon programs.

Officials of the Defense Advanced Research Projects Agency (DARPA) regarded SEMATECH at first as a way to fund very advanced long-term research in laboratories throughout the country, and doubted that a central facility was needed, said Kane. Industry negotiators protested that the most crucial technologies would be ones that could be applied immediately, and not just by the most advanced firms. The central facility, they pointed out, was necessary for engineers from many firms to get hands-on experience. "Inside the central facility, we will prove in a demonstration environment that a new ion-implantation tool works," said Kane. "When the firm wants to transfer the technology, it brings it back in the minds of its employees."

In the final compromise, the industry got its central facility, and DARPA got a commitment that 20% of SEMATECH's money would finance advanced research projects, most of them conducted outside Austin.

"It's absolutely the start of a trend," said Craig Fields, deputy director for research at DARPA. "We're looking at a number of other industries now where there's a tremendous need for assured supply, and where the industry is moving offshore, and we're going to have to do something about it."

Besides semiconductors, the industries Pentagon officials mention most frequently as candidates for rescue packages are those manufacturing machine tools, bearings, and composite materials.

The heart of Costello's proposed cultural revolution, however, is not occasional financial aid packages for industry. Rather, it is an attempt to change the way the Pentagon buys hundreds of billions of dollars worth of weapons each year.

According to an array of former senior DOD officials and industry executives, heavy-handed government regulation and unique—sometimes unreasonable—military specifications have spawned companies, and divisions within large corporations, that produce equipment for one customer only: the Department of Defense. The result, according to Costello's July report, is a defense industry that is isolated from market incentives and extraordinarily inefficient.

One part of the problem, say industry executives, is "milspec"—military specifications that define exactly how a piece of Pentagon equipment shall be built. "Companies have to bid to the requirement. They aren't allowed to say, look, if you can modify the requirement by 5%, we can reduce the price by 20%," said Lewis Branscomb, former chief scientist at IBM, who is directing a study of technology with both military and civilian applications at Harvard's Kennedy School of Government.

In some cases, said Costello, the Pentagon bureaucracy requires processes that have been abandoned by commercial industry. Most firms, he said, have adopted infrared and x-ray inspection of solder joints, while the Pentagon holds to optical methods that are less effective and more expensive.

Studies are under way to see if the De-

Can the Pentagon Fight Trade Wars?

Ask a Washington insider why the defense budget contains money for SEMATECH, the industrial consortium to revive the U.S. semiconductor industry, and you get a wry smile. "I was one of the movers behind the SEMATECH project," said Clyde Prestowitz, former counselor to the Secretary of Commerce. "I didn't want it in the Pentagon, but there's no other place to go."

"We probably should be funded through the Commerce Department, but they don't have any money," said a SEMATECH spokesman.

Nor did anyone else have the inclination, according to Senator Jeff Bingaman (D–NM). "You have a lot of ideologues in the Administration who object strenuously to the federal government taking a leadership role in something like SEMATECH unless it can be wrapped in the robe of national security," he said.

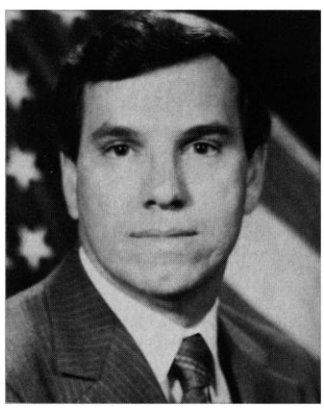
As the United States continues to take its monthly drubbing from Japan in the statistics of international trade, Congress seems more and more willing to fund R&D projects aimed at strengthening American high-tech industry. But advocates of such programs are in a quandary about which government agency should administer them. Programs like SEMATECH, the National Center for Manufacturing Sciences, and research on high-temperature superconductors have therefore ended up in the Defense Department more or less by default.

Few seem enthusiastic about making the Pentagon America's MITI. One congressional source called the idea of turning technology programs over to the Defense Department "farcical." And Simon Ramo, cofounder of TRW, compared it to "taking a group of medics that are beset with a tremendous epidemic that they can't handle, and giving them in addition the job of improving the nation's food supply. Why in the world we should assume that the Defense Department should be used as a vehicle for advancing our commercial interests I cannot imagine," said Ramo.

But in the real world of Washington politics, there are few better alternatives. In 1987, a panel of the National Academy of Engineering recommended that the federal government focus its efforts to encourage the development of critical technology "through a designated agency," but failed to agree on which agency should do the job.

William Howard, a senior fellow at the academy, ticked off the list of rejected options: The National Science Foundation would "not be appropriate"; the Department of Commerce "essentially has walked away from the job"; the Department of Energy "hadn't proved effective" at the task; and the Defense Department "is preoccupied with other motives." The panel eventually settled on the White House Office of Science and Technology Policy as the best of bad options.

One obvious strike against the Defense Department is its focus on military applications, and its lack of concern with efficient, low-cost manufacturing that is crucial for commercial technology. And most Pentagon contractors, said Prestowitz, "have little ability, interest, or incentive to commercialize what they learn."



Clyde Prestowitz: *"I didn't want [SEMATECH] in the Pentagon, but there's no other place to go" in the federal government.*

All of this is reviving talk of the need for a reorganization of the federal science and technology bureaucracy. "You need to create a counterweight to the Defense Department," said Prestowitz. He argues for a huge new Department of Science, Industry, and Technology. Bingaman supports a "civilian DARPA," a nondefense counterpart to the Defense Advanced Research Projects Agency. It would take the results of government-sponsored basic research, and develop commercial technologies that private industry, with its short-term time horizons, could then develop into commercial products. Representative George Brown (D–CA) has proposed a National Policy and Technology Foundation.

