Technology Sharing

A Guide to Assistance in Obtaining and Using Research, Development and Demonstration Outputs

U.S. Department of Transportation
Office of the Secretary

Technology Sharing
A Guide to Assistance in Obtaining and Using Research, Development and Demonstration Outputs

Developed by
U.S. DEPARTMENT OF TRANSPORTATION
Office of Intergovernmental Affairs
Technology Sharing Program

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Foreword

This is the third edition of the report *Technology Sharing* issued by the U.S. Department of Transportation. Since the publication of the original version, the Department's commitment to utilization of its research has continued, and in the past several years accelerated. Some elements of the organization now have the specific responsibility of seeing that State and local government perspectives are reflected in the design of research, and that the results of this research are useful to these governments. Other elements are consulting with State and local officials in the development of operational programs and legislative proposals. We feel that the net result has been an increase in the relevance of our programs to State and local needs.

This report, which documents those efforts, is intended to serve a dual purpose. It provides an overview of the various mechanisms now in place, and thereby serves as a guide to their possible use. However, it also serves as a status report on a continuing process of consultative and cooperative program development with State and local officials. Several of these officials, in fact, reviewed this report and made helpful suggestions for its revision. This led, for example, to additional emphasis on the technologies which the Department has available for application.

We would like to thank the various people throughout the Departments who contributed to this report. A special note of thanks should go to Mr. Eric Smith , who developed the early drafts of the document, and to Mr. Norman G. Paulhus, Jr., who coordinated the overall review, editing, and publication of the document.

We would be especially interested in your reactions to the report, and any comments you might have. In that way we can continue to improve our programs, and make them more effective for all concerned.

Sincerely,

Alfonso B. Linhares
Chief, Technology Sharing Division

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Part I: Policy Overview

Introduction

Technology Sharing is the process by which the results of Federal research on problems faced by State and local governments are made available to these jurisdictions in a form which facilitates their application. This broadly defined activity includes consultation with State and local governments on their transportation needs and problems, involving them in the formulation and conduct of Departmental research and developing mechanisms to communicate these research products to them in a useful form.

This report provides an overview of the various mechanisms and programs which the Department of Transportation (DOT) uses to provide technical material to State and local governments. This section of the document provides general information on the Department's organization, policies and programs in this area. Latter parts of the document provide detailed information on the various assistance programs managed by the Department.

Although this report emphasizes intergovernmental activities, the private sector also plays a critical role in bringing about services and improvements in transportation as an innovator, as a user of technology and as a supplier to State and local governments. Much of the information disseminated by programs described in this report may therefore benefit the private sector in its efforts to deliver or apply technology.

Mandates and Policy

Technology sharing is basic to the responsibilities of the Department. The Department of Transportation Act of 1966 specifically directs the Secretary to "promote and undertake development, collection, and dissemination of technological, statistical, economic, and other information. . ." and to ". . . consult and cooperate with State and local governments." All elements of DOT respond to this mandate to some degree, with some (notably the Federal Highway Administration) having effective and long standing mechanisms for the sharing of Federal technology.

These activities gained an added policy focus on February 25, 1977, when President Carter formally directed the executive departments and agencies to involve State and local officials in their policy and program development processes. Subsequently, DOT emphasized its commitment in this area by designating its Office of Intergovernmental Affairs as the focal point for consultative activities involving State and local governments. This has increased the visibility of the continuing technology sharing efforts.

The DOT Research Program

The main source of the technical information distributed through Technology Sharing is the Department's Research, Development and Demonstration (RD&D) Program. In Fiscal Year 1979, some $377.8 million was budgeted for RD&D activities.

There are three principal reasons why DOT undertakes projects in these areas:

1. to serve its own operating functions,
2. to support its regulatory programs, and
3. to stimulate the application of new transportation technology.

An important element of this last category is the need to provide technology to assure that the monies available through DOT's programs are productively applied.

For FY 1979, final decisions on the application of some 50 percent of the Department's projected RD&D products will be made by State and local people. Although not the ultimate users, State and locals will assist in the application of regulatory RD&D that amounts to another 20 percent of 1979 funds.

In recognition of this, DOT formulates its RD&D program plans to:

- Consider the needs and decision-making processes of the implementing (using) agencies.
- Contribute to implementation decisions by effectively packaging and disseminating the research results.

Where the results of RD&D are to be applied outside the Federal Government by State or local governments, investment in RD&D activities to promote needed actions, or "stimulation," is especially important. The Urban Mass Transportation Administration (UMTA) and the Federal Highway Administration (FHWA), for example, devote a significant part of their RD&D budgets to this purpose.

The Federal Railroad Administration (FRA) budget also has a large stimulation component, even though the ultimate user of much of its RD&D results will be the railroad industry. Recent legislation has given broad safety powers to FRA. To support these regulatory functions, FRA safety research activities have expanded, and States are joining in its track safety efforts through a federally funded State Participation Program.

Other DOT administrations are less involved in direct stimulation efforts, but their programs also have wide State and local impact. For example, while most of the RD&D of the National Highway Traffic Safety Administration (NHTSA) is conducted to support its regulatory function, much of it will be implemented by other governmental levels and the private sector. In fact, State and local government efforts are crucial to the ongoing traffic safety and alcohol countermeasures work.

