96TH CONGRESS } HOUSE OF REPRESENTATIVES { REPORT
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# STEVENSON TECHNOLOGY INNOVATION ACT OF 1980

JULY 29, 1980.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. FUQUA, from the Committee on Science and Technology, submitted the following

## REPORT

[To accompany S. 1250]

[Including the cost estimate of the Congressional Budget Office]

The Committee on Science and Technology, to which was referred the bill, S. 1250, to promote United States technological innovation for the achievement of national economic, environmental, and social goals, and for other purposes, having considered the same, reports favorably thereon with amendments and recommends that the bill do pass.

The full text of the amendments is shown in this report as part of the sectional analysis of the bill. A brief summary of the effect of the amendments is given in the first section of this report.

## PURPOSE OF THE BILL

The purpose of the bill is to improve the economic, environmental, and social well-being of the United States by—(1) establishing organizations in the executive branch to study and stimulate technology, (2) promoting technology development through the establishment of centers for industrial technology, (3) stimulating improved utilization of federally funded technology developments by State and local governments and the private sector, (4) providing encouragement for the development of technology through the recognition of individuals and companies which have made outstanding contributions in technology, and (5) encouraging the exchange of scientific and technical personnel among academia, industry, and Federal laboratories.

The bill authorizes appropriations for fiscal years 1981 through 1985 in the amounts of 24, 49, 64, 74, and 74 million dollars, respectively.

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Errata

In the "Sectional Analysis" chapter of this report, material which was included in the Senate version of the bill but was deleted by the committee amendments should have been printed ~~struck through like this~~. It was printed without being struck through. A copy of the printed version of the bill, S.1250, which shows these deletions correctly should be referred to when reading the sectional analysis.

# I. SUMMARY

## A. Background

Technological innovation is the process by which industry generates and diffuses new and improved products and processes. It is a vital component of economic growth both in a domestic and an international context. The U.S. has traditionally been the leader in innovation. However, the extent of this lead may be diminishing in relation to past U.S. industrial performance and vis-a-vis foreign industrial performance.

In concern over the state of technological innovation, the House Committee on Science and Technology, and specifically its Subcommittee on Science, Research and Technology, has undertaken a program to address these issues. Various hearings, reports, and recommendations have culminated in the Committee's support of S. 1250, the Stevenson Technology Innovation Act of 1980, as amended.

S. 1250, as amended, provides for a multi-faceted approach to improving the environment in which industrial innovation occurs. The bill acts to strengthen the relationships between Government, industry, and academia such that each sector can contribute to the innovation process in a program of shared responsibilities. The resources available in the Federal laboratories are acknowledged and an effort to improve the utilization of this knowledge and expertise is prescribed. Several of President Carter's industrial innovation initiatives are given legislative mandates through this bill.

## B. Rationale for the Bill

Overarching thrusts of the bill are (1) to build links between generators of knowledge (universities and Federal laboratories) and users of knowledge (industry and State and local governments); and (2) to build into the Federal Government a positive concern for the welfare of industry. It is the committee's judgment that these two matters have not heretofore received sufficient attention from the Federal Government, and the bill is intended to rectify the situation.

## C. Brief Description of the Bill

### 1. MAIN THRUSTS

The bill, as amended, has five separate thrusts, as follows:

*a. Centers for Industrial Technology (Sections 6 and 8)*

The bill authorizes the Department of Commerce (DoC) and the National Science Foundation (NSF) to support Centers for Industrial Technology. The Centers would be similar to existing NSF centers that either focus on a specific technology area (e.g., polymer processing) or on training university students to be technological entrepreneurs. The bill leaves fairly broad latitude for center variety. The "generic technology" centers which have been planned by the Department of Commerce would be covered by the bill.

The bulk of the dollars authorized, as noted below, would be authorized for the centers.

*b. Office of Industrial Technology (Section 5)*

The bill establishes an Office of Industrial Technology in DoC. This would provide a legislative basis for the Office of Productivity, Technology, and Innovation (OPTI) which is being formed in DoC. The Office would undertake policy studies and experiments, and would be in charge of Centers for Industrial Technology established by DoC.

*c. Utilization of Federal Technology (Section 11)*

The bill declares a policy that Federal technology should be fully used, requires the establishment of Research and Technology Applications Offices in Federal laboratories, and establishes a single Center for Utilizing Federal Technology (CUFT). CUFT is being established by DoC anyway, and the bill would provide a legislative basis for it.

*d. National Technology Medal (Section 12)*

The bill establishes a National Technology Medal to recognize individuals making outstanding contributions to technology. The President has announced his intention to have such a medal, and this would provide a legislative basis for it, similar to the legislative basis for the National Medal of Science.

*e. Personnel Exchanges (Section 13)*

The bill requires DoC and NSF to establish a program to foster the exchange of scientific and technical personnel among academia, industry, and government laboratories.

## 2. OTHER FEATURES

The bill establishes a 16-member National Industrial Technology Board. The Board would provide advice to the Secretary of Commerce about activities of the Office of Industrial Technology and related matters. The Board would replace the existing Commerce Technical Advisory Board.

## 3. AUTHORIZATIONS (SECTION 14)

The bill authorizes a total of $285 million over five fiscal years (1981–85). No funds are authorized to the National Science Foundation; rather, NSF funds for purposes of the bill would be included in the annual NSF authorization bill.

In addition, the bill provides that one half of one percent of the research and development budget of each agency with a Federal laboratory shall be available for technology utilization efforts in the agency.

The authorizations of the bill are shown in the following table.

[In millions of dollars; fiscal years]

| | 1981 | 1982 | 1983 | 1984 | 1985 | Total |
|---|---|---|---|---|---|---|
| Purpose: | | | | | | |
| Centers | 19.0 | 40 | 50 | 60 | 60 | 229 |
| Other | 5.0 | 9 | 14 | 14 | 14 | 56 |
| General | (3.0) | (5) | (10) | (10) | (10) | ---------- |
| CUFT | (1.2) | (2) | (2) | (2) | (2) | ---------- |
| Personnel | (.8) | (2) | (2) | (2) | (2) | ---------- |
| Total | 24.0 | 49 | 64 | 74 | 74 | 285 |

## D. Effect of the Committee Amendments

The bill, as passed by the Senate, included the Centers for Industrial Technology and the Office of Industrial Technology noted above. The Committee amendments make no substantive deletions from the Senate-passed version, but add material on the Utilization of Federal Technology, the National Technology Medal, and Personnel Exchanges, as noted below. The Committee amendments also add a role for the National Science Foundation, as shown below.

The Committee amendments also perfect subsection 6(e) regarding the disposition of rights to inventions made in Centers for Industrial Technology by explicitly permitting inventor compensation and appeal of certain administrative decisions.

1. Utilization of Federal Technology.
   (a) All of Section 11
   (b) The new material in Finding (3), in part
   (c) The new material in Finding (8), and all of Findings (9) and (10)
   (d) Item (3) of the Purpose (Section 3)
   (e) Item (7) of the Definitions (Section 4)
   (f) Increases in authorizations of $1.2 million in fiscal year 1981 and $2 million in each of fiscal years 1982–5
2. National Technology Medal.
   (a) All of Section 12
   (b) Finding (11)
   (c) Item (4) of the Purpose (Section 3)
3. Personnel Exchanges.
   (a) All of Section 13
   (b) The new material in Finding (3), in part
   (c) Item (5) of the Purpose (Section 3)
   (d) Increases in authorizations of $0.8 million in fiscal year 1981 and $2 million in each of fiscal years 1982–5
4. Role for the National Science Foundation.

NSF had no role in the Senate-passed version, except to coordinate, as specified in Section 9. The bill as reported by the committee gives NSF a role in supporting centers for industrial technology and in supporting personnel exchanges. To accomplish this:

(a) Section 8 has been added

(b) The term "supporting agency" has been defined in item (8) of the definitions (Section 4) and has replaced "Director" or "Secretary" in several places (the latter refer to DoC officials, while "supporting agency" would refer to either DoC or NSF, as appropriate)

(c) NSF has been written into Section 13 for sponsoring personnel exchanges

(d) Subsection 14(d) has been added regarding NSF authorization

# II. BACKGROUND

## A. General

### 1. NEEDS FOR INNOVATION IN THE ECONOMY

Technological innovation is the process by which industry generates and diffuses new and improved products and processes. Various activities are components of this process including idea generation, research, development, and commercialization. Crucial to this is the diffusion of new technologies and production methods and their utilization; utilization is the basis for increased productivity. The results of research and development activity can only have an economic impact when they are integrated into products or processes available in the marketplace.

