REPORT TO THE PRESIDENT AND CONGRESS REQUIRED BY THE TECHNOLOGY TRANSFER ACT OF 1986

ON BARRIERS TO THE COMMERCIALIZATION OF FEDERAL COMPUTER SOFTWARE

AND FEASIBILITY AND COST OF COMPILING AN INVENTORY OF FEDERALLY FUNDED TRAINING SOFTWARE

ROBERT ORTNER, UNDER SECRETARY
FOR ECONOMIC AFFAIRS

BARRY BERINGER, ASSOCIATE
UNDER SECRETARY FOR
ECONOMIC AFFAIRS

D. BRUCE MERRIFIELD, ASSISTANT
SECRETARY FOR PRODUCTIVITY,
TECHNOLOGY AND INNOVATION

JOSEPH CAPONIO, DIRECTOR
NATIONAL TECHNICAL INFORMATION
SERVICE

EXECUTIVE SUMMARY

In enacting the Federal Technology Transfer Act (P.L. 99-582) the Secretary of Commerce is directed to submit a report to Congress regarding:

(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

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

The Department has studied both questions and its findings are summarized as follows:

The main thrust of the Federal Technology Transfer Act is to encourage greater applications in the private sector of Federally funded research and development. The interest of the Administration and Congress to increase uses of Federally supported computer software--both for training and commercial applications--is an important aspect of increasing this cooperation to boost U.S. competitiveness.

This report identifies significant barriers preventing greater commercialization of this software. President Reagan in Executive Order 12591 instructed "the heads of each Executive department and agency shall, within overall funding allocations and to the extent permitted by law...cooperate, under policy guidance provided by the Office of Federal Procurement Policy (OFPP), with the heads of other affected departments and agencies in the development of a uniform policy permitting Federal contractors to retain rights to software, engineering drawings, and other technical data generated by Federal grants and contracts, in exchange for royalty-free use by or on behalf of the government."

The President is using the highly successful precedent established under P.L. 96-517 for the commercialization of Federally supported patentable technology to encourage greater development of software. The principle is that by allowing contractors and grantees to own and develop discoveries they make a much greater number of new products, jobs, and even create new businesses greatly benefitting the U.S. economy. When discoveries are taken away from their creators by the Government, the chances of subsequent development and application fall substantially.

The success of this policy for patentable technology is summarized in the April 1987 report of the General Accounting Office to Congress "Patent Policy: Recent Changes in Federal Law Considered Beneficial."

The policy being prepared by OFPP should go a long way toward encouraging greater economic benefits to the country by allowing private sector development of software created by contractors and grantees. However, current legal barriers preventing Federal employees from obtaining copyrights greatly discourage the U.S. development of their software since no exclusivity can be obtained to justify this investment. Thus, while domestic development can be frustrated, these discoveries are freely available to our foreign competitors.

THE SECRETARY OF COMMERCE
Washington, D.C. 20230

MAY 31 1988

Honorable George Bush
President of the Senate
Washington, D.C. 20510

Dear Mr. President:

Enclosed for your review is a report pursuant to the requirements of Public Law 99-582, The Federal Technology Transfer Act of 1986. The report is in two parts. Part A identifies copyright provisions or other types of barriers which limit the commercialization of Federally-developed computer software, and Part B addresses the feasibility and cost of compiling and maintaining a current and comprehensive inventory of all Federally-funded training software.

The Federal Technology Transfer Act encourages greater applications in the private sector of Federally-funded research and development. Specifically, it will allow private sector development of software created by contractors and grantees. This fall, our Office of Federal Technology Management will be submitting a report on the implementation of the Act. I look forward to working with your office on this issue.

Sincerely,

Secretary of Commerce

Enclosures

A. Barriers To Commercializing Federally Supported Computer Software

In 1986 the Federal Technology Transfer Act was approved which became Public Law 99-502. This landmark legislation paves the way for commercializing the results of research performed at federal laboratories. It does so by establishing incentives for these laboratories to enter into cooperative research and development agreements with the private sector, state and local governments, and academic institutions.

