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COMMERCIALIZATION OF FEDERALLY FUNDED R&D: A GUIDE TO TECHNOLOGY TRANSFER FROM FEDERAL LABORATORIES

PRINTED AT THE DIRECTION OF

HON. ERNEST F. HOLLINGS, *Chairman*

FOR THE USE OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

UNITED STATES SENATE



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LETTER OF TRANSMITTAL

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC, June 29, 1988.

DEAR COLLEAGUE: I am pleased to submit for your information and use a report, *Commercialization of Federally Funded R&D: A Guide to Technology Transfer from Federal Laboratories*, prepared by the Congressional Research Service at the request of the Committee on Commerce, Science, and Transportation.

Congress passed the Federal Technology Transfer Act in 1986 in order to speed the transfer of inventions and expertise from Federal laboratories to private industry and the States. Because of widespread Congressional and public interest in the Act, the Committee felt that a document summarizing the law and listing contacts in Federal laboratories would be helpful.

The Committee hopes that this report will contribute to the Nation's continuing efforts to improve technology transfer and economic competitiveness.

While this report has been neither approved, disapproved, or considered by the Committee, I believe that it will benefit all of our Members and their staff.

Sincerely.

ERNEST F. HOLLINGS, *Chairman.*

LETTER OF SUBMITTAL

CONGRESSIONAL RESEARCH SERVICE,
LIBRARY OF CONGRESS,
Washington, DC, April 13, 1988.

HON. ERNEST HOLLINGS
Chairman, Committee on Commerce, Science, and Transportation U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: I am pleased to forward the enclosed report entitled, *Commercialization of Federally-Funded R&D: A Guide to Technology Transfer from Federal Laboratories*, undertaken at the request of the Senate Committee on Commerce, Science, and Transportation and the House Committee on Science, Space and Technology. The paper was prepared by Wendy H. Schacht, Specialist in Science and Technology, Science Policy Research Division.

This study describes Federal Government activities to promote the transfer of technology from the Federal laboratories to State and local jurisdictions and the private sector. It is designed to provide information on opportunities to access the technologies, expertise, and facilities of the Federal laboratory system. As per your instructions, the material is drafted for committee publication.

On behalf of the Congressional Research Service, I would like to express my appreciation for the opportunity to undertake this timely and challenging assignment.

Sincerely,

JOSEPH E. ROSS, *Director.*

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INTRODUCTION

This report describes Federal legislation and programs to promote the transfer of technology—products and processes, skills and knowledge—from the Federal laboratories to the private sector. Recent legislation has created new opportunities for the private sector to use the scientific, technical, and engineering resources of the Federal laboratory system. These resources include skilled and knowledgeable personnel, new technologies and techniques, as well as facilities and equipment often not accessible elsewhere. The following information is designed to provide the interested party—be it a large or small company, an individual or a consortium, a business or university—with a guide to Government laboratory technology transfer programs and procedures.

EXECUTIVE SUMMARY

Several laws have been enacted to promote the transfer of technology from the Federal laboratories to State and local governments and the private sector. P.L. 96-480, the Stevenson-Wydler Technology Innovation Act and P.L. 99-502, the Federal Technology Transfer Act, create mechanisms by which Federal agencies and their laboratories can transfer technology. Each department with one or more laboratories must make available not less than 0.5 percent of its R&D budget for transfer activities, although this requirement can, and has been waived. Each laboratory is mandated to establish an Office of Research and Technology Applications (ORTA) to facilitate technology transfer by identifying technologies and ideas which have potential for application in other settings and by working with other organizations to promote the use of Federal R&D resources.

The legislation also requires that the information developed by the ORTAs be forwarded to the Center for the Utilization of Federal Technology (CUFT) at the Department of Commerce. CUFT has been placed within the National Technical Information Service (NTIS) which is designated as the clearinghouse for the collection, dissemination, and transfer of information on federally-owned or originated technology.

The Federal Laboratory Consortium for Technology Transfer (FLC) is given a legislative mandate to assist in the coordination of technology transfer activities and to promote the effective utilization of federally-developed technical knowledge by linking Federal laboratories with other Federal, State, local, and regional government entities and the private sector. The Consortium is funded by a set-aside of 0.005 percent of the R&D budgets of the Federal laboratories. Access to the entire Federal laboratory system by an individual, company, or State or local official may be made through any laboratory representative, the FLC regional coordinators, the Washington area representative, or by contacting the Chairman or Executive Director.

have either commercial value or contribute to the mission of the laboratory and (2) the transfer of technology leading to commercialization. As an additional incentive to the transfer of technology from the laboratory to the private sector, Federal employees responsible for an invention are to receive at least 15 percent of royalties generated by the licensing of that Government-owned patent. The agencies may establish their own royalty sharing programs within certain guidelines contained in the legislation. If the Federal agency has the right to an invention but chooses not to patent, the inventor, either as a current Federal employee or a former one, can obtain title to that invention (subject to the reservation by the Government of a non-exclusive, non-transferrable, irrevocable, paid up license to practice or have practiced the invention on behalf of the Government).

DISPENSATION OF ROYALTY PAYMENTS TO THE U.S. GOVERNMENT

As noted above, at least 15 percent of any royalties generated from the use of a Government-owned patent must go to the Federal employee inventor(s). The agency can promulgate regulations providing an alternative set of rights for the inventor, although this must include total royalty payments over 15 percent in a given year. The inventor may not receive more than $100,000 per year in royalty payments without the consent of the President.