Most of the U.S. Coast Guard (USCG) and Federal Aviation Administration (FAA) research and development (R&D) supports their own operations. However, many of the technologies developed by these agencies can be adapted for use by State and local governments or the private sector. Some program elements in FAA or USCG focus specifically on these constituencies. For example, the Coast Guard offers special training to State and local officials at a "Boating and Safety School" at its Reserve Training Center, Yorktown, Virginia and at the National Search and Rescue School operated at the Coast Guard Support Center, New York City.

The technology developed by these various research efforts can take a variety of forms:

- *Hardware*—any new piece of equipment that could operate as part of a transportation system, such as new vehicles, new guideways, or new support facilities.
- *Software*—any tool or structured procedure that could assist in the planning or operation of a transportation system, such as computer planning tools and similar assessment packages.
- *Operations*—any changes that are made to the way a transportation system is run to improve its performance, such as bus maintenance procedures and techniques for reconstruction or maintenance of highways.
- *Management*—any changes to the administrative structure supporting a system or changes in the way the various elements of the system are distributed as a matter of policy, such as routing and scheduling algorithms, and organization structures for transit operators.

To deal with problems that extend beyond simple transportation issues, DOT consults with other agencies on the direction and structure of its research programs. It is a member of the Federal Coordinating Council for Science, Engineering and Technology, a legislatively mandated body consisting of the assistant secretaries of the major Federal departments responsible for research and development, and administrators of certain agencies such as the National Aeronautics and Space Administration (NASA). Its chairman, the Director of the Office of Science and Technology Policy under the President, is also the President's Science Advisor. Objectives of this council include assuring interagency cooperation on common issues, elimination of unwanted duplication, focused effort on key R&D management and functional issues, and providing a forum for exchange of technical ideas.

The Technology Sharing Programs

DOT provides technology sharing services for either of two purposes: to support operational programs conducted by State or local government, as with the Federal Highway Administration's work in highway maintenance techniques; or to enlist the cooperation of these governments to support an operational requirement established by Federal law, such as the Federal Aviation Administration's operation of the national air traffic control system.

Each DOT operating administration typically has its own set of research programs and consultation mechanisms, often managed by an Associate Administrator for Research and Development or similarly titled official. The various technology and knowledge sharing programs within DOT are structured to support the specific functions of each of the operating administrations. To assure support of broader Departmental objectives, the Office of Intergovernmental Affairs' Technology Sharing Division in the Office of the Secretary (OST) provides cross-program coordination. The focus of the OST work is on integrating the various operating administration efforts, providing needed policy support to them, and reaching constituent groups not contacted by the other elements (See Figure 1.)

The role of elected officials in promoting the application of new technologies has been highlighted, and is a key focus of the OST work. A number of technology sharing services are now directed to these officials, for they may have key roles in the implementation of R&D at the State and local level.

In addition to elected officials, a wide variety of elements in State or local government take advantage of these programs. State and local organizations receiving technical assistance include State departments of transportation or highways, public service or utilities commissions, State multi-functional planning organizations, regional and local transportation planning agencies, transportation operators, public service institutes or transportation centers of universities, and many others.

To assure the relevance of its programs, DOT maintains an active relationship with the Transportation, Commerce and Community Development Task Force of the Intergovernmental Science, Engineering and Technology Advisory Panel, or ISETAP. This panel, composed of State and local officials, consults with the President's Science Advisor to help define State and local needs and problems and to suggest an appropriate role for Federal research in problem solution. The panel provides a forum for discussion between State and local governments and Federal agencies that promotes closer intergovernmental working relationships.

The Intergovernmental Science, Engineering and Technology Advisory Panel, along with a great number of special mechanisms to promote user involvement, helps DOT to generate useful and timely products for its constituents. As a result, user reaction to DOT's technology sharing efforts has been uniformly positive. All DOT operating administrations continue to become more active in the technical assistance area. DOT policy requiring consultation with State and local officials assures that this desirable trend will continue.

1. Marc Kelley, DOT Regional Representative in the Pacific Northwest, examines a new technology bus.

1.

Part II: Mechanisms for Sharing

Once a research project has been concluded, its results have to be communicated to potential users in a form which they can understand, and which will facilitate their application. DOT's various technology sharing and technical assistance activities therefore serve to:

- Communicate with State and local governments, private industry, and universities regarding their technology information needs; and
- Accomplish the sharing of technology through the appropriate communication and dissemination channels for each client group.

Each group in State and local government has its own specific information needs and requirements, and no single mechanisms can satisfy all of them. As a result, the Department uses a variety of mechanisms working together to meet the demands of its various constituents.

As summarized in this report, these activities fall generally into six categories.

Field Support and Direct Assistance

By necessity, DOT has evolved into a field-oriented agency, an organizational pattern that enables the Department to provide effective on-site and direct support of local decisions in the context of national responsibilities.