The new law's principal focus was on patent rights as an incentive for commercializing inventions resulting from these public-private sector collaborative arrangements. A number of related statutes aimed at commercializing the results of research performed by government contractors also focused on the disposition of patent rights as an appropriate incentive. However, recognizing the economic value of computer software, which is protected by trade secret and copyright law rather than by patents, the new Act also directed the Department of Commerce to advise Congress and the President as to whether federal laws or policies unnecessarily impede the transfer to the private sector of federally funded computer software.

The Department, in the course of preparing this report, has found that if effectively implemented, the President's Executive Order 12591 should greatly stimulate development of software developed

under federal grants and contracts. However, the current legal prohibition preventing government employees from receiving copyrights for works they create constitutes a significant barrier, which only a change in the law can overcome. This barrier prevents the U.S. taxpayer from receiving the full benefit of the $55 billion that the government spends on research and development each year.

The new law recognized that research performed at federal laboratories for federal program purposes in such areas as agriculture, medicine, space, defense, industrial standards, etc., is often on the frontiers of scientific and technological knowledge. If properly managed, this research can have enormous commercial potential. Accordingly, the Federal Technology Transfer Act authorized the laboratories to agree in advance to convey to a collaborating party exclusive licenses to any inventions made by a federally-employed inventor resulting from the collaboration and to pay that inventor a specified percentage of the resulting royalties.

In doing so, the Federal Technology Transfer Act reflected the principles that (a) without the ability to reward inventors, new scientific discoveries might go unreported; (b) the ability to obtain broad ownership rights enables one to exclude imitators who do not have comparable research and development costs to recoup and is, therefore, a powerful incentive to undertake the risks inherent in commercializing a new invention; and (c) those

who are closest to the new technology are the ones who are generally best able to appreciate its possibilities and to manage it wisely.

These principles were recognized earlier as well in such important laws as the Bayh-Dole University and Small Business Patent Procedures Act of 1980 (P.L. 96-517, as amended), which gave universities and small businesses ownership rights to inventions made with federal funding; the 1984 Amendments which eased certain restrictions and also gave many government owned, contractor operated laboratories rights to inventions they develop with federal funding; as well as President Reagan's Memorandum of February 18, 1983 directing agencies, to the extent consistent with law, to extend this ownership principle to all funding agreement recipients, regardless of size.

These various actions have had perceptibly beneficial results, as reported recently by the General Accounting Office. For example, university administrators have reported that the ability of universities to own federally financed inventions has encouraged business sponsorship of their research and has reduced universities' administrative costs. Small businesses have reported that the title rights provisions have encouraged small businesses to bid on government contracts and to participate in the Government's Small Business Innovation Research (SBIR) program.

However, none of these laws applied to computer software developed by contractors with federal funding or by federal employees at federal laboratories. Yet Congress has not been the only institution to express concern as to whether federal laws and policies effectively promote the commercialization of federally funded software. In April, 1987 the President issued Executive Order 12591 which directed all agencies to:

> "...cooperate, under policy guidance provided by the Office of Federal Procurement Policy (OFPP), with the heads of other affected departments and agencies in the development of a uniform policy permitting federal contractors to retain rights to software, engineering drawings, and other technical data generated by federal grants and contracts, in exchange for royalty-free use by or on behalf of the government."

Consistent with this mandate, and in response to complaints from the business sector that the government claimed more rights to data and software than it needed and failed to protect adequately that which it did acquire, OFPP, in December, 1987, presented to the Vice President's Task Force on Regulatory Review a suggested policy to guide agencies in asserting rights to privately funded and publicly funded technical data and computer software.

With respect to federally funded data and software, the policy parallels that which now exists for federally funded inventions:

the government will have royalty-free use and the contractor will otherwise be permitted to retain exclusive commercial rights.

OFPP's approach is an excellent first start. Nevertheless, while it is a generally thorough response to the Executive Order, both the order and the proposed policy are only a partial response to the problem of commercializing federally funded computer software.

Although we have developed parallel policies to promote the commercialization of federally funded, contractor developed inventions and software, we do not have a comparable policy for rewarding scientists at federal laboratories for their development of commercially valuable computer software programs. Nor can we give federal laboratory managers the same flexibility in managing copyrightable works, such as software, emerging from collaborative research and development arrangements that we give them in managing inventions.