In addition, P.L. 99-502 states that the Federal agencies are permitted to retain royalty income rather than returning it to the Treasury. After payment of the prescribed amount to the inventor, the agencies must transfer the balance of the total to their Government-operated laboratories with the major portion distributed to the laboratory where the invention was made. The laboratory may keep all royalties up to 5 percent of their annual budget plus 25 percent of funds in excess of this 5 percent limit. The remaining 75 percent of the excess returns to the Treasury. The funds retained by the laboratory are to be used for expenses incurred in the administration and licensing of inventions; to reward the scientific, engineering, and technical personnel of the laboratory; to provide for personnel exchanges between laboratories; for education and training consistent with the laboratories' and agencies' missions; or for additional technology transfer activities.

INFORMATION DISSEMINATION

The Stevenson-Wydler Technology Innovation Act (P.L. 96-480) created the Center for the Utilization of Federal Technology (CUFT) within the Department of Commerce to serve as a collection point for the information generated by the Offices of Research and Technology Application. While CUFT was originally intended to act as an entry into the technical expertise of the Federal establishment and to provide whatever additional assistance was necessary for the transfer of technology, the Center was subsequently placed under the National Technical Information Service (NTIS) and focused primarily on information dissemination. As amended by the Federal Technology Transfer Act, CUFT no longer has the functions mandated in the initial legislation

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Title V permits decisions to be made at the laboratory level in Government-owned, contractor-operated laboratories as to the award of licenses for patents generated in-house. The contractor is also permitted by this legislation to receive patent royalties for use in additional research and development, for awards to individual inventors on staff, or for education. A cap exists on the amount of the royalty returning to the laboratory.

P.L. 98-620 also permits private companies, regardless of size, to obtain exclusive license for the full life of the Government patent. Prior restrictions on large firms allowed exclusive license for only 5 of the 17 years of the patent. Additionally, in a change from P.L. 96-517—which specifically prohibited the operating units of Government-owned, contractor-operated laboratories from obtaining title to federally-funded inventions—P.L. 98-620 permits those laboratories run by universities and non-profit institutions to retain title to inventions made in the laboratory within certain defined limitations while reserving specific rights for the Federal Government. Federal laboratories operated by large companies are not included in this provision.

As noted above, P.L. 99-502, the Federal Technology Transfer Act. allows companies, regardless of size, to retain title to inventions resulting from research performed under cooperative R&D agreements with the Federal laboratories. The Government retains a royalty free license to use these patents.

EXECUTIVE ORDER: FACILITATING ACCESS TO SCIENCE AND TECHNOLOGY

On April 10, 1987, President Reagan issued Executive Order 12591, Facilitating Access to Science and Technology. This document reiterates many of the provisions of the Federal Technology Transfer Act described above as well as several provisions contained in the patent laws previously discussed. It directs the head of each executive department and agency, to the extent permitted by law, to promote cooperative R&D efforts between the Federal laboratories, State and local governments, universities, and the private sector ". . . to assist in the transfer of technology to the marketplace." This also includes granting title to the results of federally-funded R&D to all contractors, regardless of size, in exchange for royalty-free use by, or on behalf of, the Federal Government.

In addition, the Executive Order calls for (1) the establishment of a technology share program for selected Federal laboratories to work with private industry consortia in areas of research and technology with potential long-term national benefits; (2) a program of exchanges between scientists and engineers in Federal laboratories and the private sector; (3) a program to insure that American companies can exploit research and technology developed abroad; (4) the accelerated transfer of technology from the Department of Defense; and (5) an examination of the potential for Basic Science and Technology Centers funded, in part, by the Federal departments and agencies. A task force to be convened under the auspices of the Office of Science and Technology

compensated at the rate provided for level V of the Executive Schedule in section 5316 of title 5, United States Code.

(c) DUTIES.—The Secretary, through 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) provide that cooperative efforts to stimulate industrial innovation be undertaken between the Director and other officials in the Department of Commerce responsible for such areas as trade and economic assistance;

(7) consider government measures with the potential of advancing United States technological innovation and exploiting innovations of foreign origin; and

(8) 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 enactment of this Act, a report on the progress, findings, and conclusions of activities conducted pursuant to sections 5, 6, 8, 11, 12, and 13 of this Act and recommendations for possible modifications thereof. Report to President and Congress.

SEC. 6. CENTERS FOR INDUSTRIAL TECHNOLOGY. 15 USC 3705.

(a) ESTABLISHMENT.—The Secretary 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;

(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 supporting agency, and the 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 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.

Supporting agency licensing rights.

(2) Where a Center has retained title to an invention under paragraph (1) of this subsection the 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 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.

U.S. Courts of Claims, petition.

(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.

Antitrust laws.

(f) ADDITIONAL CONSIDERATION.—The supporting agency may request the Attorney General's opinion whether the proposed joint research activities of a Center would violate any of the antitrust laws. The Attorney General shall advise the supporting agency of his determination and the reasons for it within 120 days after receipt of such request.

15 USC 3706.

SEC. 7. GRANTS AND COOPERATIVE AGREEMENTS.

(a) IN GENERAL.—The Secretary 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 Secretary 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 Direc-

(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 functions of this subsection in such organizational structures. No Office of Research and Technology Applications or other organizational structures performing the functions of this subsection shall substantially compete with similar services available in the private sector.

(d) CENTER FOR THE UTILIZATION OF FEDERAL TECHNOLOGY.—There is hereby established in the Department of Commerce a Center for the Utilization of Federal Technology. The Center for the Utilization of Federal Technology shall— Establishment.