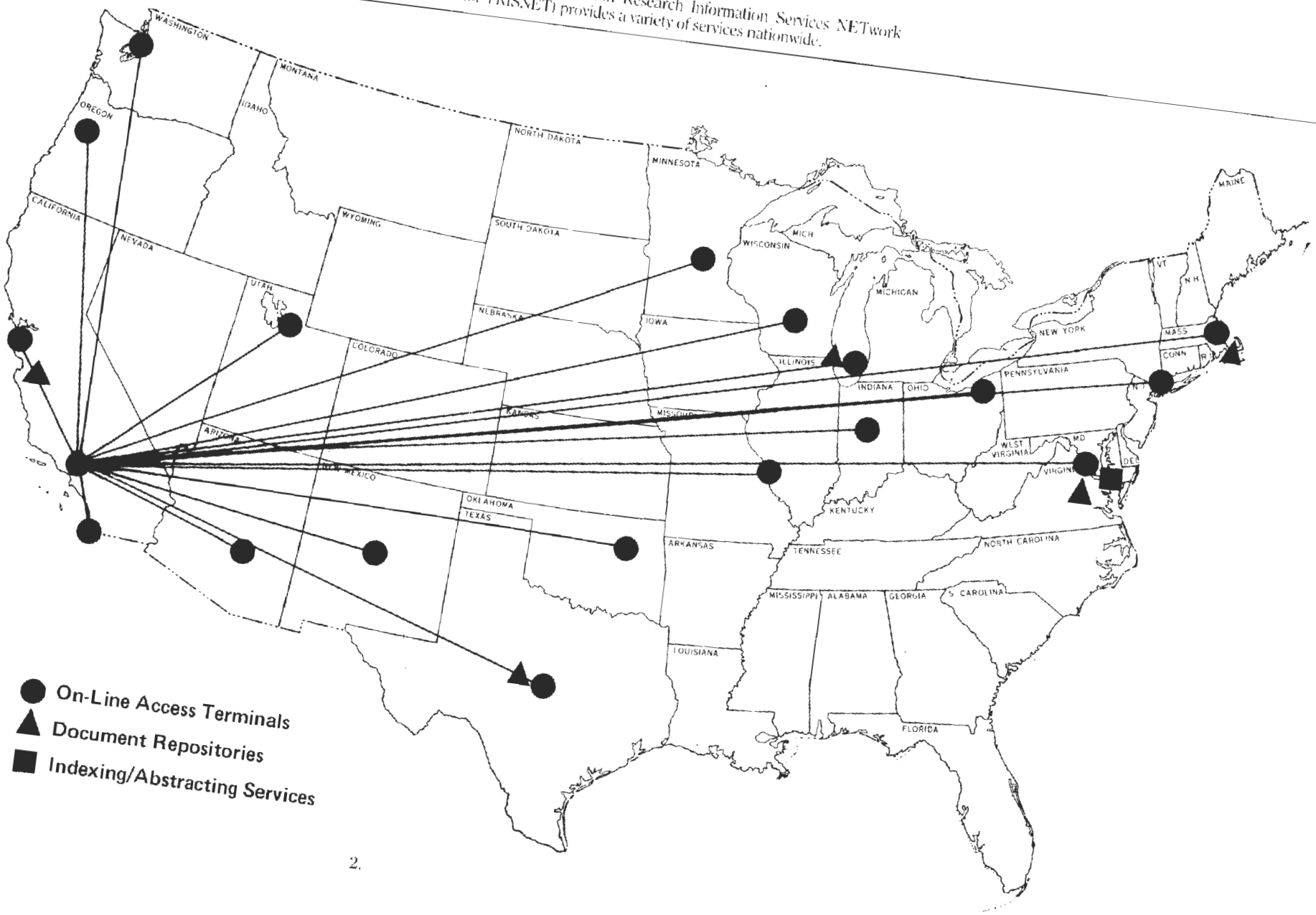
The Department now has regional headquarters in Boston, New York, Philadelphia, Atlanta, Chicago, Fort Worth, Kansas City, Denver, San Francisco, and Seattle. The Regional Representatives of the Secretary, housed in each of these cities, provide a direct channel of communication between the Secretary and State and local decision makers, and are a resource these officials can tap when problems arise.

In addition, Intermodal Planning Groups act as a Federal advisory committee in each of the ten Federal regions on planning-related issues. These groups are composed of senior field planning representatives of FAA, FRA, USCG (in some regions), UMTA, and the Regional Representatives. Participating also may be other Federal agencies, such as the Department of Housing and Urban Development, the Environmental Protection Agency, and the Department of Energy. Several of the operating administrations have regional administrators who oversee the various functions of their organizations within specific multistate areas. There are also various DOT offices at the State or "Division" level.

The Department's field offices afford opportunities for direct communication with Federal officials, both within functional departments and at the policy level. They also serve as a technical resource to provide in-person service to States and cities, and can tap the technical knowledge banks maintained by the Department as specific technical questions arise. All of the operating administrations have field offices, with FAA, FHWA, and USCG being the most highly decentralized.

In addition, the Department's centralized Technology Sharing Program sponsors a toll-free number at the Transportation Systems Center to provide answers to State and local officials: (800) 225-1612, except in Massachusetts, where it is (800) 842-1151. This service may be used free of charge to the user.

2. The Transportation Research Information Services NETwork (or TRISNET) provides a variety of services nationwide.



2.

Information Services

To enable their clientele to learn of RD&D that has been done in the different fields of transportation, each of the organizations in DOT has developed, or is developing, information services. These provide both general information and responses to specific queries. Each of the operating administrations operates its own set of information services described in more detail later in the document. In addition to these, the Transportation Research Information Services Network (TRISNET) is being developed in the Research and Special Programs Administration (RSPA) of DOT to link the various information service centers. TRISNET is evolving into a system providing one-stop service for most of the information needs of transportation-oriented technologists and planners. Many services—by cooperative agreements and projects—are already tied into the network. (See Figure 2).

TRISNET's TRIS-on-line service allows users to key information requests on specific problem areas into automated files using a remote access terminal. Demonstration terminals have been operational in State legislatures, regional planning bodies, State departments of transportation, and State highway commissions. Currently, the TRIS-on-line data base contains approximately 90,000 records in several areas of DOT information, including DOT work in progress and abstracts of DOT-sponsored technical reports.