Few expect any major reorganization, however. For example, Bobby Inman, president of the Westmark Corporation, argues that "the likelihood of creating large new agencies or organizations is essentially nonexistent." Only the Pentagon, he said, is powerful enough to "reach across a whole industry" with the kind of impact MITI has had in Japan. ■ D.C.

fense Department can adopt commercial standards for much of the equipment, such as electronic components, that it buys. The Pentagon could then buy off-the-shelf commercial products that are dramatically cheaper because they are produced in large quantities under the pressure of marketplace competition.

Some progress has been made in buying commercial off-the-shelf equipment, said Costello. The Defense Science Board is now studying how well the Defense Department has put into practice the recommendations of a 1986 report that called on the Pentagon to use more commercial components.

Changing the maze of regulations governing defense procurement will, however, be a more daunting task—especially in the wake of allegations of corruption within the Pentagon's procurement system. During recent appearances before Congress, Costello had to defend the current regulations—which he would like to trim back—against suggestions that they need to be tightened.

Currently, the Defense Department tries to guarantee fair prices for its equipment through a complex system of cost accounting regulations. But its efforts to eliminate fraud, said one electronics industry executive, have made doing business with it "a real mess." According to a variety of industry executives, those regulations virtually guarantee that Pentagon contractors will be inefficient.

To dramatize the burden of regulation that the Defense Department has placed on industry, Costello recently carried a 4-foot-high stack of regulations into a congressional hearing room. "Reform should simplify, not complicate, defense procurement," he told the House Government Operations Committee on 13 July.

One consequence of the complex procurement regulations is that companies typically set up separate divisions to work on government contracts in order to keep their commercial business from getting entangled in the Pentagon's cost-accounting rules. The facilities of these divisions sometimes duplicate the company's commercial production lines, and typically have extremely high overhead costs. They produce small quantities of equipment custom-designed for the military.

As a result, said William Perry, chief executive of HLQ Technology Partners, a venture capital firm in Silicon Valley, computer chips for the Defense Department cost more than three times what identical commercial chips do. Perry served as under secretary of defense during the Carter Administration.

The wall that separates Pentagon contractors from the commercial market also limits the commercial usefulness of the Pentagon's R&D investments. In many corporations, contact between divisions that work on commercial and military products is limited and there is "not a whale of a lot" of technology transfer from the corporation's defense work into its commercial work, said William Howard, Jr., formerly a vice president of Motorola and currently a senior fellow at the National Academy of Engineering.

Only a handful of companies—generally those with roughly half of their business in each area—make a serious effort to use Pentagon-sponsored technology in commercial products, said Branscomb. A company that relies on the Defense Department for most of its business is rarely able to function well in the commercial marketplace, said Perry. "It's a different world, a different culture," he said.

One consequence of separation from the commercial market can be technological timidity. Unlike private firms, defense contractors cannot make big profits on speculative R&D investments in new products. As a consequence firms that develop new technology for the Pentagon wait for a contract to be announced before starting to work on it.

Bobby Inman, chairman and CEO of the Westmark Corporation, agreed. During the time he headed a consortium called the Microelectronics and Computer Technology Corporation, he said, "I was amazed. The companies that were prowling the halls looking for new tools were the ones in the commercial arena. Those in the defense business were waiting to be told what to use."

For Inman, Costello's initiatives in the Pentagon have been "a breath of fresh air." But to turn the Defense Department from a haven for inefficient industries into a champion of commercial competitiveness, he said, will take "a fundamental change of approach." ■ **DANIEL CHARLES**

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Soviet Biotechnology Meets Glasnost

Moscow

In remarks that may sound familar to the American biotechnology community, a Soviet minister recently expressed frustration over the shutdown of a biotechnology facility that was prompted by protests from local citizens and an "unobjective" press.

In a rare glimpse of Soviet society under glasnost, Minister of the Medical and Microbiological Industry Valery Bykov talked about the problems related to the plant closing in an interview published is the 24 July issue of *Moscow News*, an English language newspaper published in the Soviet Union.

According to Bykov, the ministry, in an effort to beef up the nation's cattle production, set up a plant in Kirishi, a city 60 miles southeast of Leningrad, to produce fodder protein "using biotechnology." (Bykov did not specify whether production involved recombinant DNA techniques.)

The protein dust, however, proved to be an allergen. Some of it escaped the plant. "True, the cleaning system at the plant worked badly," Bykov said. "We fired some managers for that. But our plant in Kirishi was made the scapegoat for an increase in illness."

He argued that the city already suffers from heavy industrial pollution and that the contribution of the biotechnology plant was "trifling." Nevertheless, "some people claimed that the plant was producing 'biological bombs' and that it was responsible for the deaths of a number of local people. This absurdity landed in the papers. All our arguments were ignored," Bykov complained.

Criticism in the press mounted. A newspaper published a letter by plant workers, who questioned the necessity of the facility. A television show, "Spotlight of Perestroika" faulted the ministry. Bykov said, "We telephoned [the show], saying that we were ready to respond, but were informed that our reply wasn't necessary. Such are the ups and downs of glasnost," complained Bykov.

Bykov said that opposition to the Kirishi plant eventually "snowballed into a campaign against the entire industry—against biotechnology." The plant was recently closed.

"The most important part of our work, the development of biotechnology, is hindered by items in the press and the reaction to them." Bykov said, "I think we are guilty of not popularizing biotechnology, of not explaining what it would do for the people." Major scientists, he said, have written articles on biotechnology and sent them to the press for distribution, "but not a single one has been published," Bykov noted.

"Of course I'm for glasnost," he said, "but glasnost must be democratic. It's no good at all if it's based on unobjective facts."

■ **MARJORIE SUN**