Technological innovation impacts both on domestic considerations and on the U.S. position in the international marketplace. There is general agreement on the vital role innovation plays in economic growth and that innovation contributes to increased productivity and efficiency.[1] As Dr. N. Bruce Hannay stated before hearings held by the House Science and Technology Committee, and the Senate Committees on Commerce, Science and Transportation, and Banking, Housing, and Urban Affairs:

Innovation in new products and services is central to the process by which an economy grows and renews itself. . . . Innovation and productivity are closely linked because cost reductions and efficiency gains arise mainly through innovations in methods for production and distribution. . . . The health of our economy and all of the attendant consequences of increased employment and improved standard of living and progress in social areas unquestionably depend upon this innovation.[2]

The economic impacts of innovation are broad and generally interrelated. Demands for new products and processes developed through innovation create new jobs. Increased demand also encourages increased investment in R&D. The increased productivity engendered by innovation helps to ameliorate inflation in the long term.[3] Declining productivity leads to inflation when improved efficiency cannot compensate for higher cost and prices have to be raised.[4]

In an international context, the new U.S. products and processes that are the results of innovation may contribute to a more favorable

[1] U.S. Congress. House. Committee on Ways and Means. Subcommittee on Trade. Technology and Trade: Some Indicators of the State of U.S. Industrial Innovation. 96th Congress, 2d session. Washington, U.S. Government Printing Office, 1980, p. 24.

[2] Quoted in: Mogee, Mary. Industrial Innovation and its Relation to the U.S. Domestic Economy and International Trade Competitiveness. Library of Congress, Congressional Research Service, Rept. No. 78-204 SPR, October 1978, p. 19.

[3] U.S. Congress. Senate. Committee on Commerce, Science, and Transportation, National Strategy for Technological Innovation. Committee Print. 96th Congress, 1st session.

[4] Innovation, Has America Lost its Edge? Newsweek, vol. XCIII, June 4, 1979, p. 59.

balance of trade as demand is generated in the world marketplace. This demand in turn encourages job creation, new investments, and economic growth. However, increased innovation in foreign countries has led to increased competition with U.S. firms as new products are developed there which meet the needs of the U.S. public at lower costs than comparable U.S. products.[5]

Various factors are impacting negatively on the U.S. economy. Inflation is approximately 12 percent and unemployment is in the six to seven percent range. There is relatively little economic growth and productivity growth rates are declining. This situation has led to increasing concern over the rate of innovation in the United States. Much of the available information indicates that there are trends in a number of input and output indicators which show a declining U.S. innovation performance relative to past levels and to foreign competition.[6]

Although many of the data are indirect or partial indicators of innovation, due to the lack of direct measures, several trends have emerged. Since the 1960s, Federal expenditures for R&D—adjusted for inflation—have dropped by five percent.[7] The number of U.S. domestic-origin patents granted has declined in the late 1970s as has the ratio of national R&D expenditure to Gross National Product.[8] Yet it should be noted that private industrial support for R&D has increased.[9]

In an international context, while the United States still maintains a lead or is in the top three nations in terms of certain indicators, various foreign nations, notably Japan and West Germany, are making substantial gains on the U.S. position. The U.S. patent balance (the number of patents granted to U.S. nationals by foreign countries minus the number of patents granted to foreign nationals by the United States) is declining.[10] The productivity of many European countries and Japan is approaching that of the United States and these nations have surpassed the productivity growth rates of the United States.[11]

Gains on the U.S. international position also are being made in terms of the balance of trade in R&D-intensive products, national R&D as a fraction of the Gross National Product, and the number of R&D scientists as a percentage of the labor force.[12]

It is generally recognized that there is a need to improve the productive capacity of the nation's Federal laboratories by utilizing them more fully, not only as R. & D. centers for the Federal mission agencies, but also as national resources—resources that State and local governments, as well as the private sector, can turn to for sound scientific and technological know-how.

One very promising approach to increasing the effective utilization of the Federal laboratories is the establishment of active technology transfer programs throughout the Federal laboratory system. However, a strong, national policy concerning technology transfer in the

[5] Ibid., p. 59.
[6] Committee on Ways and Means, op. cit., p. 35.
[7] Newsweek, op. cit., p. 58.
[8] Committee on Ways and Means, op. cit., p. 9.
[9] Ibid., p. 10.
[10] Ibid., p. 21.
[11] Ibid., p. 24.
[12] Ibid., p. 34.

Federal government has not been developed. This lack of a national policy has prevented the institutionalization of the process and reduced the effectiveness of attempts, by many of the Federal laboratories, to provide technical assistance to help solve the problems of the public and the private sector.

### 2. SRT PROGRAM IN INNOVATION AND PRODUCTIVITY

The Subcommittee on Science, Research, and Technology has been active in legislative areas involving innovation and productivity throughout the 96th Congress. This interest has been manifest in a broad range of activities undertaken by the Subcommittee to study, delineate, and make recommendations concerning innovation. Mr. Brown, Chairman of the Subcommittee, introduced H.R. 4672 as a counterpart to S. 1250. This bill was the principal subject of hearings on university-industry relations held on July 31 and August 1 and 2, 1979. Mr. Brown also has introduced the National Technology Foundation Act on which the Subcommittee plans to hold hearings in the fall of 1980. In addition, the Science Research and Technology Subcommittee has participated in over two dozen hearings sessions on innovation-related topics during this Congress, including the October 31, 1979 hearings on the President's industrial innovation initiatives and hearings on the role of the Federal laboratories in domestic technology transfer held on June 12, 13, and 14, and July 10 and 12, 1979. Many of the subjects covered during these hearings have been included in the version of S. 1250 reported by the committee.

### 3. SRT HEARINGS PERTINENT TO THE BILL

As noted above, the Science, Research, and Technology Subcommittee held a series of hearings during the 96th Congress which addressed the issue of innovation and the United States economy. The major findings are summarized below.

*a. Government and Innovation: University-Industry Relations (July 31; August 1 and 2, 1979)*

These hearings on Government and innovation [13] were structured to examine the interaction between the academic community and the industrial sector to provide ideas for improving and facilitating this relationship as a means of increasing American innovation and productivity. The witnesses agreed that a definite innovation problem existed in the United States, especially in the context of the world marketplace, and that improved university-industry relations would enhance innovation. Various examples of successful university-industry interactions were offered to support this conclusion, including work in semiconductors, magnetism, lasers, synthetic fibers, and antibiotics. In the innovation process, universities generally provide the basic research component while the role of the industrial sector generally is in the development, commercialization, and marketing of new goods and services.

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[13] Government and Innovation: University-Industry Relations, Hearings Record, Committee on Science and Technology, 96th Congress No. 53, 1979.

In this context, mutual interaction leading to successful innovation requires the transfer of information, expertise, and know-how between the two sectors. However, concern was expressed over the inadequacy of the technology transfer mechanisms between academia and the private sector. The Government was seen as one facilitator of this interaction, given the success of various prior and on-going programs such as the Agricultural Extension Service and the National Advisory Committee for Aeronautics. Specific suggestions—offered at the hearings—for Government activities to encourage university-industry relations included:

A change in fiscal policies to encourage industry to utilize university research;

An increase in Federal funding of basic research;

The provision of incentives for universities to develop and pursue relationships with industry (for example, a program of planning grants tied to that goal; matching grants); and

The provision of direct Federal support to universities to strengthen dissemination of research results.

*b. The Role of the Federal Laboratories in Domestic Technology Transfer (June 12, 13, 14; July 10 and 12, 1979)*

The Federal Government has an extensive system of Federal laboratories within which resides a wealth of scientific and technical knowledge and expertise. However, there is a general belief that the potential for using these resources has not been fully tapped. These hearings were held to identify the resources available in the Federal laboratories; to develop an understanding of what constraints there are to using these resources; and to determine how this knowledge and expertise can be utilized in other sectors, including industry and State and local governments.

The hearings [14] pointed to the lack of a national policy concerning technology transfer in the Federal Government. This has, in part, prevented the institutionalization of the transfer process and thus reduced the effectiveness of any attempt to provide technical assistance and apply technical expertise to the problems of the public and private sectors. The Federal laboratories were developed to assist in meeting the mission requirements of the parent agency. With a few exceptions such as NASA, the technology transfer activity is not an explicit part of the agency's mandate and is secondary to its primary responsibilities. Coupled with this situation are various statutory and budgetary restrictions which limit the interaction of Federal laboratories with private industry and State and local jurisdictions.

In general, the witnesses indicated that the provision of a mandate for the Federal laboratories to undertake technology transfer and technical assistance would be a major step in encouraging commercialization and utilization of the results of federally-funded research and development which would contribute to the growth of the Nation and to the solution of many national problems. Experience has shown that those programs which have been in operation to tap the resources of

[14] The Role of the Federal Laboratories in Domestic Technology Transfer, Hearings Record, Committee on Science and Technology, 96th Congress, No. 77, 1979.

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the Federal establishment, including the Federal Laboratory Consortium for Technology Transfer, have been successful in extending the benefits of the Federal R&D endeavor beyond its original mission.