Training Programs

A large number of courses and seminars are available to upgrade administrative, managerial, and technical capacities in State and local governments. It is DOT policy to encourage these governments to enroll their employees in DOT training programs whenever the training is relevant to identified needs, and a substantial number of the courses provide technical back-up to the various DOT grant programs.

In some programs, such as those of FHWA's National Highway Institute or UMTA's Managerial Training Program, Federal funds help pay for the courses.

Other programs—for example, those of the Research and Special Programs Administration's Transportation Safety Institute—provide training entirely at Federal expense. In a third class of programs, such as FAA's training programs for non-agency employees, the charge for employees' participation is paid by State and local funds to the agency conducting the training. These programs are more fully described in Part III.

In addition to these programs, the provisions of the Intergovernmental Personnel Act (IPA) allow State and local personnel to attend any Federal technical and managerial training courses (Title III), and also provide for direct assistance through mobility assignments, either from Federal agencies to State and local governments or vice versa (Title IV). DOT policy and guidelines for administration of this program are contained in DOT Order 1230.3.

Research Development and Demonstration (RD&D) Programs

Specific Research Development and Demonstration programs are conducted either in concert with State and local organizations or to enhance their activity. *Research* projects are intended to produce information about possible improvements in transportation technology. *Development* projects involve fabrication, testing, and evaluation of new equipment, facilities, systems, or methods. The products of development projects include prototype hardware, test results, and reports. *Demonstration* projects introduce, on an experimental basis, new methods, equipment, or transportation systems into a representative environment. This permits measurement of user or community acceptance of the innovation, collection and evaluation of operating and financial statistics to ascertain economic viability, and an evaluation of operating performance of new methods or equipment in daily use.

The actual conduct of RD&D at the State and local level can contribute significantly to knowledge transfer; to improving State and local capabilities in planning, design, implementation, construction, and operation of transportation systems; and to the development of new options for general use and deployment. Especially notable programs conducted for this purpose are elements of the Federal Highway Administration's highway planning and research program, the Federal Railroad Administration's demonstration program, and elements of the Urban Mass Transportation Administration's RD&D program.

RD&D projects are typically initiated and planned by DOT and implemented by means of contracts with private firms, grants to public bodies, and working agreements with other Federal agencies. A crucial step in this process is the documentation of RD&D and dissemination of results to foster increased knowledge of innovation and the possibility of other appropriate application of new technologies. Where the State or local governments package the RD&D results themselves, as they do in FHWA projects, the Federal dissemination function is facilitated since the knowledge was developed by a representative who is familiar with the needs and problems of similar jurisdictions.

Special Mechanisms

Special technology sharing mechanisms are designed to assure communication of State and local RD&D needs to the Federal Government, suggest the most appropriate form for Federal assistance to take, and aid in the dissemination of information on new technologies.

DOT interacts with and supports such special mechanisms as:

1. Formal advisory bodies, like the Intergovernmental Science, Engineering and Technology Advisory Panel's (ISETAP) Transportation, Commerce and Community Development Task Force;
2. New special purpose mechanisms or organizations, such as the Urban Consortium for Technology Initiatives, the multistate technical information sharing bodies called innovation groups (New England Innovation Group, Pacific Northwest Information Group, etc.), and other similar networks;
3. Interactions with the public interest groups of general purpose government either through their science and technology committees or transportation staffs, or through formalized clearinghouse arrangements like the National Conference of State Legislatures' (NCSL) Model Interstate Scientific and Technical Information Clearinghouse (MISTIC).

Information Packages

All DOT elements engage in the packaging and dissemination of information. Although developed at the Federal level to address State and local problems, these packages may also incorporate material dealing with innovations initiated by non-Federal governments themselves. The information—usually in the form of a summary document or handbook—may include data summaries, state-of-the-art material on promising technologies, and planning techniques for application in the local decision-making process. The material is then distributed to appropriate State and local personnel so that they may apply it to improve transportation services or make better transportation decisions.

DOT offers three levels of technological information tailored to specific user groups:

- *Level I, for policy makers:* General-interest publications designed to aid the user in gaining familiarity with and understanding of the subject area. Emphasis is placed on the consequences of alternative major decisions.
- *Level II, for managerial, planning, and operating personnel:* Publications providing technical and management related information to augment understanding and support decision-making. Emphasis is placed on the experience of other users.
- *Level III, for transportation technical specialists:* Publications that include highly detailed and technical material. Many of those documents are the traditional products of research projects. Documents may be provided to State and local officials free of charge or made available for sale through the National Technical Information Service (NTIS) or the Government Printing Office (GPO).

DOT has found it especially useful to enlist the aid of State and local users themselves in developing technical summaries. The availability of such documents is described in more detail in Part III.

3. Mayors and Chief Transportation officials of Urban Consortium cities meet annually with top management of the Department to establish an agenda of research projects.

3.

Part III: DOT Administrations: Individual and Joint Programs

Office of the Secretary (OST)

The Office of the Secretary (OST) coordinates and guides DOT's endeavors in all areas of transportation. Its activities support and complement those of the individual DOT operating administrations, with special emphasis on problems common to more than one transportation mode. In technology sharing, OST's responsibilities are as follows:

- To ensure that State and local government *needs* for transportation technologies and information on those technologies are being addressed and reflected in the Department's RD&D programs, and
- To ensure that the *products* of DOT RD&D programs effectively reach the appropriate users in States, counties and cities.

