Tapping Government Know-How

The booming business of industry partnerships with federal labs

By TINA ADLER

Engineers routinely use seismic waves to track down oil and gas reservoirs. In the Gulf of Mexico, however, salt domes scatter and distort the waves, so oil companies need help in interpreting the data. Parallel computers, which handle close to 100 problems at once, can't handle the task. Massively parallel computers, capable of undertaking thousands of computations simultaneously, can do the job, but they would cost a company $10 to $20 million.

Los Alamos (N.M.) National Laboratory has just the sort of computers the oil companies need, explains Randy S. McKnight of Marathon Oil Co. in Houston. So this Department of Energy (DOE) lab agreed last year to use its computers to help oil companies prospect for lucrative reservoirs. The project should run 2 more years. Both partners share its total cost of approximately $8 million, as well as intellectual property rights.

That partnership represents one of a growing number of cooperative efforts under way between two leaders in the research and development (R&D) arena—U.S. industry and federal laboratories. Both sides have put billions of dollars into such deals and together have developed new technologies for such varied purposes as igniting fireworks, eliminating hazardous materials from eyeglass manufacturing, and improving crops' resistance to insects.

In the mid-1980s, Congress passed a series of laws requiring federal agencies to set up programs promoting government-industry partnerships. By offering U.S. companies two valuable resources—the know-how and the equipment of government scientists—Congress hoped to make them more competitive internationally. The Bush and Clinton administrations have encouraged such relationships.

The federal laboratories value the partnerships because they get the benefit of industry's expertise and financial support. Moreover, the new deals provide the kind of nonmilitary work that the labs have been looking for since the end of the Cold War. Businesses like the partnerships because the labs provide tremendous financial and technical support.

Some company executives involved in these relationships talk about the laboratories like newlyweds admiring their spouses. Others describe nothing but red tape.

"Many companies find [partnerships with government] highly attractive and useful, whereas others think they are a waste of time and effort—it varies widely," says Charles F. Larson, director of the Industrial Research Institute in Washington, D.C., which represents businesses that conduct R&D. "The main problem is the bureaucracy," he explains.

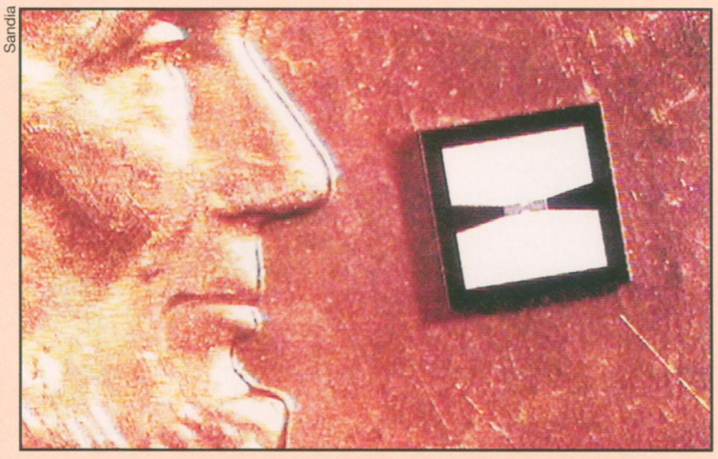
That anyone would want to work with the federal labs might surprise some government watchers. Only 2 years ago the General Accounting Office reported that the labs' facilities have deteriorated seriously as a result of decades of underfunding (SN: 10/2/93, p.213).

But some industry representatives defend the quality of the labs.

"In no way were we displeased with the physical resources or the intellectual resources" of our government partners, namely, Los Alamos and Sandia National Laboratories in Albuquerque, says McKnight.

The equipment "is world-class," agrees Edward Lanphier of Somatix Therapy Corp., a gene therapy company in Alameda, Calif. Somatix signed a partnership with Lawrence Berkeley (Calif.) National Laboratory (LBNL) to work on a treatment for Parkinson's disease.