*c. Joint Hearings on the President's Industrial Innovation Initiatives*

Joint hearings on President Carter's industrial innovation initiatives were held on October 31, 1979 by the Senate Committee on Commerce, Science, and Transportation, the Senate Select Committee on Small Business, the House Committee on Science and Technology, and the House Committee on Small Business. The participants agreed that innovation can provide an important mechanism to meet many of the Nation's problems, including inflation, energy shortages, and declining productivity and economic growth. As former Secretary of Commerce Juanita Kreps testified, "innovation underlies our ability to promote the health, welfare, well-being, and prosperity of the American people." [15] However, it was noted that the innovation leadership of the United States can no longer be taken for granted, as various technological and economic indicators point to decreased levels of innovation and productivity.

The testimony indicated a widespread belief that it is now incumbent on the Government to assess policies which affect the innovation process and to develop new options for improving the environment in which innovation takes place. As a basis for taking such action, the President initiated the Domestic Policy Review (DPR) on industrial innovation which led to the recommendations described in his message of October 31, 1979. The DPR, according to Jordan Baruch, used as a major premise the idea that the Federal Government ". . . impacts on the private sector where industrial innovation takes place in two ways: it can make available by one route or another the resources that a firm needs so that it will be able to innovate and it can make available incentives so that a firm will decide to innovate." [16]

The President's proposals were generally received as a first step in addressing the innovation problem. However, various concerns were expressed over activities and issues which were perceived as having been omitted from the President's initiatives. Such issues included tax policy, small business set-asides, and the modestness of some of the proposals, such as activities proposed to promote commercialization of, and spin-off from, technological developments in the Federal establishment with potential for leading to new industrial processes and products.

4. EXECUTIVE BRANCH BACKGROUND PERTINENT TO S. 1250

*a. National Science Foundation*

In pursuit of increasing technological innovation and national productivity, the National Science Foundation (NSF) has developed and supported several programs in a multifaceted approach to the issue, portions of which are described here.

As part of an effort to stimulate university-industry interactions leading to innovation, the Foundation has created and financed both

[15] Industrial Innovation, Hearings Record, Committee on Science and Technology, 96th Congress. No. 69, 1979, p. 13.
[16] Ibid, p. 23.

generic technology centers and technology innovation centers as part of its university-industry center program. In the first case, the generic technology centers promote institutional arrangements between the two sectors in conducting research and innovation in cross-industry technologies which generally involve large businesses. In this activity, the universities are intended to provide the basic research to be used for industrial application and commercialization. These experimental centers include the Massachusetts Institute of Technology Polymer Processing Center, the North Carolina State University Furniture R&D Applications Institute, and the New England Energy Development Systems Center. The Foundation established this program with the intention of providing incentives to industry to support the centers and eventually make them self-sustaining.

The innovation centers are structured to address the processes of invention and entrepreneurship. The work done in these centers concentrates basically on the development of a business, rather than on the development of a technology for an existing industry as is done at the generic technology centers. The innovation centers, including those at the Massachusetts Institute of Technology, Carnegie Mellon University, and the University of Oregon, are concerned with research, education, demonstration, and operational analysis in the creation of a business and the development of an idea into a product.

The university-industry centers supported by NSF are:

University of Oregon*
Carnegie-Mellon University*
University of Utah*
Massachusetts Institute of Technology*
North Carolina State University
Mitre Corporation
Massachusetts Institute of Technology
Rensselaer Polytechnic Institute
University of Kansas
Kent State University
University of Texas (San Antonio)*
University of Arkansas
Georgia Institute of Technology
Phoenix International Corporation*
University of California (Santa Cruz)*
Ohio State University
University of Massachusetts.

The Foundation also directs a program of personnel exchange under its Science Faculty Professional Development Program. This activity makes awards to individual undergraduate science professors for study in industry, academia, non-profit organizations, or government for the purpose of improving science teaching. Of the 70 awards made in fiscal year 1980, 22 were for non-academic placements (industry, not-for-profits, and government).

Technology transfer is also supported to some extent through NSF's Intergovernmental Science and Public Technology Program (ISPT). The thrust of portions of this activity is to develop and fund mechan-

*Innovative Centers.

isms to help State and local governments apply technology to meet demands for goods and services. Through the application and utilization of technology, it is expected that innovation can foster increased productivity and effectiveness in the State and local sectors. Part of this program includes participation in, and support for, the Federal Laboratory Consortium for Technology Transfer. The consortium is a voluntary association of approximately 200 Federal laboratories which works to identify and delineate problems at the State and local level which are amenable to technical solutions and then provides assistance in addressing these problems. The program manager for the Consortium is located in the Intergovernmental Science and Public Technology Program.

Another effort under NSF's Intergovernmental program is the State Science Engineering, and Technology (SSET) program. Established under congressional direction, SSET is designed to assist the executive and legislative branches of State governments to get and use scientific, engineering, and technical resources in the formulation and management of public policy and in the resolution of policy issues with scientific or technical components.

The Committee notes that funding for these programs has decreased. The fiscal year 1980 budget of $5 million for the ISPT core program was reduced by internal budget cuts to $3.43 million; down from the fiscal year 1979 budget of $5 million. The SSET program in fiscal year 1980 was reduced from its original $3 million to $1.02 million. The fiscal year 1981 proposed funding is $4 million for the core program and $1.6 million for the State Science, Engineering, and Technology activity.

In addition to the NSF programs already described which are activities which would receive a firmer legislative basis from the bill, the Foundation operates a large program of Industry/University Cooperative Research, programs of policy research and analysis on the Socioeconomic Effects of Science and Technology and on Innovation Processes and Their Management, and a Small Business Innovation Research Program. The Committee commends the Foundation for its efforts in innovation and productivity through these other programs and urges their continued support by the Foundation, even though they are not among the subjects of this bill.

*b. Department of Commerce*

The Department of Commerce has lead agency responsibility for the executive branch initiatives to promote innovation. To administer activities to encourage and increase innovation and productivity, and to oversee implementation of the presidential industrial innovation program, the Office of Productivity, Technology and Innovation (OPTI) was created. This Office includes the National Technical Information Service and the Experimental Technology Incentives Program (which will become the Office of Strategy and Evaluation). Among the major initiatives OPTI will institute—in accordance with the President's innovation message—are Cooperative Generic Technology Centers and the Center for the Utilization of Federal Technology. Both efforts are in the planning stage and are budgeted to start operations in fiscal year 1981.

According to Secretary of Commerce Philip Klutznick, the Cooperative Generic Technology Centers are designed to "develop specific, strategic technologies that can have significant impact on the productivity and competitiveness of a wide range of individual firms and industries." Slated to be a joint Federal/university/industry effort, the centers will undertake research, problem analysis, and technical assistance, and will provide those support services which are necessary to foster the development, improvement, and transfer of generic technologies in selected areas. This activity is expected to allow for the sharing of costs, risks, and ideas in technological areas where it is inappropriate for the private sector to undertake research and development alone, but which are vital to increased innovation and productivity.

The Department of Commerce has issued a notice of proposed procedures for the Cooperative Generic Technology Centers program (Federal Register, v. 45, June 1, 1980). According to this plan, the centers will provide for in-house generic research and development, consulting and technical services, information system services, training, technical evaluation, and strategic planning. Proposals for the establishment of a center will be invited, reviewed, and selected according to compatibility with program goals and budget constraints. These non-profit centers will be located at universities or other private sector organizations. The Department has requested $5.2 million for this program in the fiscal year 1981 budget.

The Commerce Department also is planning for the establishment of a Center for the Utilization of Federal Technology (CUFT). To be located within the National Technical Information Service, this effort will concentrate on the active marketing of Federal technology to the private sector to assist in the commercialization and utilization of the results of federally-funded research and development work. According to Assistant Secretary of Commerce Baruch, in testimony before the House Committee on Science and Technology, Subcommittee on Space Science and Applications (June 11, 1980), CUFT's objectives are:

To stimulate industrial demand for Federal technologies;

To promote networks of interpersonal communication between Federal and industrial personnel through a fellowship program in which industrial personnel will track user needs for, and potential applications of, Federal technology;

To facilitate access to information about industrial needs and technological opportunities through use of computerized reviews of Federal projects; and

To support industrial efforts to adapt Federal work to industrial needs.

The operational planning now being done for CUFT is based upon an active outreach program to work with industry in identifying opportunities for new markets and for the development and commercialization of Federal technology to improve the Nation's competitive position in the international marketplace. The Center also will interface with the Federal laboratory system to promote technology transfer to industry. This effort is scheduled to include workshops, conferences, and seminars. It also is expected that a fellowship program will be instituted to foster cooperation and interaction between the private

sector and the Federal laboratories. The Department has requested $1.2 million for this activity in fiscal year 1981.

Other significant OPTI initiatives include the Productivity Reference Service, which is designed to coordinate and disseminate information, data, and case histories on productivity improvement, and the National Technical Information Service's Information for Innovators, a biweekly information service on current technological developments.