To fulfill these responsibilities, OST works with the operating administrations in developing and disseminating information on innovative techniques which might solve, or help to solve, public problems. It tries to promote needed cooperation between the operating administrations through its day-to-day working relationship with them, and by its support of multi-administration projects. OST also responds to direct requests for technical information, particularly those dealing with more than one jurisdiction or governmental unit, or originating with policy level officials in State and local government.

Areas of Research

OST is its own client for most of the research it sponsors. As a result, research initiated by OST is primarily policy-oriented with a focus upon regulatory and economic analysis. Of particular concern are energy conservation, economic modeling, user charge studies, information compilation, and assessments of how to more effectively share technologies with State and local governments.

Needs Determination Mechanisms

Effective Federal technology sharing requires mechanisms for determination of the needs of all DOT's client groups, including policy-level officials. This has been a major, although not exclusive, focus of the OST work and a number of formal panels and networks have evolved to accomplish this. One notable forum of this type has been the Transportation, Commerce, and Community Development Task Force of the Intergovernmental Science, Engineering, and Technology Advisory Panel (ISETAP). ISETAP reports to the President's Science Advisor on needed areas of emphasis in Federal RD&D. This body, which consists of State and local elected officials, has a full-time local government staff person who works in OST's Technology Sharing Division. This assures the Panel's direct contact with DOT officials, and encourages the development of needed research projects.

Another prominent mechanism for needs identification which OST works with is the Urban Consortium for Technology Initiatives. The Consortium's membership now comprises 37 cities and counties with populations over 500,000. Along with FHWA and UMTA, OST supports the Urban Consortium's Transportation Task Force, which develops and annually revises a prioritized list of common urban transportation R&D problems. This material is then made available to the Department's research managers for their use in planning. Thus, the Urban Consortium, representing over 20 percent of the nation's population, serves as a formal mechanism for State and local input to Federal RD&D projects.

DOT also works with individual policy-level client groups. One example of this is the National Conference of State Legislatures (NCSL) Model Interstate Scientific and Technical Information Clearinghouse (MISTIC). This clearinghouse provides DOT with briefs on transportation-related legislative issues, and identifies R&D need areas by consolidating and interpreting the information assistance requests of its users in the state legislatures.

OST also uses data from special surveys, material from the broader consultations the Department engages in to develop legislation, and periodic reviews of information requests to help identify needed research and regulations.

Technology Sharing

Direct Assistance

Within OST, the Office of Intergovernmental Affairs conducts a technology sharing program with Department-wide responsibilities. It processes information requests and queries from policy level officials. It also provides information to any State or local official who needs information, but is not certain which part of the Department to contact. In addition, the Transportation Systems Center's (TSC) Technology Sharing Program Office in Cambridge, Massachusetts, funded in large part by OST, handles 3,000 telephone and mail queries per year concerning DOT's technology and information. Direct assistance services and answers to specific questions are available from TSC upon request toll free by calling (800) 225-1612, except in Massachusetts where the number is (800) 842-1151.

4.

4. Francis Francois of Prince Georges County, Maryland, Walt Scheiber of the Washington, D.C. Metropolitan Council of Governments, and Carleton McMullin, City Manager of Little Rock, Arkansas, attended a recent ISETAP review.

Information Services

In some cases OST determines, in concert with the individual program officials in the Department, that documents emanating from the modal administrations' R&D programs may warrant wider dissemination. To accomplish this, OST may reprint and distribute technical documents which resulted from these various projects. These reports may be republished in their original format, or in a new summary format suited to a broader audience.

The Office of Intergovernmental Affairs also publishes a bulletin for State and local officials entitled *Dialog*. The bulletin describes major legislative changes, new resources and programs available to State and local governments, and new documents or reports of special interest.

Training

The Urban Consortium for Technology Initiatives conducts workshops and seminars as part of its program. Typically, six to eight months of research into a problem area culminate in a review session involving participants from diverse backgrounds as appropriate to the subject area. For example, participants in a workshop on transit performance included local, State, regional, and Federal government officials; transit operators; transportation engineers and planners; and members of the academic community. The purpose of such sessions is to advance known technologies, share information on innovative approaches, and explore areas for new product development. OST has participated in the development of the Consortium's Joint Development Marketplace, a series of regional sessions on transit system productivity and performance, and a transit pricing workshop. These activities were originated and funded by UMTA, as part of the Departmental activities with the Consortium.

In addition, information packages developed under the Technology Sharing Program are used as backup to training sessions conducted by other elements of the Department, other Federal agencies, and the White House.

RD&D Programs

As noted previously, most RD&D conducted by OST is for its own use in developing Department-wide policies. However, the BART Impact Program, a comprehensive study and evaluation of the impacts of BART, the San Francisco Bay Area Rapid Transit System, was funded because of its utility to State and local decision-makers. The program's fundamental objective was to develop information that will guide future transportation and urban development decisions.

Federal participation in the BART Impact Program is administered both by DOT and the U.S. Department of Housing and Urban Development (HUD). DOT and HUD finance the BART program, and the Metropolitan Transportation Commission (MTC), the regional transportation planning agency for the Bay Area, has served as the prime contractor to DOT. Specific topics covered include transportation service changes, environmental impacts, land use and urban development impacts, economics and finance, institutional changes, life style alterations and Federal and local policy. Final results from this study are to be published during 1979 and 1980.

5. The reports of the BART Impact Program describe the effects of the San Francisco Bay Area's rail system, and how they were assessed.