Frustration over their inability to commercialize valuable software made in their facilities is one of the top concerns in our federal laboratories, according to a new report by the General Accounting Office. This report, Technology Transfer: Constraints Perceived by Federal Laboratory and Agency Officials confirms problems the Department of Commerce is hearing from the federal laboratories.

As one Public Health Scientist put it:

> "Many information technology advances, developments, discoveries, etc., involve computer programs as well as hardware devices. Many developments funded and/or developed by federal laboratories could and should benefit the public health. Often this can happen only if the software products and/or hardware systems are transferred into commercially marketed products which can be represented by sales and service staff in a field organization. Recent legislation effectively encourages this transfer for patentable hardware but does not encompass or even permit an analogous process for computer software programs and systems...
>
> "In essence, P.L. 99-502 contains provisions through which remuneration to federal employees for their contributions is made possible through the payment of royalties based on the assignment or licensing of patents. However, P.L. 99-502 does not extend the same royalty provisions to copyright holders of software products as to those afforded to patent holders of inventions. Yet, the creation, dissemination and use of innovative computer software - in this, the "computer age" - holds every bit as much promise for enhancing the Nation's health, welfare and international competitiveness."

The problem in large measure stems from the government's inability under copyright law (17 U.S.C. 105) to have copyright protection in any "work of the United States Government,"

although it can receive and hold copyrights transferred to it by assignment or bequest.

The Department of Commerce chairs an Interagency Committee on Federal Laboratory Technology Transfer. This group was formed by Secretary Baldrige to help the agencies implement the Federal Technology Transfer Act and the President's Executive Order. In the course of greater cooperation with U.S. industry, many agencies are already reporting that the inability of their employees to have copyright protection for valuable computer software is limiting the success of their efforts. Companies are rightly afraid that if Federal employees create software with their support it will fall into the public domain. Thus, foreign competitors could obtain for nothing important discoveries largely funded by our private sector.

This prohibition against protecting valuable federal software programs can also be a serious impediment to the Administration's efforts to ensure that U.S.-Foreign Government international science and technology agreements are consistent with sound technology management policies. There are large numbers of these agreements already in place or being negotiated with a variety of countries. Research topics can include almost any subject in which federal agencies are engaged. The inability to give exclusive rights in the U.S. to software made by federal employees under these agreements makes the likelihood of U.S.

development of resulting software or technical data highly unlikely.

For instance, if a valuable discovery is created jointly by a U.S. Government employee and a foreign scientist, some agreements specify that rights for development will be left with the party which can establish exclusive rights. This language is generally beneficial to the U.S. Of course, in the instance of federally created software this provision works against the United States.

This inability to grant an exclusive license for private sector development appears to be a barrier to greater secondary application of government training software. This problem is elaborated upon in the second part of this report.

The current problems in commercializing federally created software should not be surprising. Just as the government is not in a position to commercialize an invention itself and must depend on others to do so, so too is the government in a poor position to assume the burden of commercializing software. The government does not prepare the software products for the commercial market and cannot provide the extensive support services needed for complex matters. Such added value can only be provided by private industry interested in marketing the software.

But just as patent rights or exclusive licenses are necessary to assure the company taking the risks of commercializing a new invention that mere imitators with no research costs to recoup will not get a "free ride" on its pioneering efforts, so too is it necessary to provide similar assurances to software vendors. Without copyright protection, firms will be unwilling to commercialize software in the public domain because of the high costs of readying the product for the market. These include costs of documentation, preparation of training materials, debugging, and establishing user support systems.

The current provisions in the copyright law denying the government copyright protection for valuable works such as computer software is a substantial barrier to successful technology transfer. Putting such taxpayer-supported discoveries in the public domain not only prevents U.S. development, it can actually harm our international competitiveness by making this software freely available to foreign competitors. Study should be immediately given to examining the need for legislation to: (a) allow the government to have and convey necessary protection to computer software, and (b) reward the creating scientist with a percentage of the resulting royalties.

In making this recommendation, the Department is not advocating repeal of that statute. The current law needs to be examined only to determine if its application to software should be modified. Section 105 has an impact on matters having nothing to

do with technology transfer, such as National Park Service publications on Yellowstone or Yosemite or Navy Department publications on certain ships, and a suggestion of outright repeal would be inappropriate.