*c. Selected Additional Technology Transfer Programs* [16]

*The Agricultural Extension Service.*—The Agricultural Extension Service was created in 1914 to provide technical education and technology transfer to assist in increasing farmer productivity. Fiscal, administrative, and policy support is provided jointly by Federal, State, and local jurisdictions. The program is based upon technology development, demonstration, dissemination, and assistance to the agricultural community through the land grant colleges and an extensive field staff located in most counties. Agents serve as a link between research and the practitioners' needs for technology and information. The Extension Service staff generally works directly with farmers to identify and solve agricultural problems. Private enterprise also participates in application and commercialization of R&D for the farm industry.

*The National Aeronautics and Space Administration's Technology Utilization Program.*—The Technology Utilization Program at the National Aeronautics and Space Administration has been developed to accelerate and broaden the transfer of aerospace technology to the public and private sectors. Following the legislative mandate to ". . . provide for the widest practical and appropriate dissemination of information concerning its activities and the results thereof," NASA has established a number of mechanisms to accomplish this mission requirement. To promote technology transfer within the Nation's industrial complex, the agency operates a network of Industrial Applications Centers (IACs) which provide information retrieval services and technical assistance to industrial clients. Staffed by scientists, engineers, managers, and computer information specialists experienced in industry liaison, the IACs seek to increase and expedite technology transfer by assisting the private sector to find and apply information and/or technology and thus to avoid duplication of research and development already accomplished.

A related service to industry is provided by NASA's Computer Software Management and Information Center (COSMIC) at the University of Georgia. COSMIC collects, screens, and stores computer programs developed by NASA and other Government agencies. Adaptable to secondary use by industry, Government, or other organizations, these programs perform such tasks as structural analysis, electronic circuit design, chemical analysis, design of fluid systems, determination of building energy requirements, and a variety of other functions.

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[16] For additional information on the various technology transfer programs of the Federal Government see: U.S. Congress. House. Committee on Science and Technology. Subcommittee on Science. Research. and Technology. Domestic technology transfer: issues and options. 95th Congress, 2d session. Serial CCC. Washington, U.S. Government Printing Office, 1978. 853 pp. at head of title: Committee Print.

NASA also operates a Remote Sensing Applications Program to assist State and local governments in utilizing satellite remote sensing technology as a source for their resource management and planning decisions.

Transfer of remote sensing technology is accomplished through:

Orientation programs to acquaint State and local decision-makers with remote sensing capabilities, applications, and limitations;

Training programs which enable key State and local personnel to utilize remote sensing data;

Application demonstrations of proven technology to acquaint potential users with specific applications in operational environments; and

Technical assistance to help users establish independent self-sustaining capability to use remotely sensed data.

The program draws on all NASA field centers in the development of activities in the States and for support of specific projects.

NASA also works with the Federal Laboratory Consortium for Technology Transfer.

*d. Domestic Policy Review on Industrial Innovation and Resulting Presidential Initiatives*

In May 1978, President Carter initiated a Domestic Policy Review (DPR) on Industrial Innovation. Headed by the Secretary of Commerce, this activity was undertaken to identify and recommend Government actions to encourage increased industrial productivity and innovation. Representatives from industry, academia, Government, and the public participated in this study designed to illuminate policies affecting the innovation process and to enumerate positive steps to increase the innovative capabilities of U.S. industry. An interagency committee conducted the effort advised by several panels of industrial executives. Twenty-eight agencies and approximately 500 private sector representatives participated. A series of public hearings was held on economic, tax, and trade policy; environmental, health, and safety regulations; Federal procurement and research grant policy; patents; and antitrust policy. The principal documents resulting from the Domestic Policy Review were a series of subcommittee reports [17] and a paper sent to the President which has not been made available outside the executive branch.

On October 31, 1979 President Carter announced various initiatives to provide a positive environment for industrial innovation which were based on the Domestic Policy Review. These "President's Initiatives on Industrial Innovation" were presented to Congress on the same day.[18] Specific recommendations were made in nine areas:

Enhancing the Transfer of Information;
Increasing Technical Knowledge;
Strengthening the Patent System;
Clarifying Antitrust Policy;
Fostering the Development of Small Innovative Firms;

[17] United States Department of Commerce, Final Report of the Advisory Committee on Industrial Innovation, September 1979.
[18] Industrial Innovation, Hearings Record, op. cit.

Opening Federal Procurement to Innovations;
Improving Our Regulatory System;
Facilitating Labor/Management Adjustment to Technical Change; and
Maintaining a Supportive Climate for Innovation.

Several of the President's initiatives are strengthened by this bill. President Carter's program included the creation of the NTIS Center for the Utilization of Federal Technology, which is also addressed in S. 1250.

The Generic Technology Centers and the NSF industry-university program identified in the executive initiatives also are incorporated into S. 1250, as reported. The presidential directive to clarify antitrust impacts on innovation is paralled by the requirement in the Stevenson Technology Innovation Act for a judgment on antitrust violations prior to establishment of Innovation Centers. A legislative basis for the President's initiative to establish an award for technological innovation is provided by the bill.

Other of the initiatives include efforts to utilize foreign technology; regulatory technology development to assist industry in complying with environmental, health, and safety regulations; uniform patent policy and additional improvements in the patent system; support and extension of the NSF Small Business Innovation Research Program; Corporations for Innovation Development to assist in providing start-up capital; additional Federal policies and support for small R&D firms; efforts to increase the availability of venture capital; opening Federal procurement to innovations; improvements in the regulatory system; and activities to facilitate labor/management adjustment to technological change. The Committee has taken steps other than this bill to strengthen the President's initiatives in some of these other areas and is analyzing the entire range of initiatives.

## B. Legislative History of S.1250

### 1. SENATE

On May 24, 1979 S. 1250 was introduced by Mr. Stevenson with Senators Cannon, Hollings, Inouye, W. H. Ford, Riegle, Moynihan, Schmitt, Bradley, Randolph, Heinz, and Magnuson as cosponsors. The bill was referred to the Senate Committee on Commerce, Science, and Transportation, Subcommittee on Science, Technology, and Space. Hearings were held by the Subcommittee on June 21, June 27, and November 21, 1979.

On April 29, 1980 a Commerce, Science, and Transportation Committee mark-up was held. The bill was ordered to be favorably reported, with amendments. The report (S. Rpt. 96–781) was filed on May 15, 1980.

The bill passed the Senate, as reported, on the Consent Calendar on May 28, 1980.

### 2. HOUSE

On June 28, 1979 H.R. 4672 was introduced as a companion bill to S. 1250 by Mr. Brown of California with Representatives Fuqua,

Ertel, Watkins, Wydler, Hollenbeck, and Ritter as cosponsors. The bill was referred to the House Committee on Science and Technology, Subcommittee on Science, Research, and Technology. On July 31, August 1 and 2, 1979 hearings were held by the Subcommittee on Science, Research, and Technology on H.R. 4672, and university industry relations generally.

Following passage by the Senate, S. 1250 was referred to the House Committee on Science and Technology on May 30, 1980, and then to the Subcommittee on Science, Research, and Technology on June 4.

Based on its hearings on H.R. 4672, on hearings into the role of the Federal laboratories in domestic technology transfer, on hearings regarding the President's Industrial Innovation Initiatives, on other hearings regarding innovation and productivity, and on the GAO analysis of the House hearings on H.R. 4672 and the Senate hearings on S. 1250, the Subcommittee considered and marked up S. 1250 on June 17, 1980. The bill was ordered reported to the full Committee, as amended.

Full Committee consideration and mark-up of S. 1250 took place on July 2, 1980. The bill was ordered to be reported, as further amended.

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## III. RATIONALE FOR S. 1250

The provisions of this bill emerge from a continuing intensive study of innovation and productivity in the United States by the Committee on Science and Technology. These provisions are a few modest but positive steps toward reviving innovation and productivity in American industry and in State and local government. The steps proposed by the bill all have counterparts in actions already underway or proposed by the administration. This bill, in most cases, goes beyond what the administration has proposed in order to accomplish more.

*In general*—overarching thrusts of the bill are (1) to build links between generators of knowledge (universities and Federal laboratories) and users of knowledge (industry to provide goods and services and State and local governments to provide government services) and (2) to build into the Federal Government a positive concern for the welfare of industry. It is the committee's judgment that these two matters have not heretofore received sufficient attention from the Federal Government, and the bill is intended to help rectify that situation.

*Centers for Industrial Technology.*—These address the needs for fore research in certain areas of technology, better links between universities and industry, and more technological entrepreneurs.

*Office of Industrial Technology and National Industrial Technology Board.*—These build concern for industry into the Department of Commerce, provide an administrative framework for this concern, and provide a brain to think futher about industry issues.

*Utilization of Federal Technology.*—The provisions of this section highlight the need for the Federal Government to do much more to transfer the results of federally funded research and development to users and provide an administrative structure to meet that need.

