



PARTNERS ON A MISSION:

**Federal Laboratory Practices
Contributing to Economic
Development**

Executive Summary

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EXECUTIVE SUMMARY

Research universities have been a source of new ideas and technologies in Silicon Valley, North Carolina Research Triangle, and other recognized technology regions. Federal laboratories like universities also can be a source of new ideas and technology for communities and regions. Federal laboratories as economic development catalysts, however, face somewhat different challenges and expectations than universities stemming from a more mission-oriented focus. Nevertheless, some federal laboratories have successfully transferred technologies to the private sector and provided other related activities to surrounding communities and regions. There are now some outstanding examples of federal department and agency programs, and federal-state collaborative programs that have significantly contributed to economic development around federal laboratories.

It is generally recognized that a federal laboratory's presence benefits local economic development by attracting highly educated scientists and engineers to the area and creating an attractive atmosphere for entrepreneurial development and growth. By adding physical infrastructure, such as incubators and research parks to the area, some federal laboratories provide additional incentives for entrepreneurs. Some federal laboratories also sponsor technical and business assistance, capital incentives and linkages, business networking, entrepreneurial leave programs, education and training, and information dissemination that promote entrepreneurship, expand high-tech enterprises, and advance other firms.

In order to bring some of these examples to the federal research and economic development communities, the Office of Technology Policy (OTP), U.S. Department of Commerce, entered into a cooperative agreement with Innovation Associates (IA). IA administered a questionnaire, conducted on-site research and produced case studies on federal laboratory activities in economic development. IA found that federal laboratories were pursuing a variety of activities that benefited the communities and states in which the laboratories were located, and at the same time, benefited the laboratories themselves.

IA found that the labs participating in the study benefited from involvement in local economic development in several ways. Laboratories were able to attract more qualified employees when the area in which the lab was located became more economically attractive, the spouses of lab employees were able to find employment, and school systems were more

attractive for their children. Labs directly benefited from helping local suppliers improve their quality and meet standards needed to support the lab's sophisticated research and development (R&D). Labs also benefited when technologies stemming from their R&D were developed and adapted for dual use by lab employees and when lab employees assisted other businesses in adapting technologies. The results of these activities benefited the lab by raising the level of technology available to it and to other government and commercial markets.

The study indicated that business assistance programs sponsored by federal laboratories can facilitate and add value to technology transfer programs. Programs such as the business assistance and Mentor Protégé programs at Sandia National Laboratories (SNL) enable technology enterprises to commercialize technologies originating at federal labs. They also augment and enhance technology supply chains that enrich the laboratories and the private sector. Federal lab activities performed in conjunction with universities such as Pacific Northwest National Laboratory's (PNNL) use of MBA students to conduct marketing studies on lab technologies and Los Alamos National Laboratory's (LANL) use of university interns as technology scouts leverage university and federal laboratory strengths.

Entrepreneurial leave programs at some DOE laboratories were shown to promote technology transfer by encouraging lab employees to start their own businesses and assist other businesses to mature and adapt lab technologies for commercial and government use. Entrepreneurial leave programs benefited the government by improving the supplier pool available to the labs and benefited the community and region by increasing and enhancing start-up enterprises. SNL's program, for example, has helped start or expand almost 100 technology enterprises, some of which have become suppliers to the lab. Entrepreneurial leave programs also were shown to improve the labs' ability to recruit and retain productive employees who may have been attracted to other research organizations that provide flexible opportunities to carry their basic research through to practical applications.

The study also indicated that networking activities sponsored by federal labs and community organizations can provide a valuable service by linking labs with outside business, education and economic development entities. Through conference and liaison activities, the Patuxent Partnership in Maryland brings the Naval Air Warfare Center Aircraft Division closer to regional sources of suppliers, other businesses, universities, and local and state policy makers. Several labs sponsor or participate in venture capital forum. SNL brings venture capitalists to New Mexico to participate in an annual Equity Capital Symposium that showcases entrepreneurs, and PNNL critiques technical presentations for entrepreneurs participating in its state forum.

Intermediary organizations can play an important role in facilitating business-laboratory relations, linking geographically distant labs with enterprises, and leveraging resources that benefit enterprises working with labs. The study included several such organizations. Wright

Technology Network (WTN) and MEP Management Services Inc. (MEP MSI), for example, have “embedded” technical specialists in labs to identify and transfer technologies to local and distant enterprises. These specialists can add value through their dual understanding of federal laboratory and commercial perspectives and goals. TechLink, a center of Montana State University, brings distant federal lab technology and know how to enterprises in Montana and other rural states.

Other federal, state, and local organizations are partnering with federal labs to leverage resources. For example, in Ohio, the NASA-sponsored Great Lakes Industrial Technology Center identifies minority and disadvantaged enterprises, and provides grants and assistance to help them work with federal labs in Ohio and the region. In Maryland, the Technology Development Corporation provides grants for enterprises to work on technology commercialization of federal laboratory technologies. In New Mexico, through a special legislated return of gross tax receipts from SNL, the Lab is able to give technical assistance to small and minority-owned enterprises. In Maine, MEP MSI leverages the federal Manufacturing Extension Partnership (MEP) and other federal and state funding resources to bring distant federal lab technologies to local enterprises.