It has been clearly demonstrated over the past eight years that the changes in federal patent policy have yielded significant returns to our economy. The U.S. taxpayer is the real beneficiary of these policies which are now stimulating economic growth around our universities and now our federal laboratories. There is every reason to believe that providing copyright protection for valuable computer software created under government R&D will also benefit U.S. competitiveness.

B. Encouraging Greater Access to Federally-Funded Training Software

The Federal Technology Transfer Act of 1986 (P.L. 99-502), Section 5(3),(B), requires the Secretary of Commerce to submit to the President and Congress a "report regarding the feasibility and cost of compiling and maintaining a current and comprehensive inventory of all federally funded training software." P.L. 99-502 defines "training technology" to mean computer software and related materials which are developed by a Federal agency to train employees of such agency, including but not limited to software for computer-based instructional systems and for interactive video disc systems.

The report must address several questions: feasibility, quality and cost. Feasibility simply asks is anyone capable of providing such an inventory? Quality asks would such an inventory be used by anyone to identify and acquire federally funded training packages? Serious thought must be given as to how software with potential secondary applications is separated from those programs with little or no other uses. Little is now known on an aggregate scale about the quality of Federally funded training packages. This, of course, is the key question. Compiling an expensive, exhaustive inventory of large numbers of training packages with little secondary

application is clearly counterproductive. Thus, a limited demonstration project appear to be the most prudent course at this time. Fragmentary evidence of private interest in high quality, federally funded training software exists. A few inventories have been compiled for some training packages. There are at present no requirements for agencies developing training packages to inventory them and make them available for public dissemination. Of course, until the question of quality is resolved and incentives developed for further private sector development provided, it is highly doubtful that inventories alone will lead to greater secondary applications of existing training packages.

The next question, the cost and justification of compiling and maintaining a current and comprehensive inventory of federally funded training packages, is a critical consideration. At this time such a sweeping program does not appear justified. Another option at no cost to the government, would rely on existing authorities to compile a partial inventory. For example, the acquisition and dissemination of federal scientific and technical information within the National Technical Information Service (NTIS) is undertaken on a cost reimbursable basis. Identifying individual training packages to be included in an NTIS inventory could accomplish the inventory function on a self-supporting basis. Again, the

crucial question is the quality of the programs. This is the most prudent option at this time until there is a better understanding of the quality and demand for the programs. The inventory itself would have to be purchased by users in quantities and at a price to sustain the resources needed to develop and maintain the inventory. Obviously, if there is not sufficient demand to support even a limited inventory a great deal of time and expense can be avoided preparing a more extensive inventory for which there is little demand.

The use of computers for training is a relatively new field of Computer-Assisted (Aided) Learning (CAL). It is based in a number of disciplines, but its primary origins lie in computer science and psychology. From computer science and its predecessors, mathematics and engineering, came the computers and the programs that allowed them to function. From psychology came the knowledge of learning theory, instructional strategies, and motivation. The early applications of CAL were confined to fairly simple uses, such as drill and practice, and tutorials. The early successes in CAL research led educators to proclaim that CAL would revolutionize education. By the mid to late seventies, the great promise of CAL had not come about and there was disenchantment of many educators as well as key funding agencies. Because of the cost of mainframe and mini-computers, CAL was used in only a small fraction of the

nation's educational institutions and was quite limited. The failure of computers to revolutionize education was due to the costs of hardware, costs of developing courseware, inadequate training of instructors, instructors' fear of technology, and exaggerated claims made for CAL. Several of these obstacles were removed with the commercial introduction of microcomputers in the late seventies. With the introduction of microcomputers, the development of artificial intelligence and expert systems, and the lessons learned from the previous 20 years, CAL is revolutionizing the use of computers in education. Currently, CAL is becoming a common method for teaching and training students and personnel in business, educational, industrial, and military settings.