*National Technology Medal.*—The establishment of this award highlights the importance of technological accomplishment and provides an incentive for technological accomplishment.

*Personnel Exchange.*—The exchange of scientific and technical personnel among universities, industry, and Federal laboratories will build links among these three groups so that researchers will have better awareness of research needed by industry, industry will be more aware of results of research, and students will be exposed to role models other than academic professionals. Exchange programs may help also with tenure-lock and salary problems currently faced by universities.

Rationale for the specific provisions of the bill is given in the sectional analysis portion of this report.

## IV. SECTIONAL ANALYSIS

### A. Outline of the Bill

Section 1—Short title: "Stevenson Technology Innovation Act of 1980".

Section 2—Findings. Twelve findings are given.

Section 3—Purpose. To improve the economic, environmental, and social well-being of the United States by—(five steps are listed).

Section 4—Definitions. Eight terms are defined.

Section 5—Commerce and Technological Innovation:

(a) In General. Office of Industrial technology established.

(b) Director. Office to have a Director.

(c) Duties. Eight duties are given to the Director.

(d) Report. A report is required within three years.

Section 6—Centers for Industrial Technology:

(a) Establishment. The Director shall provide assistance for Centers. Six objectives are given.

(b) Activities. Four types of activities are given.

(c) Requirements. Five requirements on the establishment of Centers are given.

(d) Planning Grants. The Director may make planning grants.

(e) Research and Development Utilization:

(1) Centers may acquire title to inventions made there under six conditions.

(2) The government may march in under certain conditions.

(3) Government march-in under (2) may be appealed.

(f) Additional Consideration. Attorney General shall advise on anti-trust.

Section 7—Grants and Cooperative Agreements:

(a) In General. Director may make grants.

(b) Eligibility and Procedure. Anyone may apply under procedures set by the Director.

(c) Terms and Conditions. Grants are subject to terms set by the Director and records must be kept.

Section 8—National Science Foundation Centers for Industrial Technology:

(a) Establishment and Provisions. The National Science Foundation shall establish Centers; the provisions of 6 (a), (b), (c), (e), and (f) shall apply.

(b) Planning Grants. The National Science Foundation may make planning grants.

(c) Terms and Conditions. Shall be governed by the Foundation's organic act.

Section 9—Administrative Arrangements:

(a) Coordination. Is required among several agencies.

(b) Cooperation. Agencies should cooperate with the programs of the Act.

(c) Administrative Authorization:

(1) Agencies may give.

(2) The Secretary of Commerce and the National Science Foundation may receive.

Section 10—National Industrial Technology Board:

(a) Establishment. The Board is established.

(b) Duties. Four are given.

(c) Membership, Terms, and Powers. Five provisions are given.

Section 11—Utilization of Federal Technology:

(a) Policy. Federal research results should be used.

(b) Establishment of Research and Technology Applications Offices. Each Federal laboratory should have an office. Large laboratories must have at least one office staffer. Agencies must provide at least ½% of their research and development budgets for technology transfer.

(c) Functions of Research and Technology Applications Offices. Four are given.

(d) Center for the Utilization of Federal Technology. The Center is established. Six functions are given.

(e) Agency Reporting. Agencies must prepare annual reports on activities under this section.

Section 12—National Technology Medal:

(a) Establishment. The Medal is established.

(b) Award. Criteria for the award are given.

(c) Presentation. The President shall present the award.

Section 13—Personnel Exchanges. The Director and the National Science Foundation shall foster exchange of scientific and technical personnel among academia, industry, and Federal laboratories.

Section 14—Authorizations:

(a) (For Centers in the Department of Commerce).

(b) (For other Act activities in the Department of Commerce).

(c) (Sums appropriated to be available until expended).

(d) (National Science Foundation activities to be authorized through annual Foundation authorization bill).

## B. General

A complete print of the bill follows with explanations of meaning or intent given immediately following the text to which they apply. The text of the bill as passed by the Senate is given in **boldface** type. Where the committee has amended the bill to delete material of the Senate bill, that material is shown in **boldface type struck through.** Material added by committee amendment is given in *italic* type. Explanatory material is given in roman type.

General considerations are covered in the section of this report "Rationale for the Bill" rather than in this sectional analysis.

C. SECTION 1—SHORT TITLE

**AN ACT To promote United States technological innovation for the achievement of national economic, environmental, and social goals, and for other purposes**

***Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*** **That this Act may be cited as the "Stevenson Technology Innovation Act of 1980"**

D. SECTION 2—FINDINGS

SEC. 2. FINDINGS.

**The Congress finds and declares that:**

**(1) Technology and industrial innovation are central to the economic, environmental, and social well-being of citizens of the United States.**

**(2) Technology and industrial innovation offer an improved standard of living, increased public and private sector productivity, creation of new industries and employment opportunities, improved public services and enhanced competitiveness of United States products in world markets.**

**(3) Many new discoveries and advances in science occur in universities and Government** *Federal* **laboratories, while the application of this new knowledge to commercial and useful public purposes depends largely upon actions by business and labor.** *Cooperation among academia, Federal laboratories, labor, and industry, in such forms as technology transfer, personnel exchange, joint research projects, and others, should be renewed, expanded, and strengthened.*

**(4) Small businesses have performed an important role in advancing industrial and technological innovation.**

**(5) Industrial and technological innovation in the United States may be lagging when compared to historical patterns and other industrialized nations.**

**(6) Increased industrial and technological innovation would reduce trade deficits, stabilize the dollar, increase productivity gains, increase employment, and stabilize prices.**

**(7) Government antitrust, economic, trade, patent, procurement, regulatory, research and development, and tax policies have significant impacts upon industrial innovation and development of technology, but there is insufficient knowledge of their effects in particular sectors of the economy.**

**(8) No national policy exists to enhance technological innovation for commercial and public purposes.** *There is a need for such a policy, including a strong national policy supporting domestic technology transfer and utilization of the science and technology resources of the Federal Government.*

*(9) It is in the national interest to promote the adaptation of technological innovations to State and local government uses. Technological innovations can improve services, reduce their costs, and increase productivity in State and local governments.*

*(10) The Federal laboratories and other performers of federally funded research and development frequently provide scientific and technological developments of potential use to State and local governments and private industry. These developments should be made accessible to those governments and industry. There is a need to provide means of access and to give adequate personnel and funding support to these means.*

*(11) The Nation should give fuller recognition to individuals and companies which have made outstanding contributions to the promotion of technology or technological manpower for the improvement of the economic, environmental, or social well-being of the United States.*

### E. Section 3—Purpose

SEC. 3. PURPOSE.

**It is the purpose of the Congress in this Act to enhance technological innovation for the improvement of the economic, environmental and social well-being of the United States.** *It is the purpose of this Act to improve the economic, environmental, and social well-being of the United States by—*

*(1) establishing organizations in the executive branch to study and stimulate technology;*

*(2) promoting technology development through the establishment of centers for industrial technology;*

*(3) stimulating improved utilization of federally funded technology developments by State and local governments and the private sector;*

*(4) providing encouragement for the development of technology through the recognition of individuals and companies which have made outstanding contributions in technology; and*

*(5) encouraging the exchange of scientific and technical personnel among academia, industry, and Federal laboratories.*

### F. Section 4—Definitions

SEC. 4. DEFINITIONS.

**As used in this Act, unless the context otherwise requires, the term—**

**(1) "Office" means the Office of Industrial Technology established under section 5 of this Act.**

**(2) "Secretary" means the Secretary of Commerce.**

**(3) "Director" means the Director of the Office of Industrial Technology appointed pursuant to section 5 of this Act.**

**(4) "Centers" means the Centers for Industrial Technology established under section 6 *or section 8* of this Act.**

**(5) "Nonprofit institution" means an organization owned and operated exclusively for scientific or educational purposes, no part of the net earnings of which inures to the benefit of any private shareholder or individual.**

**(6) "Board" means the National Industrial Technology Board established pursuant to section 9 *10*.**

*(7) "Federal laboratory" means any laboratory or center owned and funded by the Federal Government, operated either by the Federal Government or by a contractor.*

*(8) "Supporting agency" means either the Secretary of Commerce or the National Science Foundation, as appropriate.*

G. SECTION 5—COMMERCE AND TECHNOLOGICAL INNOVATION

SEC. 5. COMMERCE AND TECHNOLOGICAL INNOVATION.