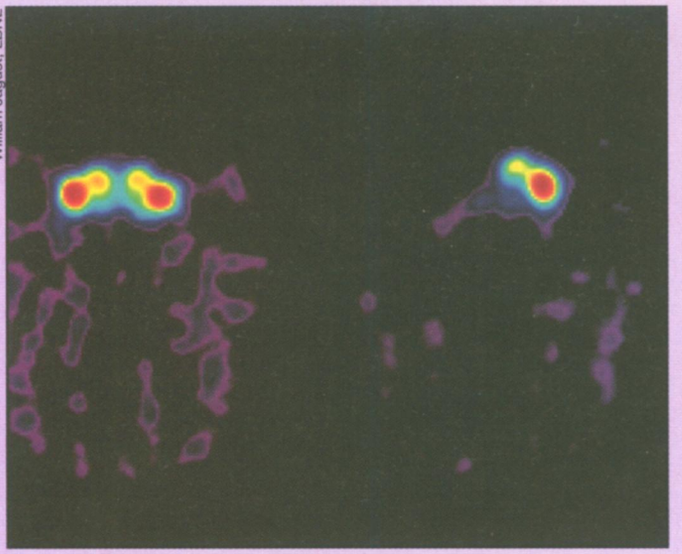
The new Republican leadership poses the biggest threat to the health of the laboratories' relations with industry. These members of Congress don't take kindly to such marriages, calling them



Buena Vista Pictures Distribution (BV) in Lake Buena Vista, Fla., a subsidiary of the Walt Disney Co., needed a faster, more precise way to ignite fireworks. Scientists at Sandia lab had a semiconductor device from their research on explosives that they thought would do the trick. They modified it slightly to meet BV's needs, as part of a 1-year, $733,000 CRADA.

Semiconductors doped with phosphorus get hot more quickly than the wires normally used in igniters, explains Sandia's Dennis E. Mitchell. Eventually, the Sandia researchers may add timing devices to the igniter. "You should be able to have [a semiconductor] igniter control itself, but we haven't gotten to that point yet," he explains.

The semiconductor igniter is small enough to fit on the head of a penny. Electrical leads attach to the white, aluminum area; the explosive is packed on top.


William Jagust, LBNL

Somatix and LBNL established a $3.5 million, 3-year CRADA last May to test a possible treatment for Parkinson's disease, a progressive neurological disorder.

Before getting involved in the CRADA, Somatix researchers had induced Parkinson's in 25 rhesus monkeys. They then inserted into the primates' brains genetically engineered cells that overproduce an enzyme which promotes the production of dopamine, a neurotransmitter, explains Edward Lanphier of Somatix. People develop Parkinson's because their cells' ability to make dopamine gradually declines. The new cells should boost patients' production of the neurotransmitter.

Last year, after the monkeys got their new cells, LBNL scientists monitored the animals' dopamine production with both positron emission tomography (PET) and single-photon computed tomography scanning devices.The treatment looked so promising that the company hopes to start human trials next year.

These PET images reveal the differences in dopamine concentrations, shown in red, in the brains of healthy primates (left) and those with Parkinson's disease (right).

"corporate welfare." They don't want the government creating winners and losers among industries by providing certain companies with federal support.

The House is debating a FY 1996 appropriations bill that calls for reducing DOE's budget by 6.7 percent. The bill eliminates the department's technology transfer programs (SN: 7/22/95, p.59). Without their own pool of funds, such projects will have to compete with other DOE endeavors for support. Members of Congress hope this will force the agency to enter into only those partnerships that truly advance its goals.

Many members have a "real skepticism about industry-government partnerships," asserts William G. Morin of the National Association of Manufacturers in Washington, D.C.

Members of Congress aren't the only ones sharpening their shears. Chunks of DOE's agreements may end up on the floor next month, when Energy Secretary Hazel O'Leary announces departmentwide cuts in spending, a DOE spokesman says.

One way companies and laboratories join forces is by entering into cooperative research and development agreements (CRADAs), which, like prenuptial agreements, spell out each partner's rights and obligations.

The two sides generally share costs equally and may contribute staff, equipment, and facilities to the project. The federal laboratories do not provide funds to their industry collaborators. Either partner may withhold commercially valuable findings or developments from the public for up to 5 years. Companies may manufacture and sell products that result from the CRADA, although both partners retain rights to their employees' inventions.

The industrial partners range from one-person businesses to consortiums of large companies. Often lasting 2 or 3 years, their projects typically refine or improve existing technologies, though about 20 percent involve basic research.

Investments in CRADAs have grown dramatically in recent years. The Office of Management and Budget (OMB) estimates that federal agencies will have CRADAs valued at $5.8 billion in FY 1996 (which begins Oct. 1)—roughly twice their FY 1994 worth.