5.

Special Mechanisms

Building on its research needs assessment activities, the Transportation Task Force of the Urban Consortium for Technology Initiatives selects problems of the highest priority to the cities and counties for information packaging activities. The Task Force prepares information bulletins on the ten or so highest priority problems identified in a given year. These brief issue papers have proven to be very useful to local government personnel in identifying those subject areas that could benefit from further research, information exchange, or product development.

The Task Force and Federal staff may develop manuals or case study reports on priority issues for use by jurisdictions across the United States. These documents may be revised, if necessary, based on the experience gained and user response to the initial versions. For example, a series of special manuals developed by the Task Force, using San Francisco, San Jose, St. Louis, and Buffalo are now demonstrating systematic methods for economically increasing the capacity of existing traffic lanes by giving special treatment to buses and carpools. The manuals are being revised to reflect the lessons these cities learned.

The Consortium has published case study reports on center city revitalization and has developed a series of reports on the transportation problems of the elderly. It has also published the proceedings of the technical or training sessions it conducts to promote broader experience sharing from these seminars and workshops.

The Urban Consortium program is administered by Public Technology, Inc. (PTI), a non-profit organization originally created as a technology resource by six public interest groups of general-purpose government. PTI also serves as secretariat to similar organizations: the Urban Technology System (UTS), reaching communities with populations between 50,000 and 500,000; and the Community Technology Initiatives Program (CTIP), some 30 representative communities with populations under 50,000. The Consortium's products are further disseminated through these two networks, and by direct mailings to other users. A formal evaluation of these distributions will be conducted during 1980.

The National Conference of State Legislatures' MISTIC, supported in part by OST's Technology Sharing Program, helps gather information on scientific and technological issues facing State lawmakers and their staffs. This clearinghouse links State legislatures with outside resources such as Federal agencies, universities, private industry, professional societies, and other States. Examples of MISTIC services include response to information requests from State legislatures on such areas as oil spill prevention and clean-up, highway de-icing salts, shipment of hazardous materials, and transit financing. It also supports State legislatures in the organization of seminars and briefings; publishes a monthly newsletter, *Science and Technology for the Legislatures*; prepares issues briefs; and identifies future scientific and technical issues.

Information Packages

Under OST sponsorship, state-of-the-art documents on critical technologies identified by State or local governments are produced by the Technology Sharing Program Office at RSPA's Transportation Systems Center (TSC). Subjects given recent treatment include light rail systems, rural transportation systems, transportation and energy, transportation for the elderly and handicapped, and innovative State programs. In addition to this TSC work, a formal program was initiated during 1979 to identify, reprint, and distribute State and local research reports on topics of broader interest.

Documents are selectively disseminated and also distributed on request at DOT-sponsored seminars on these issues and at other conferences on specific subject areas. The documents are also used in support of training courses such as those conducted by the National Highway Institute. Specific titles now available or under preparation in this series are listed at the end of this section. Topics which have received special emphasis are rural and small city transportation and energy conservation.

Further Information and OST Contacts

For further information, the following publications are available through the Technology Sharing Division (I-25), U.S. Department of Transportation, Washington, D.C. 20590:

Technology Sharing Documents:

Level 1 (general interest introductory publications):
Energy Primer
Taxicab Bibliography
State and Local Program Summary
Transportation Glossary for Small Systems
Handicapped and Elderly Transportation Literature Capsule
Handicapped and Elderly Transportation: Programs & Problems

Level 2 (more detailed technical and management information):
Energy Conservation in Transportation
Priority Techniques for High Occupancy Vehicles
Light Rail Transit

Urban Consortium Information Bulletins

1978-1979 Information Bulletins
Transportation Needs and Programs Summary
Accelerated Implementation Procedures
Alternative Work Schedules
Center City Circulation
Neighborhood Traffic Controls
Parking Management
Traffic Performance Measurement
Transit Marketing
Urban Goods Movement

Revised 1977-78 Bulletins:
Institutional Framework for Integrated Transportation Planning
Transit System Productivity

Updated 1977-78 Bulletins:
Integration of Para-Transit with Conventional Transit Systems
Transportation Planning and Impact Forecasting Tools

Technology Sharing Reprint Series

An Analysis of Transit and Paratransit Options for the Elderly and Handicapped, by North Central Texas Council of Governments, January 1978

An Approach to Local Transportation Planning for National Energy Contingencies, by North Central Texas Council of Governments, January 1978

Marketing Manual for Transit Operators, by Iowa Department of Transportation, February 1979

Michigan Small Bus Program System Management Handbook, by Bureau of Urban and Public Transportation of Michigan Department of State Highways and Transportation, June 1978

Public Transit Management/Technical Assistance in Iowa, by Public Transit Division, Iowa Department of Transportation, June 1979

Taxis, The Public and Paratransit: A Coordination Primer, for the International Taxicab Association, August 1978

Transportation Development Planning in Non-Urbanized Areas, by Public Transportation Division, North Carolina Department of Transportation, January 1979

The Use of School Buses for Public Transportation, by North Central Texas Council of Governments, October 1978

VANGO: A Status Report after 17 Months of Operation, by Maryland Department of Transportation and VANGO, Inc., June 1979

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6. One emphasis area in FHWA's current research is highway reconstruction and maintenance, including pothole patching.

6.