**(a) In General.—The Secretary shall establish and maintain an Office of Industrial Technology in accordance with the provisions, findings, and purposes of this Act.**

**(b) Director.—The President shall appoint, by and with the advice and consent of the Senate, a Director of the Office, who shall be compensated at the rate provided for level V of the Executive Schedule in section 5316 of title 5, United States Code.**

**(c) Duties.—In addition to any other duty prescribed by law or assigned by the Secretary, the Director, on a continuing basis, shall—**

**(1) determine the relationships of technological developments and international technology transfers to the output, employment, productivity, and world trade performance of United States and foreign industrial sectors;**

**(2) determine the influence of economic, labor and other conditions, industrial structure and management, and government policies on technological developments in particular industrial sectors worldwide;**

**(3) identify technological needs, problems, and opportunities within and across industrial sectors that, if addressed, could make a significant contribution to the economy of the United States;**

**(4) assess whether the capital, technical and other resources being allocated to domestic industrial sectors which are likely to generate new technologies are adequate to meet private and social demands for goods and services and to promote productivity and economic growth;**

**(5) propose and support studies and policy experiments, in cooperation with other Federal agencies, to determine the effectiveness of measures with the potential of advancing United States technological innovation;**

**(6) undertake cooperative efforts to stimulate industrial innovation with other officials in the Department of Commerce responsible for trade and economic assistance;**

**(7) recommend to the Secretary for transmittal to the President and Congress government measures with the potential of advancing United States technological innovation and exploiting innovations of foreign origin; and**

**(8) assist in the preparation of the report required under subsection (d) and publish the results of studies and policy experiments.**

**(d) Report.—The Secretary shall prepare and submit to the President and Congress, within 3 years after the date of enact-**

**ment of this Act, a report on the progress, findings, and conclusions of activities conducted pursuant to sections 5, and 6 *6, 8, 11, 12, and 13* of this Act and recommendations for possible modifications thereof.**

The Office of Industrial Technology (OIT) to be established in the Department of Commerce by this section will have functions similar, if not identical, to those proposed for the Office of Productivity, Technology, and Innovation (OPTI) which has been created in partial response to the Presidential message on industrial innovation. This mandate would establish the legislative basis for what is now known as OPTI. It is expected that functions of OPTI not explicit in the bill would be assigned to OIT by the Assistant Secretary of Commerce for Productivity Technology and Innovation.

The Office of Industrial Technology would undertake policy studies and experiments to improve understanding of the innovation process and develop mechanisms to address identified problems. The Office is to undertake those efforts, in cooperation with other public and private organizations including other offices within the Commerce Department, which will encourage national innovation. In addition, this Office will have responsibility for the creation and operation of the Centers for Industrial Technology as established by this Act.

The Director of the Office is to report to the Assistant Secretary for Productivity, Technology and Innovation, who in turn is to report to the Secretary of Commerce. In the performance of his duties, the Director is to coordinate with the National Science Foundation regarding policy studies of mutual interest and relevance.

The report to Congress and the President, required of the Secretary of Commerce within three years of the enactment of this legislation, is to be prepared in cooperation with the National Science Foundation, especially in regard to those sections (8, 11, and 13) which concern NSF. This report will be used by the Committee in pursuit of its oversight responsibilities.

### H. Section 6—Centers for Industrial Technology

SEC. 6. CENTERS FOR INDUSTRIAL TECHNOLOGY

**(a) Establishment.—The Director shall provide assistance for the establishment of Centers for Industrial Technology. Such Centers shall be affiliated with any university, or other nonprofit institution, or group thereof, that applies for and is awarded a grant or enters into a cooperative agreement under this section. The objective of the Centers is to enhance technological innovation through—**

**(1) the participation of individuals from industry and universities in cooperative technological innovation activities;**

**(2) the development of the generic research base, important for technological advance and innovative activity, in which individual firms have little incentive to invest, but which may have significant economic or strategic importance, such as manufacturing technology;**

**(3) the education and training of individuals in the technological innovation process;**

**(4) the improvement of mechanisms for the dissemination of scientific, engineering, and technical information among universities and industry;**

**(5) the utilization of the capability and expertise, where appropriate, that exists in Federal laboratories; and**

**(6) the development of continuing financial support from other mission agencies, from State and local government, and from industry and universities through, among other means, fees, licenses, and royalties.**

**(b) Activities.—The activities of the Centers shall include, but need not be limited to—**

**(1) research supportive of technological and industrial innovation including cooperative industry-university basic and applied research;**

**(2) assistance to individuals and small businesses in the generation, evaluation and development of technological ideas supportive of industrial innovation and new business ventures;**

**(3) technical assistance and advisory services to industry, particularly small businesses; and**

**(4) curriculum development, training, and instruction in invention. entrepreneurship, and industrial innovation.**

**Each Center need not undertake all of the activities under this subsection.**

This section provides a legislative mandate for the establishment of a wide variety of types of centers by the Department of Commerce. Centers might focus on an area of technology applicable to a number of industries, i.e. a "generic technology". An existing center of this type is the MIT Polymer Processing Program formerly supported by NSF, and now supported by a group of industries. Centers might focus on the evaluation of inventions such as has been done at the University of Oregon Innovation Center supported by NSF. Centers might emphasize the training of students in entrepreneurship and invention and assist in the start-up of innovative small businesses, as has been done in the NSF supported innovation centers at the University of Utah, Carnegie-Mellon University, and MIT. Centers need not be limited to a single building; they might be organizational in nature and consist of a coordinated group of activities at a university which, together, fulfill the purposes of this section and undertake the activities described above.

This section would provide a legislative basis, as well, for the Cooperative Generic Technology Program proposed by the Department of Commerce.[1] The Commerce proposal is for "generic technology" type centers, and the Department is urged to consider establishing other types of centers as more adequate funding is made available for the program.

Section 8 complements this section by authorizing the establishment of centers by the National Science Foundation, as well.

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[1] "Cooperative Generic Technology Program: Proposed Procedures", Federal Register Vol. 45, No. 119, June 18, 1980, pp. 41153–6.

**(c) Requirements.—Prior to establishing a Center, the Director shall find that—**

**(1) consideration has been given to the potential contribution of the activities proposed under the Center to productivity, employment, and economic competitiveness of the United States;**

**(2) a high likelihood exists of continuing participation, advice, financial support, and other contributions from the private sector;**

**(3) the host university or other nonprofit institution has a plan for the management and evaluation of the activities proposed within the particular Center, including:**

**(A) the agreement between the parties as to the allocation of patent rights on a nonexclusive, partially exclusive, or exclusive license basis to and inventions conceived or made under the auspices of the Center; and**

**(B) the consideration of means to place the Center, to the maximum extent feasible, on a self-sustaining basis;**

**(4) suitable consideration has been given to the university's or other nonprofit institution's capabilities and geographical location; and**

**(5) consideration has been given to any effects upon competition of the activities proposed under the Center.**

The Committee expects that outside funding will be forthcoming from the academic and industrial sectors as well as from other Federal departments and/or State and local governments. However, the Committee recognizes the differing funding requirements of the various types of Centers which must be considered when determinations are made under subsections 6(c)(2) and 6(c)(3) regarding the likelihood of continued private sector participation and financial support for the Centers. Because of the nature of their organization and responsibilities, Generic Technology Centers are more apt to become self-sustaining than are the Innovation Centers which concentrate efforts on education and training. Federal support should not be terminated solely on failure of the Center to become self-supporting; while these organizations are to be self-sufficient "to the maximum extent feasible", this is not mandatory.

**(d) Planning Grants.—The Director is authorized to make available nonrenewable planning grants to universities or nonprofit institutions for the purpose of developing a plan required under subsection (c)(3).**

**(e) Research and Development Utilization.—(1) To promote technological innovation and commercialization of research and development efforts, each Center has the option of acquiring title to any invention conceived or made under the auspices of the Center that was supported at least in part by Federal funds: *Provided,* That—**

**(A) the Center reports the invention to the Director *supporting agency* together with a list of each country in which the Center elects to file a patent application on the invention;**

**(B) said option shall be exercised at the time of disclosure of invention or within such time thereafter as may be provided in the grant or cooperative agreement;**

**(C) the Center intends to promote the commercialization of the invention and file a United States patent application;**

**(D) royalties be used for** *compensation of the inventor or for* **educational or research activities of the Center;**

**(E) the Center make periodic reports to the Director** *supporting agency*, **and the Director** *supporting agency* **may treat information contained in such reports as privileged and confidential technical, commercial, and financial information and not subject to disclosures under the Freedom of Information Act; and**

**(F) any Federal department or agency shall have the royalty-free right to practice, or have practiced on its behalf, the invention for governmental purposes.**

**The Secretary** *supporting agency* **shall have the right to acquire title to any patent on an invention in any country in which the Center elects not to file a patent application or fails to file within a reasonable time.**

**(2) Where a Center has retained title to an invention under paragraph (1) of this subsection the Secretary** *supporting agency* **shall have the right to require the Center or its licensee to grant a nonexclusive, partially exclusive, or exclusive license to a responsible applicant or applicants, upon terms that are reasonable under the circumstances, if the Secretary** *supporting agency* **determines, after public notice and opportunity for hearing, that such action is necessary—**

**(A) because the Center or licensee has not taken and is not expected to take timely and effective action to achieve practical application of the invention;**

**(B) to meet health, safety, environmental, or national security needs which are not reasonably satisfied by the contractor or licensee; or**

**(C) because the granting of exclusive rights in the invention has tended substantially to lessen competition or to result in undue market concentration in the United States in any line of commerce to which the technology relates.**

*(3) Any individual, partnership, corporation, association, institution, or other entity adversely affected by a supporting agency determination made under paragraph (2) of this subsection may, at any time within 60 days after the determination is issued, file a petition to the United States Court of Claims which shall have jurisdiction to determine that matter de novo and to affirm, reverse, or modify as appropriate, the determination of the supporting agency.*

It is the intent of the committee that any title to any invention held by a Center under subsection (e) carry with it the normal rights of a title—particularly including the right to license—except as qualified by the remainder of this subsection.