(1) serve as a central clearinghouse for the collection, dissemination and transfer of information on federally owned or originated technologies having potential application to State and local governments and to private industry;

(2) coordinate the activities of the Offices of Research and Technology Applications of the Federal laboratories;

(3) utilize the expertise and services of the National Science Foundation and the existing Federal Laboratory Consortium for Technology Transfer; particularly in dealing with State and local governments;

(4) receive requests for technical assistance from State and local governments and refer these requests to the appropriate Federal laboratories;

(5) provide funding, at the discretion of the Secretary, for Federal laboratories to provide the assistance specified in subsection (c)(4); and

(6) use appropriate technology transfer mechanisms such as personnel exchanges and computer-based systems.

(e) AGENCY REPORTING.—Each Federal agency which operates or directs one or more Federal laboratories shall prepare biennially a report summarizing the activities performed by that agency and its Federal laboratories pursuant to the provisions of this section. The report shall be transmitted to the Center for the Utilization of Federal Technology by November 1 of each year in which it is due.

SEC. 12. NATIONAL TECHNOLOGY MEDAL. 15 USC 3711.

(a) ESTABLISHMENT.—There is hereby established a National Technology Medal, which shall be of such design and materials and bear such inscriptions as the President, on the basis of recommendations submitted by the Office of Science and Technology Policy, may prescribe.

(b) AWARD.—The President shall periodically award the medal, on the basis of recommendations received from the Secretary or on the basis of such other information and evidence as he deems appropriate, to individuals or companies, which in his judgment are deserving of special recognition by reason of their 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.

(c) PRESENTATION.—The presentation of the award shall be made by the President with such ceremonies as he may deem proper.

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substantial purpose of which is the performance of research, development, or engineering by employees of the Federal Government.

"(e) DETERMINATION OF LABORATORY MISSIONS.—For purposes of this section, an agency shall make separate determinations of the mission or missions of each of its laboratories.

"(f) RELATIONSHIP TO OTHER LAWS.—Nothing in this section is intended to limit or diminish existing authorities of any agency.".

SEC. 3. ESTABLISHMENT OF FEDERAL LABORATORY CONSORTIUM FOR TECHNOLOGY TRANSFER.

Section 11 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710) is amended— *Post*, p. 1791.

tium shall submit a report to the President, to the appropriate authorization and appropriation committees of both Houses of the Congress, and to each agency with respect to which a transfer of funding is made (for the fiscal year or years involved) under paragraph (7), concerning the activities of the Consortium and the expenditures made by it under this subsection during the year for which the report is made.

"(7)(A) Subject to subparagraph (B), an amount equal to 0.005 percent of that portion of the research and development budget of each Federal agency that is to be utilized by the laboratories of such agency for a fiscal year referred to in subparagraph (B)(ii) shall be transferred by such agency to the National Bureau of Standards at the beginning of the fiscal year involved. Amounts so transferred shall be provided by the Bureau to the Consortium for the purpose of carrying out activities of the Consortium under this subsection.

"(B) A transfer shall be made by any Federal agency under subparagraph (A), for any fiscal year, only if—

"(i) the amount so transferred by that agency (as determined under such subparagraph) would exceed $10,000; and

"(ii) such transfer is made with respect to the fiscal year 1987, 1988, 1989, 1990, or 1991.

"(C) The heads of Federal agencies and their designees, and the directors of Federal laboratories, may provide such additional support for operations of the Consortium as they deem appropriate.

"(8)(A) The Consortium shall use 5 percent of the funds provided in paragraph (7)(A) to establish demonstration projects in technology transfer. To carry out such projects, the Consortium may arrange for grants or awards to, or enter into agreements with, nonprofit State, local, or private organizations or entities whose primary purposes are to facilitate cooperative research between the Federal laboratories and organizations not associated with the Federal laboratories, to transfer technology from the Federal laboratories, and to advance State and local economic activity.

"(B) The demonstration projects established under subparagraph (A) shall serve as model programs. Such projects shall be designed to develop programs and mechanisms for technology transfer from the Federal laboratories which may be utilized by the States and which will enhance Federal, State, and local programs for the transfer of technology.

"(C) Application for such grants, awards, or agreements shall be in such form and contain such information as the Consortium or its designee shall specify.

"(D) Any person who receives or utilizes any proceeds of a grant or award made, or agreement entered into, under this paragraph shall keep such records as the Consortium or its designee shall determine are necessary and appropriate to facilitate effective audit and evaluation, including records which fully disclose the amount and disposition of such proceeds and the total cost of the project in connection with which such proceeds were used.". Records.

SEC. 4. UTILIZATION OF FEDERAL TECHNOLOGY.

(a) RESPONSIBILITY FOR TECHNOLOGY TRANSFER.—Section 11(a) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710(a)) is amended—

(1) by inserting "(1)" after "POLICY.—"; and

(2) by adding at the end thereof the following new paragraphs:

(4) by striking out paragraph (4) and inserting in lieu thereof the following:

"(3) receive requests for technical assistance from State and local governments, respond to such requests with published information available to the Service, and refer such requests to the Federal Laboratory Consortium for Technology Transfer to the extent that such requests require a response involving more than the published information available to the Service;"; State and local governments.

(5) by redesignating paragraphs (5) and (6) as paragraphs (4) and (5), respectively; and

(6) by striking out "(c)(4)" in paragraph (4) as so redesignated and inserting in lieu thereof "(c)(3)".

(d) AGENCY REPORTING.—Section 11(f) of such Act (15 U.S.C. 3710(e)) (as redesignated by section 3(1) of this Act) is amended—

(1) by striking out "prepare biennially a report summarizing the activities" in the first sentence and inserting in lieu thereof "report annually to the Congress, as part of the agency's annual budget submission, on the activities"; and Reports.