Federal Highway Administration (FHWA)

The Federal Highway Administration (FHWA) develops a wide range of programs to promote an effective national highway system and is one of the oldest elements of DOT. The nation's roads now comprise some 800,000 miles of Federal-aid routes and 4,000,000 miles overall. This system must be designed and operated to satisfy national, regional, and local needs. The FHWA mission therefore requires a high degree of cooperation with State and local agencies.

In addition to helping preserve existing roads, FHWA also develops innovations to provide safer, more efficient and less costly highway systems in the future. Throughout the process of innovation, a continuing FHWA policy concern is improving the compatibility of highway goals with the nation's broader social and environmental goals, and maintaining the balance of highway service with that of other modes of transportation. FHWA is also involved in development of new initiatives to provide transportation services to people in rural and small urban areas, including public transportation.

Highway improvements are coordinated with other transportation improvements through intermodal transportation planning. FHWA's planning requirements are designed to ensure that highway improvements contribute to the achievement of community goals and are compatible with planned land use management. Traffic operations improvements can also increase urban street safety and capacity, in turn reducing the need for new construction.

Areas of Research and Development

The role of research and development in FHWA is to solve current operational problems, to identify trends and approaching difficulties and explore options for their solution, and to transfer this technology to the State and local highway agencies for implementation. Specific objectives of the FHWA research program are the following:

- *Increased Performance*—With a major reduction in new highway construction, the efficiency of existing highways must be increased. Along with increased performance, better service and greater reliability in moving people and goods must be attained.
- *Enhanced Safety*—The annual loss of many thousands of lives and billions of dollars in property damage sustained on the nation's highways is unacceptable. The FHWA devotes a significant portion of its resources to developing safety technology and establishing and applying effective safety performance standards. These efforts complement work by the National Highway Traffic Safety Administration (NHTSA) in developing safer vehicles and improving driver performance.
- *Improved Environmental Compatibility*—FHWA emphasizes the development of technology to improve air quality, reduce noise, minimize wildlife losses, and maintain water quality. Total compatibility of the highway and the environment is its ultimate aim.
- *Reduced Costs*—Significant reductions in the cost of highway construction, operation, and maintenance are desired so that limited funds may be used for high priority highway projects, safety improvements, and aesthetic features. FHWA is strongly committed to developing new methods for constructing, operating, and maintaining highway structures, pavements, and traffic control systems at minimum cost and with reduced energy consumption.

To assure that all highway R&D activities in support of these goals are coordinated and duplication of effort minimized, an overall national program structure has been established. This structure is designated as the Federally Coordinated Program (FCP) of Research and Development for Highway Transportation. The FCP is organized to achieve research results within specific time frames and to evolve constantly as old problems are solved and new problems arise. The FCP structure maintains oversight in a number of areas, including the National Cooperative Highway Research Program (NCHRP) funded by the States, State research funded by Highway Planning and Research (HP&R) funds, FHWA's contract research program, FHWA staff-conducted research and research directly funded by the states, the private sector, and universities. To help focus these efforts, the FCP is continually updated to reflect the most urgent problems facing local, State, and Federal highway officials.

A significant portion of FHWA's R&D program is dedicated to developing and implementing research results. Activities range from full-scale demonstration and experimental projects to special promotion and implementation programs. In addition, all FHWA-sponsored research progress is reported to a variety of research information services to assure timely dissemination.

Needs Determination Mechanisms

Assuring the relevance of its research programs and products is a major feature of FHWA's R&D management system. To promote this, FHWA's major development determinations are not made by a single person. The decision-making process usually involves up to six elements representing research, development, operating offices, field offices, users, and public officials. Participation in the FCP by the total highway community is solicited and encouraged. FHWA particularly seeks the advice of State highway agencies, whose direct experience with problems and specialized research talent is not available elsewhere.

FHWA's program of input to R&D is focused by two annual FCP conferences, where selected projects in the FCP are reviewed by Federal, State, Transportation Research Board, local, university, and industrial representatives. The conferences provide a forum for coordination and immediate feedback on technology related to highway research. Later in the implementation process. FHWA requires States and metropolitan planning agencies to provide for input from appropriate local officials and to allow for public participation. This improves the linkage between the planning and programming of projects.

Technology Sharing

The highly developed cooperative Federal-State relationship is the key element in the success of the Federal-aid highway program, and has proved to be essential in any attempt to make use of highway research findings. Through this partnership, the results of research and development are applied to highway planning, construction, operation and maintenance activities on a nationwide basis. Above all, the FHWA policy seeks to ensure that the benefits of research and development are made available to other governmental agencies and to private enterprise through effective dissemination programs and appropriate incentives for their use.