The administration's FY 1996 budget provides for 6,816 CRADAs, or 36 percent more than in FY 1994. Many agencies plan to have a large number: The Department of Defense wants to have 1,223 agreements in FY 1996, up 45 percent from FY 1994; NASA is planning for 1,000, up 15 percent from FY 1994.

DOE, however, will lead the pack, with an anticipated 2,976 CRADAs worth some $4.9 billion in FY 1996—60 percent more than it had 2 years earlier. That would give the agency 44 percent of all such agreements.

"CRADAs currently occupy pride of place among the array of mechanisms employed by DOE to encourage laboratory-industry cooperation," states the report of an independent task force headed by Robert Galvin, former chief executive officer of Motorola and a mem-

Young lacewings will happily eat other insects, including farmers' foes such as aphids, whiteflies, leafhoppers, and mites. As part of a 2-year, $34,510 CRADA, Smucker Manufacturing Co. in Harrisburg, Ore., and the U.S. Department of Agriculture's Agricultural Research Service (ARS) scientists in Byron, Ga., developed a device that would spray onto plants both lacewing eggs and an adhesive that Smucker had already developed. The glue holds eggs onto the leaves until the insects hatch and can begin devouring pests.

Smucker plans to sell the device to farmers next spring.

Here, ARS scientist John Blythe sprays the eggs in a vineyard in Madera, Calif.


Levi Mills

ber of the company's board of directors. The panel, which released its report in February, reviewed 10 of the department's research facilities and recommended ways in which DOE might revamp them to meet national needs (SN: 2/18/95, p.108).

The Galvin commission, as well as other policy experts and Congress, cast a critical eye on DOE's enthusiasm for CRADAs. They argue that the agency has failed to follow rules dictating that federal labs work only on projects that tie in closely with their missions.

In DOE's case, those missions are protecting national security; cleaning up and managing radioactive and hazardous waste sites; supporting research in physics, materials science, chemistry, nuclear medicine, and biology; and ensuring that the country has an adequate supply of energy, O'Leary stated in June.

Some policy experts cite DOE's agreements with the textile industry as examples of partnerships that fail to support the agency's missions. One such CRADA, between Brookhaven National Laboratory in Upton, N.Y., and Cotton, a firm in Raleigh, N.C., involves genetic analysis of cotton plants to help breeders produce better ones.

"The labs are struggling to justify themselves, and in some cases they are really pushing the envelope," asserts Morin.

DOE has "engaged in a pretty indiscriminate effort to find industrial collaborators who might be interested in [its] technology. . . . There's been, until recently, very little effort to focus these efforts," contends Richard K. Lester, a Galvin task force member and director of the Massachusetts Institute of Technology's Industrial Performance Center.

Alexander MacLachlan of DOE's Office of Technology Partnerships agrees that some CRADAs fail to further the agency's mission but says his office is making an effort to change that.

The Galvin report also warned DOE against competing with private firms that could offer the technical services CRADAs now provide.

In addition, report authors found that DOE lacks a good system for deciding what proposed agreements to fund and for reviewing the quality of its partnerships. "The [CRADA] peer-review process [is not] as rigorous as other DOE programs," the Galvin report states.

"We weren't able to tell from data provided to the panel what fraction of these CRADAs were very successful, partly successful, and not successful at all," Lester contends.

In a series of investigative articles published June 4 to 10, the Philadelphia Inquirer criticizes sharply government agencies' partnerships with companies. The reporters include examples of the problems at DOE that Galvin commission members cite.

The newspaper concludes that the government's partnerships in general "suffer from duplication, inflated management costs, and exaggerated claims of success." Most important, the programs have also failed to produce the jobs that their supporters promised.

In a letter to the paper, DOE's MacLachlan disputes many of these claims and points out that the agency enters partnerships to promote its mission, not necessarily to create jobs. "The nature of [the Inquirer's] rhetoric is so incredible that no thoughtful reader could take it seriously," Galvin contends in a separate letter.

No matter what the critics assert, one U.S. institution—General Motors Corp.—has nothing but praise for its CRADAs. The automaker's 50-plus agreements, primarily with DOE, are helping it to develop better batteries, turbines, exhaust systems, and more.

Before CRADAs existed, representatives of industry "used to sit on opposite sides of the table with government," says Nuno A. Vaz of GM's government partnerships program in Warren, Mich. "Now we sit on the same side. . . . The change of atmosphere is enormous."

"We sure hope that the GOP understands the great advantage there is to CRADAs," he says. □