(2) by striking out the second sentence.

SEC. 5. FUNCTIONS OF THE SECRETARY OF COMMERCE. 15 USC 3710.

Section 11 of the Stevenson-Wydler Technology Innovation Act of 1980 (as amended by the preceding provisions of this Act) is further amended by adding at the end thereof the following new subsection:

"(g) FUNCTIONS OF THE SECRETARY.—(1) The Secretary, in consultation with other Federal agencies, may—

"(A) make available to interested agencies the expertise of the Department of Commerce regarding the commercial potential of inventions and methods and options for commercialization which are available to the Federal laboratories, including research and development limited partnerships;

"(B) develop and disseminate to appropriate agency and laboratory personnel model provisions for use on a voluntary basis in cooperative research and development arrangements; and

"(C) furnish advice and assistance, upon request, to Federal agencies concerning their cooperative research and development programs and projects.

"(2) Two years after the date of the enactment of this subsection and every two years thereafter, the Secretary shall submit a summary report to the President and the Congress on the use by the agencies and the Secretary of the authorities specified in this Act. Other Federal agencies shall cooperate in the report's preparation. Reports.

"(3) Not later than one year after the date of the enactment of the Federal Technology Transfer Act of 1986, the Secretary shall submit to the President and the Congress a report regarding— Reports.

"(A) any copyright provisions or other types of barriers which tend to restrict or limit the transfer of federally funded computer software to the private sector and to State and local governments, and agencies of such State and local governments; and Copyrights. State and local governments.

"(B) the feasibility and cost of compiling and maintaining a current and comprehensive inventory of all federally funded training software.".

SEC. 6. REWARDS FOR SCIENTIFIC, ENGINEERING, AND TECHNICAL PERSONNEL OR FEDERAL AGENCIES.

The Stevenson-Wydler Technology Innovation Act of 1980 (as amended by the preceding provisions of this Act) is further amended by inserting after section 12 the following new section:

15 USC 3710b.

"SEC. 13. REWARDS FOR SCIENTIFIC, ENGINEERING, AND TECHNICAL PERSONNEL OF FEDERAL AGENCIES.

"The head of each Federal agency that is making expenditures at a rate of more than $50,000,000 per fiscal year for research and development in its Government-operated laboratories shall use the appropriate statutory authority to develop and implement a cash awards program to reward its scientific, engineering, and technical personnel for—

"(1) inventions, innovations, or other outstanding scientific or technological contributions of value to the United States due to commercial application or due to contributions to missions of the Federal agency or the Federal government, or

"(2) exemplary activities that promote the domestic transfer of science and technology development within the Federal Government and result in utilization of such science and technology by American industry or business, universities, State or local governments, or other non-Federal parties.".

SEC. 7. DISTRIBUTION OF ROYALTIES RECEIVED BY FEDERAL AGENCIES.

The Stevenson-Wydler Technology Innovation Act of 1980 (as amended by the preceding provisions of this Act) is further amended by inserting after section 13 the following new section:

15 USC 3710c.

"SEC. 14. DISTRIBUTION OF ROYALTIES RECEIVED BY FEDERAL AGENCIES.

"(a) IN GENERAL.—(1) Except as provided in paragraphs (2) and (4), any royalties or other income received by a Federal agency from the licensing or assignment of inventions under agreements entered into under section 12, and inventions of Government-operated Federal laboratories licensed under section 207 of title 35, United States Code, or under any other provision of law, shall be retained by the agency whose laboratory produced the invention and shall be disposed of as follows:

"(A)(i) The head of the agency or his designee shall pay at least 15 percent of the royalties or other income the agency receives on account of any invention to the inventor (or co-inventors) if the inventor (or each such co-inventor) was an employee of the agency at the time the invention was made. This clause shall take effect on the date of the enactment of this section unless the agency publishes a notice in the Federal Register within 90 days of such date indicating its election to file a Notice of Proposed Rulemaking pursuant to clause (ii).

Effective date.
Federal Register, publication.

Regulations.

"(ii) An agency may promulgate, in accordance with section 553 of title 5, United States Code, regulations providing for an alternative program for sharing royalties with inventors who were employed by the agency at the time the invention was made and whose names appear on licensed inventions. Such regulations must—

"(I) guarantee a fixed minimum payment to each such inventor, each year that the agency receives royalties from that inventor's invention;

(2) Technology transfer, consistent with mission responsibilities, is a responsibility of each laboratory science and engineering professional.

"(3) Each laboratory director shall ensure that efforts to transfer technology are considered positively in laboratory job descriptions, employee promotion policies, and evaluation of the job performance of scientists and engineers in the laboratory.".

(b) RESEARCH AND TECHNOLOGY APPLICATIONS OFFICES.—(1) Section 11(b) of such Act (15 U.S.C. 3710(b)) is amended—

(A) by striking out "a total annual budget exceeding $20,000,000 shall provide at least one professional individual full-time" and inserting in lieu thereof "200 or more full-time equivalent scientific, engineering, and related technical positions shall provide one or more full-time equivalent positions";

(B) by inserting immediately before the next to last sentence the following new sentence: "Furthermore, individuals filling positions in an Office of Research and Technology Applications shall be included in the overall laboratory/agency management development program so as to ensure that highly competent technical managers are full participants in the technology transfer process.";

(C) by striking out "requirements set forth in (1) and/or (2) of this subsection" in the next to last sentence and inserting in lieu thereof "requirement set forth in clause (2) of the preceding sentence"; and

(D) by striking out "either requirement (1) or (2)" in the last sentence and inserting in lieu thereof "such requirement".