Under (D) above regarding royalties, it is the intent of the committee that "royalties" be construed as net royalties and that gross proceeds from title to an invention may be used for reimbursement of patenting, licensing, and related expenses of title acquisition and use.

**(f) Additional Consideration.—Before substantial public and private funds are committed to a Center, the Secretary** *supporting agency* **shall submit a request to the Attorney General for an**

**opinion whether the joint research activities of the Center would be in violation of any of the antitrust laws. The Attorney General shall advise the Secretary *supporting agency* of his determination and the reasons therefor within 120 days after receipt of such request.**

To address concerns of antitrust activities regarding operation of the technology centers created by this Act, the supporting agency is required to seek the judgment of the Attorney General as to whether Center operations are in violation of antitrust laws.

I. SECTION 7—GRANTS AND COOPERATIVE AGREEMENTS

SEC. 7. GRANTS AND COOPERATIVE AGREEMENTS.

**(a) In General.—The Director may make grants and enter into cooperative agreements according to the provisions of this section in order to assist any activity consistent with this Act, including activities performed by individuals. The total amount of any such grant or cooperative agreement may not exceed 75 percent of the total cost of the program.**

**(b) Eligibility and Procedure.—Any person or institution may apply to the Director for a grant or cooperative agreement available under this section. Application shall be made in such form and manner, and with such content and other submissions, as the Director shall prescribe. The Director shall act upon each such application within 90 days after the date on which all required information is received.**

**(c) Terms and Conditions.—**

**(1) Any grant made, or cooperative agreement entered into, under this section shall be subject to the limitations and provisions set forth in paragraphs *paragraph* (2) and (3) of this subsection, and to such other terms, conditions, and requirements as the Director deems necessary or appropriate.**

**(2) Any person who receives or utilizes any proceeds of any grant made or cooperative agreement entered into under this section shall keep such records as the Director shall by regulation prescribe as being necessary and appropriate to facilitate effective audit and evaluation, including records which fully disclose the amount and disposition by such recipient of such proceeds, the total cost of the program or project in connection with which such proceeds were used, and the amount, if any, of such costs which was provided through other sources.**

Section 7 authorizes the Director of the Office of Industrial Technology to make grants and enter into cooperative agreements to allow for the achievement of the mandate of this Act, provided certain conditions are met. The Office is limited to providing 75 percent of the total program cost; this allows for funding to be higher in the initial stages of the program when the Federal responsibility is the greatest. It is expected that the amount of the Federal contribution will decrease over time to maintain the 75 percent contribution to the entire activity.

## J. Section 8—National Science Foundation Centers for Industrial Technology

***SEC. 8. NATIONAL SCIENCE FOUNDATION CENTERS FOR INDUSTRIAL TECHNOLOGY.***

*(a) Establishment and Provisions.—The National Science Foundation shall provide assistance for the establishment of Centers for Industrial Technology. Such Centers shall be affiliated with a university, or other nonprofit institution, or a group thereof. The objective of the Centers is to enhance technological innovation as provided in section 6(a) The activities of the Centers shall be as provided in section 6(b). Prior to establishing a Center, the National Science Foundation shall find that requirements (1) through (5) of section 6(c) have been met. The provisions of sections 6(e) and (f) shall apply to Centers established under this section.*

*(b) Planning Grants.—The National Science Foundation is authorized to make available nonrenewable planning grants to universities or nonprofit institutions for the purpose of developing a plan, as required under subsection 6(c)(3).*

*(c) Terms and Conditions.—Grants, contracts, and cooperative agreements entered into by the National Science Foundation in execution of the powers and duties of the National Science Foundation under this Act shall be governed by the National Science Foundation Act of 1950 and other pertinent Acts.*

The National Science Foundation is specifically instructed to provide for the establishment of Centers for Industrial Technology. This mandate is identical to the one afforded the Department of Commerce in section 6 of this bill. It is the Committee's intention that both the National Science Foundation and the Commerce Department support these centers to achieve a mix of approaches to the concept. The most effective mode of operation for the centers program has not been adequately determined because of the lack of extensive experience in this area. NSF has only operated an innovation centers program since 1973 and the Department of Commerce is in the process of developing its plan for Cooperative Generic Technology Centers in response to President Carter's message on industrial innovation. Thus, the Committee requires that a dual effort be made on behalf of NSF and DOC. In this undertaking, both institutions are to maintain contact to foster the exchange of ideas, observations, and results. It is anticipated that each agency will operate its own centers; however, there are no prohibitions against joint efforts.

It should be noted that subsection 8(b) corresponds to subsection 6(d), and subsection 8(c) corresponds to section 7 of this Act. Under the mandate to the National Science Foundation, the organization is provided with broader discretion in the support of its centers than that given to the Department of Commerce under section 7. Although NSF is not required to keep to a maximum of 75 percent of the total funding for each innovation center, the Committee expects that the Foundation will seek to secure outside contributions for those activities it supports.

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K. SECTION 9—ADMINISTRATIVE ARRANGEMENTS

SEC. 8. *9.* ADMINISTRATIVE ARRANGEMENTS.

**(a) Coordination—The Director *Secretary and the National Science Foundation* shall, on a continuing basis, obtain the advice and cooperation of departments and agencies whose missions contribute to or are affected by the programs established under this Act, including the development of an agenda for research and policy experimentation. These departments and agencies shall include but not be limited to the Departments of Defense, Energy, Health, Education, and Welfare,** *Health and Human Services*, **Housing and Urban Development, the Environmental Protection Agency, National Aeronautics and Space Administration, National Science Foundation, Small Business Administration, Council of Economic Advisers, Council on Environmental Quality, and Office of Science and Technology Policy.**

**(b) Authorization.—The Secretary is authorized to receive moneys from other departments or agencies to support activities of the Centers established under section 6 and for the support of studies and policy experiments. National Laboratories are authorized to to participate in, contribute to or serve as a resource for the Centers.**

*(b) COOPERATION.—It is the sense of the Congress that departments and agencies, including the Federal laboratories, whose missions are affected by, or could contribute to, the programs established under this Act, should, within the limits of budgetary authorizations and appropriations, support or participate in activities or projects authorized by this Act.*

*(c) ADMINISTRATIVE AUTHORIZATION.—*

*(1) Departments and agencies described in subsection (b) are authorized to participate in, contribute to, and serve as resources for the Centers and for any other activities authorized under this Act.*

*(2) The Secretary and the National Science Foundation are authorized to receive moneys and to receive other forms of assistance from other departments or agencies to support activities of the Centers and any other activities authorized under this Act.*

L. SECTION 10—NATIONAL INDUSTRIAL TECHNOLOGY BOARD

SEC. 9. *10.* NATIONAL INDUSTRIAL TECHNOLOGY BOARD.

**(a) Establishment.—There shall be established a committee to be known as the National Industrial Technology Board.**

**(b) Duties.—The Board shall take such steps as may be necessary to review annually the activities of the Office and advise the Secretary and the Director with respect to—**

**(1) the formulation and conduct of activities under section 5 of this title;**

**(2) the designation and operation of Centers and their programs under section 6 of this Act including assistance in establishing priorities;**

**(3) the preparation of the report required under section 5(d); and**

**(4) such other matters as the Secretary or Director refers to the Board for review and advice.**

**The Director shall make available to the Board such information, personnel, and administrative services and assistance as it may reasonably require to carry out its duties.**

**(c) Membership, Terms, and Powers.—**

**(1) The Board shall consist of 15 voting members who shall be appointed by the Secretary. The Director shall serve as a nonvoting member of the Board. The members of the Board shall be individuals who, by reason of knowledge, experience, or training are especially qualified in one or more of the disciplines and fields dealing with technology, labor, and industrial innovation or who are affected by technological innovation. The majority of the members of the Board shall be individuals from industry and business.**

**(2) The term of office of a voting member of the Board shall be 3 years, except that of the original appointees, five shall be appointed for a term of 1 year, five shall be appointed for a term of 2 years, and five shall be appointed for a term of 3 years.**

**(3) Any individual appointed to fill a vacancy occurring before the expiration of the term for which his or her predecessor was appointed shall be appointed only for the remainder of such term. No individual may be appointed as a voting member after serving more than two full terms as such a member.**

**(4) The Board shall select a voting member to serve as the Chairperson and another voting member to serve as the Vice Chairperson. The Vice Chairperson shall perform the functions of the Chairperson in the absence or incapacity of the Chairperson.**

**(5) Voting members of the Board may receive compensation at a daily rate for GS–18 of the General Schedule under section 5332 of title 5, United States Code, when actually engaged in the performance of duties for such Board, and may be reimbursed for actual and reasonable expenses incurred in the performance of such duties.**

Section 10 establishes the National Industrial Technology Board (NITB) to advise the Secretary of Commerce and the Director of the Office of Industrial Technology on the activities undertaken to implement the mandate of this Act. The National Industrial Technology Board replaces the Commerce Technical Advisory Board (CTAB) and is expected to perform all the specific and implied functions of CTAB, plus additional responsibilities. Thus, NITB is to, in addition to its stated functions, serve as a liaison with industry; study and evaluate the technical activities of the Department of Commerce and recommend changes to increase the impact on business; and have a consumer representative as a member—activities which have previously been charged to the Commerce Technical Advisory Board and which will continue under the National Industrial Technology Board, although not explicitly enumerated in this section.