Because CAL encompasses a wide spectrum of technical and informational technologies, developments in other technological areas has also influenced the development of CAL. The impact of these technologies to CAL has proven to be beneficial in the training field. Research has shown that CAL systems improve learning, reduce learning time compared with the traditional stand-up or classroom training, and improve the student's attitudes towards the computer and the subject matter. In addition, CAL allows a consistent training program that can be precisely tailored to the needs of the students and may be precisely controlled. It allows the student to pace himself or

herself and lets the instructor act as a counselor and tutor rather than as a record keeper. Students benefit by the improved educational techniques and the increased one-on-one contact with the training supervisor for counselling and tutoring. Due to computer tracking, students encountering problems can be rapidly identified so that they may be assisted. The CAL system's automated and improved ability to analyze student performance data will result in improved courses. The larger initial investment required for training technology will result in greater benefit to organizations in the long run. As the number of times the course is presented increases, the cost per trainee decreases.

There has been considerable activity focused on training packages the federal sector has developed or is currently developing and their potential use by secondary users--public and private. In September 1985, the Society for Applied Learning Technology in cooperation with the Office of Productivity, Technology and Innovation, U.S. Department of Commerce, convened a Senior Executive Conference on Productivity Improvement. The subject was, "Incentives and Barriers to the Application of Technology-Based Learning." The conclusion of the conference left no doubt of the scope and significance of education and training activity in this country:

- Educational activity in the United States costs $250 billion per year, including universities, public education, vocational and industrial training, and adult learning.
  - 7% of the population work in the field of education/training and 7% of the GNP is devoted to it
  - 40% of the population participates in learning activities
  - 25 million adults take some form of education, 60% job-related
  - DOD spends an estimated $13.4 billion on formal training each year

A second Conference convened by the same group in December 1986, focused specifically on the need to identify what is currently available in courseware and technology. One recommendation of the conferees indicates a potential for secondary utilization of federal training resources. It calls for, "promoting more interdepartmental coordination and communication by Federal agencies, and stimulation a greater transfer of technology-based federal learning systems to the private sector."

The State and local government community in the United States represents a high potential audience for the use of federally funded training software. There are millions of State and local government employees, many of whom are working in

professional and technical skill or clerical areas which can utilize electronically-based training software. In fact, it would appear that if the Federal Government can identify its high quality training programs and allow for subsequent development for secondary applications that these programs could result in a substantial boost to state and local governments as they proceed to improve staff performance. Their training needs are in many ways parallel to those of the federal government.

The public school systems of the nation also constitute a key organizational piece with a high potential for utilizing some federally funded training software. These educational institutions are on the firing line on a day-to-day basis to train and educate. These institutions have the potential of being interested in obtaining relevant software, both for their use in achieving their teaching mission, as well as for heightening the capability of both their teaching staffs and their support personnel. Interest and momentum are picking up in the use of computers for instructional purposes in local school districts. According to Dr. James Mecklenberger of the National Association of School Boards, most schools have some microcomputer capability at the present time--VCRs are commonplace. He estimates that there are some 10,000-15,000 videodisc recorders in 1,000 school districts. Most school

districts have a connection with an educational television system. Videotape, satellites and distance learning are no longer considered threatening to faculty to the degree that they were in the earlier stages of the movement toward technology.

FEASIBILITY

A. Identification of Useful Software

Can federally developed training packages which may have secondary uses be identified for new users?

Little is known on an aggregate scale about the number, content or quality of federally funded training packages. The most important question of quality cannot be answered by a mere inventory. Some partial, specialized inventories have been developed by Federal agencies in order to provide access to them by partner organizations in State and local governments. However, at the present time, much of the secondary utilization of federally funded training packages results from a high level of motivation, persistence and networking skills on the part of relatively few individuals scattered throughout those organizations. There is no cohesive system to catalogue or provide ongoing interaction between potential suppliers and

users of new training packages. The Federal Aviation Administration (FAA) in the Department of Transportation (DOT), have invested substantial amounts of monies in training software development and have documented their output to facilitate its wider use in the FAA and in other Federal government organizations. The Center for the Utilization of Federal Technology in the National Technical Information Service and the Training and Management Assistance Branch of the Office of Personnel Management have entered into a Memorandum of Understanding to stimulate improvement and more widespread use of federally funded training technology, identify potential methods to enhance the transfer of software. However, the most common pattern in civilian agencies at this point is for individual program units to move into the development of training technology on their own for the purpose of meeting specific program needs. Invariably they maintain such inventories of the software as they may need themselves. Often, as was reported in the surveys conducted in support of the study, little is known about the existence of training software in other components of their own agency or elsewhere in the government. In the Department of Defense (DOD), the magnitude and pace of development of training software in support of the Department's mission has resulted in heightened attention being paid to the need for systemically identifying the training software that has been developed with