(2) Section 11(c) of such Act (15 U.S.C. 3710(c)) is amended—

(A) by striking out paragraph (1) and inserting in lieu thereof the following:

"(1) to prepare application assessments for selected research and development projects in which that laboratory is engaged and which in the opinion of the laboratory may have potential commercial applications;";

(B) by striking out "the Center for the Utilization of Federal Technology" in paragraph (3) and inserting in lieu thereof "the National Technical Information Service, the Federal Laboratory Consortium for Technology Transfer,", and by striking out "and" after the semicolon;

(C) by striking out "in response to requests from State and local government officials." in paragraph (4) and inserting in lieu thereof "to State and local government officials; and"; and

(D) by inserting immediately after paragraph (4) the following new paragraph:

State and local governments.

"(5) to participate, where feasible, in regional, State, and local programs designed to facilitate or stimulate the transfer of technology for the benefit of the region, State, or local jurisdiction in which the Federal laboratory is located."

(c) DISSEMINATION OF TECHNICAL INFORMATION.—Section 11(d) of such Act (15 U.S.C. 3710(d)) is amended—

(1) by striking out "(d)" and all that follows down through "shall—" and inserting in lieu thereof the following:

(d) DISSEMINATION OF TECHNICAL INFORMATION.—The National Technical Information Service shall—";

(2) by striking out paragraph (2);

(3) by striking out "existing" in paragraph (3), and redesignating such paragraph as paragraph (2);

nical Information Service, refer such requests to that Service, and

"(ii) otherwise refer these requests to the appropriate Federal laboratories and agencies;

"(D) facilitate communication and coordination between Offices of Research and Technology Applications of Federal laboratories;

"(E) utilize (with the consent of the agency involved) the expertise and services of the National Science Foundation, the Department of Commerce, the National Aeronautics and Space Administration, and other Federal agencies, as necessary;

"(F) with the consent of any Federal laboratory, facilitate the use by such laboratory of appropriate technology transfer mechanisms such as personnel exchanges and computer-based systems;

"(G) with the consent of any Federal laboratory, assist such laboratory to establish programs using technical volunteers to provide technical assistance to communities related to such laboratory;

"(H) facilitate communication and cooperation between Offices of Research and Technology Applications of Federal laboratories and regional, State, and local technology transfer organizations;

"(I) when requested, assist colleges or universities, businesses, nonprofit organizations, State or local governments, or regional organizations to establish programs to stimulate research and to encourage technology transfer in such areas as technology program development, curriculum design, long-term research planning, personnel needs projections, and productivity assessments; and

"(J) seek advice in each Federal laboratory consortium region from representatives of State and local governments, large and small business, universities, and other appropriate persons on the effectiveness of the program (and any such advice shall be provided at no expense to the Government).

"(2) The membership of the Consortium shall consist of the Federal laboratories described in clause (1) of subsection (b) and such other laboratories as may choose to join the Consortium. The representatives to the Consortium shall include a senior staff member of each Federal laboratory which is a member of the Consortium and a representative appointed from each Federal agency with one or more member laboratories.

"(3) The representatives to the Consortium shall elect a Chairman of the Consortium.

"(4) The Director of the National Bureau of Standards shall provide the Consortium, on a reimbursable basis, with administrative services, such as office space, personnel, and support services of the Bureau, as requested by the Consortium and approved by such Director.

"(5) Each Federal laboratory or agency shall transfer technology directly to users or representatives of users, and shall not transfer technology directly to the Consortium. Each Federal laboratory shall conduct and transfer technology only in accordance with the practices and policies of the Federal agency which owns, leases, or otherwise uses such Federal laboratory.

Reports. "(6) Not later than one year after the date of the enactment of this subsection, and every year thereafter, the Chairman of the Consor-

"(3) waive, subject to reservation by the Government of a nonexclusive, irrevocable, paid-up license to practice the invention or have the invention practiced throughout the world by or on behalf of the Government, in advance, in whole or in part, any right of ownership which the Federal Government may have to any subject invention made under the agreement by a collaborating party or employee of a collaborating party; and

"(4) to the extent consistent with any applicable agency requirements and standards of conduct, permit employees or former employees of the laboratory to participate in efforts to commercialize inventions they made while in the service of the United States.

Regulations.

"(c) CONTRACT CONSIDERATIONS.—(1) A Federal agency may issue regulations on suitable procedures for implementing the provisions of this section; however, implementation of this section shall not be delayed until issuance of such regulations.

"(2) The agency in permitting a Federal laboratory to enter into agreements under this section shall be guided by the purposes of this Act.

"(3)(A) Any agency using the authority given it under subsection (a) shall review employee standards of conduct for resolving potential conflicts of interest to make sure they adequately establish guidelines for situations likely to arise through the use of this authority, including but not limited to cases where present or former employees or their partners negotiate licenses or assignments of titles to inventions or negotiate cooperative research and development agreements with Federal agencies (including the agency with which the employee involved is or was formerly employed).

"(B) If, in implementing subparagraph (A), an agency is unable to resolve potential conflicts of interest within its current statutory framework, it shall propose necessary statutory changes to be forwarded to its authorizing committees in Congress.

"(4) The laboratory director in deciding what cooperative research and development agreements to enter into shall—

Small business.

"(A) give special consideration to small business firms, and consortia involving small business firms; and

Business and industry.
International agreements.

