STATEMENT OF THE PROBLEM

Although endowed with the best research institutions in the world, the United States is increasingly challenged in its productivity and economic competitiveness. A vast storehouse of mission-oriented advances in scientific knowledge exists within the federal laboratory system, but no systematic effort presently facilitates the translation of these innovations into useful technology for business and industry except in the field of agriculture.

The situation is particularly critical for businesses struggling for survival in depressed industries. Firms hard hit the most have been forced to lay off personnel simply to survive. Little effort can be afforded by these firms in searching for innovative approaches to improve productivity in a seemingly complex, impenetrable federal laboratory network.

Some large firms with resources and manpower can individually search the federal laboratories for technologies to improve the energy efficiency of their manufacturing facilities, to reduce the cost of product assembly, to identify new product opportunities, or to identify other means to enhance profitability. Thus, the domestic benefits of the tremendous research and development investment funded by all taxpayers generally accrue to an elite few.

The Stevenson-Wydler Technology Innovation Act of 1980 (P.L. 96-480), the Packard Report of the White House Science Council (May, 1983), and other policy pronouncements from G. A. Keyworth, Science Advisor to the President and Director of the Office of Science and Technology Policy (March, 1984), have established intent for an increase in the utilization

of federally funded technology developments by the private sector. Federal agencies have produced the beginnings of a coordinated system for laboratory response to outside requests with Offices of Research and Technology Application (ORTAs). The Federal Laboratory Consortium for Technology Transfer (FLC) now encompasses 300 laboratories with established ORTAs, and the membership is increasing.

While the federal laboratories now have a response capability for technical inquiries, the impact of successful technology transfer remains limited to single shot projects with individual firms. Additionally, the ORTA representatives find themselves deluged with information requests and no way of determining which requests deserve priority.

Also, private sector individuals must search the federal laboratory system alone. No organized linkages exist between industries through which to gain insight regarding the information search process. The result is a reliance on informal relationships and endless telephone calling to finally connect with the right ORTA.

GOALS AND OBJECTIVES

The primary goal of the proposed program is to increase employment opportunities in the private sector through the identification of innovative technologies that can improve the productivity/profitability of existing industry and that therefore represent new product opportunities for existing or new businesses. A concomitant goal, then, is to facilitate commercialization of federally developed technology through appropriate documentation and information dissemination to the private sector.

The work agenda for the program will be determined by industry groups to ensure relevance of the program to private sector needs as opposed to "solutions in search of a problem." The problems/needs to

receive the highest priority will be those identified by the largest number of firms within an industry group. Thus, the benefits of the program will accrue to entire industries.

Accomplishment of these goals begins with the establishment of a network of technology transfer agents to:

1. Serve as the focal point for private sector information requests.
2. Conduct information searches throughout the federal laboratory system.
3. Serve as "information translators" between the private sector and laboratory scientists.
4. Document alternative solutions to private sector problems.

Trade associations, business and professional societies, and similar organizations provide an ideal forum in which the membership can articulate problems of a non-proprietary nature. Cooperation with these business and industrial associations will facilitate the identification of problems/needs to be prioritized based upon commonality to the industry group.

Technology transfer activities regarding commercially available technologies are within the realm of private consulting firms. Since a fundamental tenet of the proposed program is to avoid competition with private consultants, the activities in this program are to promote the development and utilization of technologies yet to be commercialized.

PROGRAM METHODOLOGY

All but one of the components of the proposed technology transfer program are presently in place. No new organizations are to be established from scratch. No potential white elephants need to be

created. The program builds upon existing institutional capabilities with the injection of the most critical component into the scenario, a network of technology transfer agents.

The technology transfer process to be implemented in the proposed program is as follows.

IDENTIFICATION OF FEDERAL LAB TECHNOLOGIES

Fulfilling the P.L. 96-480 requirements for Offices of Research and Technology Applications (ORTAs), federal laboratory representatives prepare application assessments of research and development projects and other federally owned products, processes, and services. In addition to the inquiry response capability of the laboratory ORTAs, the Center for the Utilization of Federal Technology (CUFT) is established by P.L. 96-480 to serve as a central clearinghouse for information on federally owned or originated technologies.