DOD support. The investment by DOD and its individual services in the development of training packages is substantial. In 1984 a DOD witness testified before Congress that $262 million was invested annually by DOD in educational technology. The investment by DOD and its individual services in the development of training packages is substantial. In 1984, a DOD witness testified before Congress that $262 million was invested annually by DOD in educational technology. There is no overall Department inventory or any total inventories maintained by the individual services at this point. Individual components involved in the development of training software are maintaining listings in formats of their own development of the items they have produced or supported. On occasion, periodic surveys of the field are conducted to rather information about the types of training software that exists. Several agencies are undertaking efforts to identify training packages developed with specific technologies across all agencies for secondary distribution, such as the National Audio Visual Center (NAVC). These activities illustrate current efforts for secondary utilization of federally developed training packages. However, none fulfill the definition of a "comprehensive" inventories of federally developed training software (packages).

The most common pattern in civilian agencies at this time is for individual program units to develop training packages to meet specific program needs. Where this is the case, they maintain only such inventories of the packages as they may need themselves. Often this is no inventory at all. Little is known about the existence of training packages in other components of their own agency or elsewhere in the government. In Spring, 1987, the Association for the Development of Computer-based Instructional Systems (ADCIS) queried its members on the usefulness of federally funded training packages. Membership of ADCIS is equally divided among private sector, educational institutions and government. All of the Federal agency members responding to the questionnaire indicated that their agencies did not have a policy for inventorying, on an agency-wide basis, the training packages that are developed under their jurisdiction.

The Department of Energy has management and operating contractors in 50 facilities around the country with 130,000 employees. Many of these facilities develop training packages, including those which are electronic-based, in support of their missions. An on-line database containing an inventory of 3,000 training packages has been developed to serve the 50 facilities and encourage exchange within DOE. Some 24-33% of the current database is represented by training software. While some of

the software is highly technical in nature and site-specific, there are examples of individual packages with clear utility for secondary users. For example, the Micro-Computer Aided Engineering (Micro-CAE), developed by the Lawrence Livermore Laboratory which has received widespread application outside this lab.

It is impossible to identify the universe of federal training packages without, in effect, creating the inventory being analyzed for feasibility and cost. Most Federal agencies have developed training packages. Whether secondary users are interested in acquiring these packages is the next issue addressed in ascertaining the feasibility of an inventory. First, federally funded training packages exist. Second, there is a need for action to identify them and determine which are most likely to have secondary uses.

In the fall of 1986, the U.S. Department of Labor's Bureau of International Labor Affairs and the U.S. Department of Commerce's National Technical Information Service convened a Roundtable to, "Identify and Distribute Education and Training Programs and Materials Developed Within the U.S. Government or Otherwise in the Public Domain." There convenors queried the Federal and State training community regarding the existence within the Federal sector of packages and if there were

potential secondary users. Over half of the federal respondents know of packages with potential for secondary utilization if properly adapted. The remaining respondents were not aware of what was being developed in the Federal sector. They were therefore unable to indicate candidate packages for secondary use. All respondents noted a need for training materials and confirmed that if useful packages existed, there would be secondary users. Of course, the central question is how many of the existing packages are "useful" and what modifications are needed for achieving secondary applications.

There is an opportunity for direct application of many generic software items in management, basic skills development, and other general areas within federal government agencies. Where missions are similar, specialized packages could be utilized with relatively minor adaptation. The interagency utilization of specialized training software is already being demonstrated. One such example is the Federal Aviation Administration, which develops complex technology-based training software in direct support of its mission. The training is then used by personnel of the Coast Guard, the Air Force and the Navy. A number of other examples of such multi-agency utilization exist. There is potential for far more sharing were information about existing training software more widely available.

C. Comprehensive Inventory Option

Given that a comprehensive inventory of federally developed training packages is feasible, what issues will affect its maximum utility?