Incubators and research parks add another dimension to federal lab R&D. The study showed that research parks were attracting research corporations and major suppliers that work with the labs, bringing them closer to the source of R&D and promoting access to lab researchers and facilities. Some incubators such as the Tri-Cities Enterprise Center associated with PNNL offer business assistance and technical support to help enterprises commercialize technologies originating in PNNL. DOD’s Center for Entrepreneurship in Camden, New Jersey helps enterprises transfer DOD technologies and also helps DOD “spin in” commercial technologies. The Center serves an added economic development function through its presence in a city Enterprise Zone.

IA’s study confirmed that federal lab activities with education institutions, from K-12 to community colleges and universities, are well supported in some labs and well received in communities. Federal labs that sponsored tours of R&D facilities and dispensed mobile lab units to schools gave students and teachers an unusual opportunity for “hands-on” experience with sophisticated technologies. Programs such as the Science, Engineering, Mathematics, and Aerospace Academy sponsored by NASA Glenn provided academic enrichment and career awareness that encourage K-12 students to pursue math and science careers. These types of programs may help insure a future labor pool of scientists. Lab employees also contributed to curriculum development at all education levels. Special apprentice programs such as the Pre-Apprentice Machining Program at NASA Glenn provided innovative workforce development that served the technical labor needs of the Lab and at the same time helped meet the employment needs of the community.

These are just some of the ways in which federal labs are actively engaged in economic development and related activities. As a result of responses to the economic development questionnaire and discussions with federal laboratory, federal agency and economic development representatives, IA identified numerous issues that affect the ability of federal laboratories to actively support economic development and related activities. Chief among these issues is the tentative and precarious support for technical and business assistance, and economic development in federal labs. This stems from unclear Congressional and agency mandates for such activities. Although there is a clear technology transfer mandate, there is little recognition and support for federal lab activities that facilitate and enhance technology transfer; that is, technical and business assistance needed to realize the commercial potential from technologies and know how originating in the laboratories.

There is also wide recognition that the "valley of death" remains a major obstacle to maximizing economic development benefits from federally funded R&D. The "valley of death" – the gap between originating research ideas and "proofs of concept" and their possible commercial application – is a complex and pervasive issue that affects technology transfer in various research venues including federal laboratories. Although strides have been made to address this challenge, it may be timely to revisit the issue, review the latest research findings, and engage federal policy makers in a dialogue to consider available options and whether new initiatives might be warranted. It was suggested that a national advisory committee composed of public and private sector representatives, including representatives of small technology enterprises, would be helpful to explore the policy and administrative options. The following highlights other findings and conclusions.

- Representatives in some federal labs would like policy makers to clarify their intent with regard to federal lab participation in technical and businesses assistance, and support for economic development, and back up this intent with dedicated funding.
- Technical and business assistance, now a peripheral activity for most federal labs, can be beneficial to the federal labs' technology transfer mission. Some lab and economic development officials suggested that agencies may want to review and consider support for programs such as DOE's former TPP and other programs at particular laboratories with similar intent to provide technical and business assistance.
- Entrepreneurial leave programs are potentially valuable mechanisms for promoting commercial use of laboratory technologies and know how. More study is needed on the costs and benefits of these programs to determine whether they should be expanded to other agencies and labs.

- By sponsoring and/or participating in entrepreneurial, seed and venture capital, and business networking events, some federal laboratories are contributing valuable technical expertise and credibility to these events.
- Programs such as SNL's Mentor Protégé Program and others designed to encourage small business partnering are helping to strengthen suppliers, benefiting communities and federal labs.
- A number of labs have developed research parks and incubators at or near laboratory facilities. But proximity alone appears insufficient to insure effective linkages between enterprises in parks/incubators and labs; labs and economic development organizations should facilitate these linkages.
- Education programs were popular among lab managers and employees as well as the communities included in the study. These programs contribute to the future talent pool available to labs and promote federal labs as "good neighbors".
- Information dissemination activities of labs, once limited to publicizing scientific and technological research, now often cover broad areas of interest to technology firms. Internet-based dissemination also can be used to provide on-line tutorials, facilitate third-party evaluations, and promote technology transfer. Expanded use of Internet-based services by labs can assist in achieving better information dissemination.
- Federal lab representatives are often confused about allowable work with SBIR firms and are looking for clarification about the restrictions and the waiver process.
- In near future years, labs may experience difficulties in filling technical and scientific positions. Policy makers should take notice of this potential short fall and consider policies aimed at meeting future labor needs.

In conclusion, strengthening the business communities in which the labs are located appears to make good economic sense for the communities and states in which labs are located and for the federal laboratories. Building stronger, higher quality enterprises provides better suppliers for the labs; stimulating science and engineering interest in students develops a stronger future labor pool; and working in more effective and flexible ways with business and industry insures that federal laboratory-inspired technologies and knowledge will be transferred and commercialized. Moreover, fostering maturation and commercialization of federal lab technologies through business and technical assistance and entrepreneurial programs adds value to lab technologies, sometimes contributing back to the lab higher quality technologies than the original, and raising the scientific and engineering bar higher for all.