"(B) give preference to business units located in the United States which agree that products embodying inventions made under the cooperative research and development agreement or produced through the use of such inventions will be manufactured substantially in the United States and, in the case of any industrial organization or other person subject to the control of a foreign company or government, as appropriate, take into consideration whether or not such foreign government permits United States agencies, organizations, or other persons to enter into cooperative research and development agreements and licensing agreements.

"(5)(A) If the head of the agency or his designee desires an opportunity to disapprove or require the modification of any such agreement, the agreement shall provide a 30-day period within which such action must be taken beginning on the date the agreement is presented to him or her by the head of the laboratory concerned.

"(B) In any case in which the head of an agency or his designee disapproves or requires the modification of an agreement presented under this section, the head of the agency or such designee shall

15 USC 3712. **SEC. 13. PERSONNEL EXCHANGES.**

The Secretary and the National Science Foundation, jointly, shall establish a program to foster the exchange of scientific and technical personnel among academia, industry, and Federal laboratories. Such program shall include both (1) federally supported exchanges and (2) efforts to stimulate exchanges without Federal funding.

15 USC 3713. **SEC. 14. AUTHORIZATION OF APPROPRIATIONS.**

(a) There is authorized to be appropriated to the Secretary for purposes of carrying out section 6, not to exceed $19,000,000 for the fiscal year ending September 30, 1981, $40,000,000 for the fiscal year ending September 30, 1982, $50,000,000 for the fiscal year ending September 30, 1983, and $60,000,000 for each of the fiscal years ending September 30, 1984, and 1985.

(b) In addition to authorizations of appropriations under subsection (a), there is authorized to be appropriated to the Secretary for purposes of carrying out the provisions of this Act, not to exceed $5,000,000 for the fiscal year ending September 30, 1981, $9,000,000 for the fiscal year ending September 30, 1982, and $14,000,000 for each of the fiscal years ending September 30, 1983, 1984, and 1985.

(c) Such sums as may be appropriated under subsections (a) and (b) shall remain available until expended.

(d) To enable the National Science Foundation to carry out its powers and duties under this Act only such sums may be appropriated as the Congress may authorize by law.

15 USC 3714. **SEC. 15. SPENDING AUTHORITY.**

No payments shall be made or contracts shall be entered into pursuant to this Act except to such extent or in such amounts as are provided in advance in appropriation Acts.

Approved October 21, 1980.

LEGISLATIVE HISTORY:

HOUSE REPORT No. 96-1199 (Comm. on Science and Technology).
SENATE REPORT No. 96-781 (Comm. on Commerce, Science, and Transportation).
CONGRESSIONAL RECORD, Vol. 126 (1980):
May 28, considered and passed Senate.
Sept. 8, considered and passed House, amended.
Sept. 26, Senate concurred in certain House amendments, disagreed to others, and concurred in remainder with amendments.
Oct. 1, House receded from its amendments and concurred in Senate amendments.
WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS, Vol. 16, No. 43:
Oct. 21, Presidential statement.

(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.

45 FR 69201.

15 USC 3710.

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 where appropriate to transfer federally owned or originated technology to State and local governments and to the private sector.

Technology transfer.

(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. The agency head may waive the requirements set forth in (1) and/or (2) of this subsection. If the agency head waives either requirement (1) or (2), the agency head shall submit to Congress at the time the President submits the budget to Congress an explanation of the reasons for the waiver and alternate plans for conducting the technology transfer function at the agency.

Waiver.
Submittal to Congress.

(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

tor shall prescribe. The Secretary 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 paragraph (2) of this subsection, and to such other terms, conditions, and requirements as the Secretary 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 Secretary 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.

15 USC 3707.

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) through the conduct of activities as provided in section 6(b). The provisions of sections 6(e) and 6(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 the plan, as described under section 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.

42 USC 1861 note.

15 USC 3708.

SEC. 9. ADMINISTRATIVE ARRANGEMENTS.

(a) COORDINATION.—The 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, Education, Health and Human Services, Housing and Urban Development, the Environmental Protection Agency, National Aeronautics and Space Administration, Small Business Administration, Council of Economic Advisers, Council on Environmental Quality, and Office of Science and Technology Policy.

(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.

(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.

(c) REQUIREMENTS.—Prior to establishing a Center, the Secretary 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.

(d) PLANNING GRANTS.—The Secretary 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).

Inventions, title acquisition.

(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 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;

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.

15 USC 3702.

SEC. 3. PURPOSE.

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.

15 USC 3703.

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 10.

(7) "Federal laboratory" means any laboratory, any federally funded research and development center, or any center established under section 6 or section 8 of this Act that is owned and funded by the Federal Government, whether operated by the Government or by a contractor.

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

Office of Industrial Technology, establishment. 15 USC 3704.

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

Policy is to report back to the President in one year as to the status and progress of technology transfer from the Federal laboratory system.

Although the Executive Order does not have the force of law, it directs the heads of the Federal departments and agencies to implement the stated provisions within the authority of existing laws. Where the law provides the agencies with discretion, the Executive Order is designed to prescribe the direction of related actions. By issuing this document, the agencies are now required to determine how to execute the Order and to determine what each department or agency can do under the laws which govern its operations. This is particularly important in the area of patents where various laws mandate the dispensation of title to, and licensing of, inventions made under Federal funding. [See Appendix D for the text of the Executive Order.]

(most of these functions are now carried on by the Federal Laboratory Consortium). Instead, the National Technical Information Service is designated as the clearinghouse for the collection, dissemination, and transfer of information on federally-owned or originated technology to State and local governments and the private sector. However, CUFT continues to operate under NTIS. Information is available on a cost reimbursable basis.