The data elements used to describe each entry in the inventory will substantially affect the utility of the inventory. It became apparent during the joint effort between NTIS and OPM that standard categorization terms for federal scientific and technical information did not include descriptors relevant to training packages. The meetings and evaluations conducted in the process of this study identified the absence of usable data elements to identify the uses and limits of training packages, especially if these packages included use of new technologies.

For example, DOD has established the Defense Training and Performance Data Center (TPDC) in Orlando, Florida to facilitate the identification of training packages for transfer within the armed services. The TPDC is developing a prototype catalog of computer-based training systems which have been developed by the military, a courseware directory and a study of the impacts of new training technologies. The contractor identified at least 100 major interactive training systems. The effort involved finding out what data are needed, how the data are best obtained, and, how to make the data available to

interested parties. The complexity and difficulty of developing the information which a potential user must have to make a meaningful assessment of a given piece of training software contained within a training package is substantial.

Our findings support that there are some federally funded training packages with potential secondary utilization. It is also clear that they are obtainable but only in random manner. This has serious implications for the development of a comprehensive inventory. Simple identification that a training package exists is fraught with tremendous burdens on agencies' limited resources. Currently agencies are not required to identify or submit for cataloguing packages they deem as developed for "unique" agency training needs. But they are so required of materials intended for outside use. Should an agency voluntarily identify these packages--or any training materials--there is potential demand from secondary users. Meeting this demand requires considerable resources in personnel time to respond to inquiries and funds to duplicate and disseminate the materials. The agencies are reluctant to assume these burdens and have received no guidance to do so. They are generally discouraged from becoming involved in secondary utilization of their training packages because the resources to do so are lacking.

If secondary uses of training materials are to be encouraged, it will either require large expenditures of money or providing incentives for seeking secondary applications. In the case of patentable technology, this was accomplished through contractor ownership of those programs created under grants and contracts, and by allowing the federal agencies to keep royalties brought in through commercialization of inventions under the Federal Technology Transfer Act. Thought should be given to creating similar incentives for federal agencies creating important software packages to encourage broader application in the U.S. Of course, this is not possible unless the copyright Act is amended as outlined in Part A of this report.

COST

A "comprehensive" inventory suggests identification of <u>all</u> federally funded training packages, and, on a continuing basis. However, an inventory might include only those packages identified by established criteria to be generic--not unique to a specific agency's training needs--or adaptable, with minor modifications to secondary users with closely related training needs. This is a broad question and is incorporated in this study to identify several options and their associated costs. The options include: a no-cost to government-user financed option, demonstration option(s), and a comprehensive inventory option.

A. User Financed Option

This no cost to government option could be accomplished by performing the inventory of federally funded training packages on a self-supporting basis. NTIS operates in this mode with all voluntarily submitted scientific and technical information (STI). This already includes some federally developed training packages. Some issues are apparent--the quality of the materials inventoried, timeliness and comprehensiveness. For NTIS to develop a comprehensive inventory, the demand for the inventory would have to be sufficient to support the cost of its development. Of course, absent this demand there is little reason for any such project. Care would have to be taken to identify training packages with potential demand in order to support the process. These packages may include new technologies such as interactive diskettes. Additional costs necessary for the collection, archiving and dissemination of federal training packages have not been identified. Care must be taken that any inventory not include taking proprietary rights to sell software from their creators. Thus, the best, most effective option at this time is a referral service linking potential users directly with the Federal Agencies or private sector contractors who have created high quality training packages. A fee could be charged for such referrals to make the listing service self supporting.

B. Three Other Demonstration Options

A demonstration option could be undertaken in several different ways. (A) A small number of federal agencies developing training packages which appear to have high potential for secondary utilization could be identified and their training packages included in an inventory. (B) Or, training packages from these same agencies could be comprehensively inventoried. (C) Or, an inventory of all federal agencies' training packages limited to those training packages which have high potential for secondary utilization could be developed.

The demonstration options would require personnel and money. Until the questions of demand and quality of the training materials can be determined in a user-financed program, the demonstration projects are premature.

C. Comprehensive Inventory Option

A comprehensive inventory of all federally developed training packages is the third option. The cost for this option is approximately $1,510,000, which includes a director and 15 individuals. There is no justification at this time for such a project at taxpayer expense.