Technologies are described in terms of operational characteristics and potential functions served. The developmental laboratory scientist is identified as well for follow-up information such as raw material requirements, peripheral equipment or systems requirements, etc.

DEVELOPING THE PRIORITY NEEDS AGENDA

A great number of trade associations, business and professional societies, and similar organizations include in their mission the identification of ways to improve the productivity/profitability of their membership. To ensure broad impact from the proposed technology transfer process, program management will work in cooperation with these business and industrial groups to generate a list of problems/needs experienced by the largest percentage of the industry.

The user orientation of the program precludes listing of specific problems/needs here, but the general emphasis in developing the needs list will be (1) infrastructure improvements relative to plant and equipment, such as building technologies, energy efficiency, water and power use reduction, cost-effective compliance with environmental protection regulations, less costly means of enhancing safety, and (2) process improvements, such as in product manufacture; distribution; inventory storage, preservation, and retrieval; etc. Articulation of the problems/needs will be encouraged to be in terms of the situation stimulating the search for alternatives, the goals sought through the solution, and possible barriers to solution.

Inherent in the needs identification approach is the recognition that individual firms are hesitant to release information that might expose weaknesses to competitors. Needs generation through the trade association management will be designed to preserve the anonymity of individual firms in addition to the "market aggregation" function served by the trade associations.

TECHNOLOGY TRANSFER AGENT NETWORK

Critical to the results-orientation of the program is the establishment of a network of technology transfer agents to operate as the interface between the user groups and the federal laboratories. With a background in engineering and business, personnel utilized as technology agents will be able to effectively communicate with business and industry groups as well as with laboratory scientists.

Each technology agent will be assigned responsibility for searching the federal laboratory system relative to a set of priority problems/

needs consistent with the agent's educational specialization and experience. Operating in a network mode will result in the ability of each agent to build upon and tap the knowledge and search experiences of the others. Particular effort by program management will be devoted to the identification of individual state networks with which to interact. Some of these networks are the Engineering Research Center (University of Maryland), Center for Technological Development (University of Missouri), Engineering Experiment Station (Georgia Technical Institute), the Oklahoma Productivity Center (Oklahoma State University), and the state Cooperative Extension Services.

Alternative solutions that the technology agents identify relative to priority problems will be documented and published as "state-of-the-art" reports. The report format will include a description of the technologies with problem-solving potential, raw material requirements, peripheral needs, and economic evaluation where practical. Emphasis will be placed on development of the reports in language that is readily applicable to the user audience.

Productivity centers (university-based organizations) will be utilized on an ad hoc basis to evaluate promising innovations relative to production requirements, production costs, market size, projected usage rates, etc. The results of productivity center evaluations will be incorporated into the state-of-the-art reports.

INFORMATION DISSEMINATION AND TECHNOLOGY COMMERCIALIZATION

State-of-the-art reports developed by the technology agents will be distributed to the memberships of logical product or service supplier associations (including associations of inventors and entrepreneurs) for

consideration of the opportunities. The state-of-the-art information will also, of course, be supplied to the user association memberships. This dissemination effort will serve as an efficient arrangement to promote information utilization among relevant organizations.

Firms interested in applying for an exclusive license to produce and market a technology may contact the laboratory scientist(s) identified in the state-of-the-art report for details. Those firms desiring a license to the federal technology apply to the federal agency within which the technology was developed. According to U.S. Code 41:101-4:

> An exclusive license may be granted to the applicant with the best plan for development or marketing of the invention, or both, and with information about the applicant's capability to fulfill the plan.

Thus, the proposed program will impact economic development in two ways: First, business and industrial productivity will be realized through the introduction of innovative, cost-saving technologies. Second, new product and service opportunities will be identified for new and existing businesses. Both of these program benefits translate into increased employment.

APPENDIX

FUNCTIONAL FLOW CHART