The Center for the Utilization of Federal Technology publishes various documents which may be of interest to individuals and companies attempting to use the technical resources of the Government. The Federal Technology Catalog is an annual compilation and index of new technologies and techniques identified in the monthly Tech Notes. The Directory of Federal Technology Resources describes R&D-related resources of the Government which are available for use by the private sector. Included in the Directory is information on laboratory contacts, equipment which can be used, listings of technical information centers, sources for computer software, and information analysis centers. CUFT also publishes State Technical Assistance Centers and Federal Technical Information Centers Available to U.S. Business and a Guide to Innovation Resources and Planning for the Smaller Business. The Catalog of Government Patents identifies Government inventions which are available for licensing by the public. These, and additional information, can be obtained by contacting the Center for the Utilization of Federal Technology, National Technical Information Service, Springfield, Virginia, (703) 487-4805.

PATENTS

The ownership of patents derived from research and development performed under Federal funding is a subject with an impact on the transfer of technology from Federal laboratories to the private sector. Generally, the Government retains title to these inventions and can issue to companies either an exclusive or a non-exclusive license. However, it is argued that without title (or at least an exclusive license) to an invention and the ability to preclude others from using the idea it conveys, a company will not invest the time and money necessary for commercialization. P.L. 96-517, the University and Small Business Patent Procedure Act, provides, in part, for title to be vested in a contractor if it is a small business, a university, or a not-for-profit institution. Certain rights are reserved for the Government and these organizations are required to commercialize within a predetermined and agreed upon time frame.

In a February 1983 memorandum concerning the vesting of title to inventions made under Federal funding, President Reagan, as a matter of policy, ordered all agencies to make available to all Government contractors benefits similar to those provided under P.L. 96-517 to the extent permitted by law.

Further changes in the patent laws made by the enactment of P.L. 98-620, Amendments to the Patent and Trademark Laws, affect the transfer of technology from Federal laboratories to the private sector.

Cooperative research requires that a company provide funding and/or personnel in exchange for use of the laboratory.

COOPERATIVE R&D: JOINT PUBLIC-PRIVATE VENTURES

Additional access to the Federal laboratories is promoted by the provision in P.L. 99-502 which permits the Government-owned, Government-operated laboratories (GOGO) to enter into cooperative research and development agreements with private companies, universities, State and local governments, foundations, not-for-profits, and consortia of such groups. The director of the laboratory, a Federal official, can enter into these cooperative R&D agreements, as well as negotiate licensing agreements for Government-owned inventions previously made at that laboratory. There is limited agency headquarter review of cooperative agreements; these agreements are intended to be negotiated at the laboratory level. In pursuing these cooperative efforts, the GOGO laboratory may accept funds, personnel, services, and/or property from the collaborating party and may provide personnel, services, and property (but not funds) to the other organization. The work performed must be consistent with the laboratory's mission responsibilities.

Under a cooperative R&D agreement, title to, or licenses for, inventions made by a Federal employee may be granted in advance to the participating party by the Director of the laboratory. In addition, the laboratory Director can waive, in advance, any right of ownership the Government might have on inventions resulting from the collaborative effort regardless of the size of the company. This differs from other, current patent law which only requires that title to inventions made under Federal R&D funding be given to small businesses, not-for-profit institutions, and universities. (See section on patents.) In all cases the Federal Government retains a non-exclusive, non-transferrable, irrevocable, paid up license to practice or have practiced the invention for its own needs.

Laboratory personnel and former employees are permitted to participate in the commercialization activities if these are consistent with the agencies' regulations and rules of conduct. Federal employees are still subject to conflict of interest restraints. Preference for such cooperative ventures is given to small business, companies which will manufacture in the United States, or foreign firms from countries which permit American companies to enter into similar arrangements.

It should be noted that the Government-owned, contractor-operated laboratories of the Department of Energy are not included in this provision of P.L. 99-502. However, these laboratories are not necessarily prohibited from entering into cooperative agreements and some do participate in cooperative R&D ventures.

FEDERAL EMPLOYEES AND COMMERCIALIZATION ACTIVITIES

To further encourage the expanded use of Federal R&D resources, the Federal Technology Transfer Act provides for cash awards to Federal laboratory scientific, technical, or engineering personnel for activities facilitating (1) scientific or technological advancements which

from the system, each laboratory is required to create an Office of Research and Technology Application (ORTA); laboratories with 200 or more full-time equivalent scientific, engineering, and related technical positions must have one or more full-time equivalent professionals staffing the ORTA.

Each Office of Research and Technology Applications has the responsibility for identifying and assessing technologies and ideas originating within the facility which have potential for application in other environments. They are also mandated to cooperate with other organizations which promote the use of Federal R&D resources; to provide technical assistance to State and local governments; and to participate in regional, State, and local technology transfer efforts. These offices are not to substantially compete with private sector organizations providing similar services. Assistance for individuals, companies, and State and local representatives may be obtained by contacting any ORTA directly.

FEDERAL LABORATORY CONSORTIUM FOR TECHNOLOGY TRANSFER

In most cases, the ORTA staff contact is also the representative of the Federal Laboratory Consortium for Technology Transfer (FLC). The Consortium was originally established under the auspices of the Department of Defense in 1971 to assist in transferring DOD technology to State and local governments. Several years later it was expanded to include other Federal departments and agencies in a voluntary organization of approximately 300 Federal laboratories. P.L. 99-502, the Federal Technology Transfer Act, provided the Consortium with a legislative mandate to operate and required the membership of most Federal laboratories.