The Committee expects that NITB, although specifically required to report to the Department of Commerce, also will maintain close liaison with the National Science Foundation, providing the Foundation with all reports except those which are sensitive and are applicable solely to the Commerce Department.

M. SECTION 11—UTILIZATION OF FEDERAL TECHNOLOGY

## *SEC. 11. UTILIZATION OF FEDERAL TECHNOLOGY.*

*(a) POLICY.—It is the continuing responsibility of the Federal Government to ensure the full use of the results of the Nation's Federal investment in research and development. To this end the Federal Government shall strive to transfer federally owned or originated technology to State and local governments and to the private sector.*

The phrase "technology transfer," as used throughout this section, is intended to mean the transformation of R. & D. into processes, products, and services that can be applied to State and local government and private sector needs.

This definition is broad and the determination of which agency activities fall under the umbrella of "technology transfer" will admittedly, be subject to each agency's interpretation of the definition in view of its unique organizational characteristics and R. & D. activities. However, the overriding consideration in making a determination as to what should be categorized as technology transfer is that the activity so classified should be dedicated to technology transfer from the outset. Many Federal R. & D. activities ultimately result in processes or products or services useful in meeting State and local government or private sector needs. However, this is not technology transfer because technology transfer, as defined here, is the transformation process itself. NASA's Technology Transfer and Technology Utilization programs are good examples of programs dedicated to achieving this transformation. Likewise, many agencies have technical information dissemination programs aimed at achieving the same goal.

It is recognized that a strong national policy concerning technology transfer in the Federal government has not been developed. This lack of a national policy has prevented the institutionalization of the process and reduced the efficacy of attempts, by many Federal laboratories, to provide technical assistance for solving the problems of the public and private sectors.

The Federal laboratories have been established to assist their parent agencies to meet their mission requirements. With the exception of NASA, the technology transfer activity is not a part of the congressionally mandated mission of Federal agencies. Thus, technology transfer activities are, at best, secondary to those endeavors which support the agencies' primary responsibilities.

A major objective of the Act is to clearly articulate that it is the intent of Congress to mandate and promote technology transfer activities at the Federal agencies and their laboratories. Thus, Section 11 begins by specifically stating a congressional policy on technology transfer in the Federal government. It is intended that this policy will provide the basis for the inclusion of technology transfer programs in the mission requirements of every Federal agency engaged in R. & D. activities.

*(b) ESTABLISHMENT OF RESEARCH AND TECHNOLOGY APPLICATIONS OFFICES.—Each Federal laboratory shall establish an Office of Research and Technology Applications. Laboratories having existing organizational structures which perform the functions of this section may elect to combine the Office of Research and Technology Applications within the existing organization. The staffing and funding levels*

*for these offices shall be determined between each Federal laboratory and the Federal agency operating or directing the laboratory; except that (1) each laboratory having a total annual budget exceeding $20,000,000 shall provide at least one professional individual full-time as staff for its Office of Research and Technology Applications, and (2) after September 30, 1981, each Federal agency which operates or directs one or more Federal laboratories shall make available not less than 0.5 percent of the agency's research and development budget to support the technology transfer function at the agency and at its laboratories, including support of the Offices of Research and Technology Applications.*

Section 11(b) establishes an institutional framework for the performance of the technology transfer function at the Federal laboratories. Institutionalizing the technology transfer function is crucial in order to ensure that the technology transfer activities at the laboratories are given the visibility and resources needed to carry out the requirements of the Act.

At the same time, it is recognized that the Federal agencies, due to their differing missions and structures, need a degree of flexibility in handling the technology transfer requirement. Thus, the Act provides that each agency shall determine in consultation with its laboratories, how the Research and Technology Applications Offices shall be staffed and funded and whether to combine the functions of the applications offices with any existing units at the laboratories which perform similar functions. Where there are existing units, it is not the committee's intent to force them to be renamed; there should be a designation of what unit is the Office of Research and Technology Applications at each laboratory, however, so that the Center for the Utilization of Federal Technology and other groups know whom to contact with regard to the functions of this section. Although this considerable flexibility is provided, the Act mandates that, at a minimum, laboratories having an annual budget exceeding $20 million, must commit at least one full time staff person to the Research and Technology Applications Office.

It is further noted that there are few incentives at most Federal laboratories for scientists or other professionals to become actively involved in technology transfer activities because it is not part of their mission. As a corollary, because technology transfer is not a recognized, officially sanctioned activity of the majority of Federal laboratories, work performed in this capacity is not often relevant to professional promotion within the organization. In fact, career development of staff engaged in technology transfer is sometimes detrimentally affected because time is spent on activities other than those specified in positions descriptions upon which promotions are based.

Laboratory Directors are hesitant to encourage what often has been perceived as volunteer work for State and local governments and private organizations due to the fear that, at budget time, OMB and Congressional Committees will view these activities as evidence of surplus staff time and other resources.

For the above reasons, it is considered crucial to the accomplishment of the objectives of the Act that officially sanctioned offices, specifically assigned the mission of promoting technology transfer at the laboratories, be established, and that, at least in the case of laboratories with annual budgets exceeding $20 million, a full time staff member is assigned to the Office.

To provide the fiscal resources necessary to carry out the functions of the Research and Technology Applications Offices (as defined in Section 11(c)), Section 11(b) mandates that each Federal agency which operates or directs one or more Federal laboratories shall make available *not less than* 0.5 percent of the agency's research and development budget to support the technology transfer function at the agency and its laboratories. It should be noted that this 0.5 percent set-aside is not effectively mandated until fiscal year 1982 in order to provide Federal agencies the time they need to plan and develop the activities mandated by this Act.

It should also be noted that the set-aside is to be applied both to agency level and laboratory activities in support of the requirements of section 11 of this Act. The determination as to how the set-aside is to be allocated among the laboratories under the agency's control and agency level technology transfer activities is left to each agency's discretion. It is *not* the intent of the Act that, where an agency is currently funding technology transfer endeavors in excess of 0.5 percent of its annual R & D budget, the agency view the 0.5 percent set aside as a justification to cut back on such endeavors to the 0.5 percent level. The Act specifically states that "not less than 0.5 percent of agency's R & D budget" be committed to this function. The set-aside, therefore, is to be viewed as a minimum rather than a maximum budget commitment.

That the 0.5 percent minimum is truly minimal may be seen in the testimony of William C. Norris, founder and Chief Executive Officer of Control Data Corporation: "We recommend, therefore, that each Federal agency allocate five percent of its R & D funds for technology transfer."[1] This is ten times the minimum stipulated by the bill.

(*c*) *FUNCTIONS OF RESEARCH AND TECHNOLOGY APPLICATIONS OFFICES.—It shall be the function of each Office of Research and Technology Applications—*

*(1) to prepare an application assessment of each research and development project in which that laboratory is engaged which has potential for successful application in State or local government or in private industry;*

*(2) to provide and disseminate information on federally owned or originated products, processes, and services having potential application to State and local governments and to private industry;*

*(3) to cooperate with and assist the Center for the Utilization of Federal Technology and other organizations which link the research and development resources of that laboratory and the Federal Government as a whole to potential users in State and local government and private industry; and*

*(4) to provide technical assistance in response to requests from State and local government officials.*

*Agencies which have established organizational structures outside their Federal laboratories which have as their principal purpose the transfer of Federally owned or originated technology to State and local government and to the private sector may elect to perform the*

[1] Norris, William C., in testimony before a joint hearing of the Task Force on Inflation of the House Budget Committee and the Subcommittee on Science, Research and Technology of the House Committee on Science and Technology, "Productivity and Technical Innovation," Committee on Science and Technology, No. 36, 1979, p. 46.