The primary purpose of the FLC is to promote the effective utilization of technical knowledge developed within the Federal laboratory system by linking these facilities with other Federal entities, State, local and regional governments, and the private sector. The Consortium assists in identifying, structuring, and addressing user needs in light of the increasing demands placed on State and local jurisdictions for technical solutions to problems. It also establishes a means by which Federal technology and expertise can be publicized and made available through individual laboratories to private industry for further development and commercialization. Access to the resources of the full Federal laboratory system can be made through any laboratory representative, the FLC regional coordinators, the Washington area representative located at the National Bureau of Standards, or by contacting the Chairman or Executive Director. [See Appendix C for a list of laboratories and representatives.]

The Federal Laboratory Consortium, itself, does not transfer technology; it assists and improves the technology transfer efforts of the laboratories where the work is performed. The legislation requires that the FLC perform various functions including the development of material, techniques, and training methods on how to transfer technology from the Federal laboratories and to further advise and assist the agencies and laboratories in their technology transfer program. The

tion of the resources of the Federal Government. The Government spent over $60 billion on research and development in fiscal year 1987. The on-going pursuit of science and technology has created technologies which may have applications beyond their original use in meeting the mission requirements of the Federal departments and agencies. The knowledge and skills developed may be helpful to State and local governments in the provision of services to the public and to the private sector in various commercialization endeavors.

Since the 1970s, the Federal laboratory system has served as a resource to assist State and local governments address technology-oriented problems. For example, to aid in energy conservation, the Federal laboratories have provided expertise in heat sensing as well as equipment for fly-overs of public buildings to identify costly heat loss. A computer system developed by the Navy was adapted and applied to allow the New York City police department to monitor the use of gasoline in patrol vehicles. And, in a cooperative effort to meet a public need, the National Bureau of Standards and the Army's Edgewood Arsenal worked with Dupont and local police departments to develop a bullet proof vest which has saved many lives.

In the past several years, as more attention has focused on increasing economic growth through technology development in the private sector, the Congress expanded Federal laboratory responsibility to help provide technology and technical expertise for the nation's private sector. Since then, various technologies invented in the Federal laboratories have been transferred to private firms where many have been further developed, applied, and/or commercialized. The Department of Energy's Pacific Northwest Laboratory (operated by Battelle) developed ionic additives for paints and transferred this technology to a small local company which brought it to market. The additive puts a "finger print" on tools used in the oil industry and is used to detect and identify equipment which has been stolen. In another example, the Army Corps of Engineers developed a computer software system called "Blast" which allows for the assessment of building energy efficiency early in the design process. This system is used by companies such as McDonnel-Douglas, Control Data Corporation, and Boeing Computer Services, as well as by other firms throughout the world. One company which licensed a patent for a ceranode (a small high tech device that prevents cathodic corrosion on buried pipelines, storage tanks, and waterfront structuring) from the Corps of Engineers was so successful in commercializing the technology that the firm increased its workforce from 30 to 142 employees, increased its sales by an estimated $8.5 million, and generated royalties of $425,000 a year for the U.S. Government. [Testimony of Col. Paul Theuer, Director, U.S. Army Construction Engineering Laboratory, at hearings before the Joint Economic Committee on August 7, 1984.]

As State and local government look toward innovation-related activities to encourage economic development in their regions, there has been increasing interest in establishing networks to use the resources of the States, the private sector, and the Federal laboratories. In an at-

To further promote technology transfer, the law allows Government-owned, Government-operated laboratories to enter into cooperative R&D agreements with universities and the private sector. Title to patents resulting from these cooperative efforts is given to the participating company, regardless of size, with the Government retaining certain rights. The Government-owned, contractor-operated laboratories of the Department of Energy are not included in this provision although they are not necessarily prohibited from such joint ventures.

The Federal departments and agencies are directed to create a cash awards program and a royalty sharing activity for Federal scientists, engineers, and technicians to reward their efforts toward the commercialization of federally-developed technology. In addition, the individual laboratories are permitted to retain a certain portion of royalties resulting from inventions made in that laboratory for further transfer endeavors.

Several laws pertaining to the ownership of patents resulting from federally-funded R&D have also been enacted to encourage the commercialization of technologies developed with Government assistance. It is argued that without title (or at least an exclusive license) to an invention, and the exclusivity it conveys, a company will not invest the time and money necessary to bring a product or process to the marketplace. P.L. 96-517 provides, in part, for title to be vested in contractors if these are small businesses, universities, or not-for-profit institutions. P.L. 98-620 permits private companies, regardless of size, to obtain exclusive license for the full life of a Government patent. It also allows the operating units of the Government-owned, contractor-operated laboratories, if they are universities, non-profit organizations, or small businesses, to retain title to inventions made in that laboratory.

President Reagan issued Executive Order 12591, Facilitating Access to Science and Technology, on April 10, 1987. This document reiterates many of the provisions of the Federal Technology Transfer Act as well as several requirements of the patent laws. In addition, a task force is to be convened under the auspices of the Office of Science and Technology Policy (OSTP) to report back to the President as to the status and progress of technology transfer from the Federal laboratory system.

Among the specific questions answered in this report are the following:

What help can the Federal Government provide industry under laboratory technology transfer programs? (See pages 7–8.)

What are some examples of industry-laboratory cooperation in technology transfer? (See pages 3–4.)

What are possible intellectual property arrangements in technology transfer activities? (See pages 8, 10–11.)

Where can I go to seek assistance in tapping Federal laboratory R&D resources? (See pages 6–7.)

What are the rules governing royalty payments to Government inventors? (See page 9.)

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