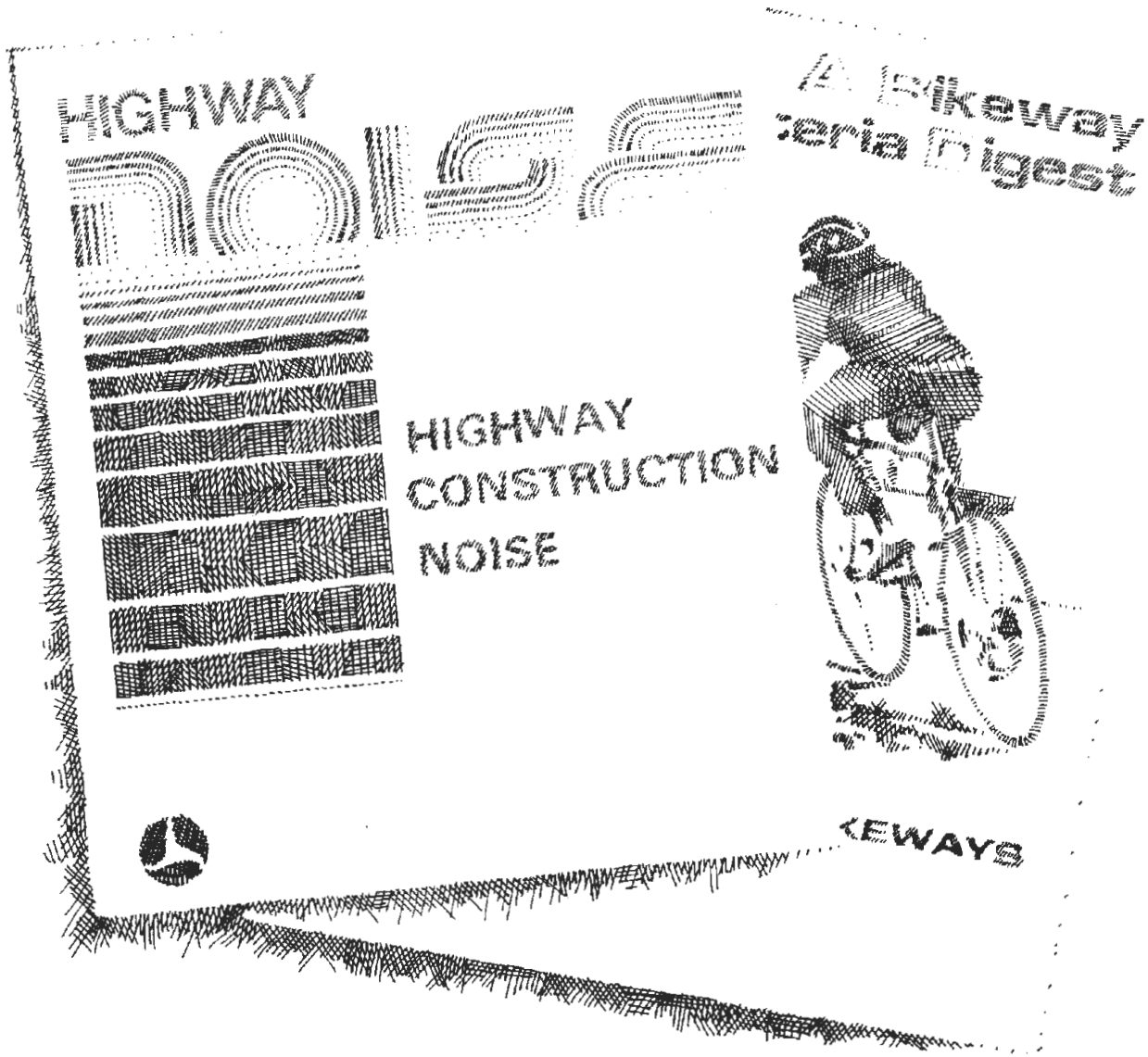
A priority program in this area is the practice of technology sharing. In order to increase the benefits of highways, improve their quality, and minimize their costs, FHWA promotes the widespread and timely use of new technology. Recognizing that no single mechanism can assure this, a variety of channels are used to communicate with potential users. Policies in this area are set by a formally established Inter-Office Review Group (IRG), which determines the balance between the various mechanisms.

Direct Assistance

FHWA's day-to-day activities afford opportunities for direct sharing of technology. Its field offices serve as locally available sources of information, and two-way exchange of ideas by FHWA staff with their counterparts in State and local governments and others in transportation activities is a daily activity. FHWA's Division Offices in each State are quite active in providing this kind of support.

Particularly productive working relationships can evolve from the actual performance of R&D. In each regional office, several individuals are normally involved in the conduct of research. Responsibility for management of the R&D program rests in the Office of Planning and Research, and more directly with the Regional Research Engineer or Program Manager. Field Project Advisors (FPA's) are technical specialists in such areas as the environment, hydraulics, and traffic operations. While coordinating the technical aspects of their FCP projects, the FPA's provide valuable advice regarding research needs and potentials to their counterparts in Washington. The FPA's also have authority to commit FHWA on technical aspects of their FCP studies performed by States within the region. Each regional office also has a *Technology Transfer Coordinator*, or committee, which is responsible for coordinating and promoting activities for experimental construction projects, implementation, demonstration projects, training and education, and other technology transfer activities.

7. FHWA has developed summary packages on many topics, including highway noise and bikeway design.



7.

A structure similar to the regional office exists in FHWA division offices located in each State. The Division Planning and Research Engineer (who may be designated as the Program Manager, Transportation Planner or Community Planner) has prime responsibility for administering the research program. Operational experience is supplied by Field Technical Coordinators who are assigned technical surveillance responsibility for an FCP study or a group of studies. Division offices also have Technology Transfer Coordinators or other appropriate mechanisms for technology transfer.

Since the division office is the direct point of contact between FHWA and the State, this office has the greatest potential and opportunity to assure essential liaison between practicing engineers and State researchers. It is also the point for one-on-one contact on implementation of usable research findings.

In addition to the field operations, the Implementation Division of FHWA's Office of Development is specifically mandated to stimulate the utilization of new highway technology at the State and

local level. It consults with users to determine information packages which should be developed, provides support in the use of these packages, and continually evaluates the effectiveness of the process. The Office of Highway Planning provides a similar support to State and local planners.

FHWA's Fairbanks Highway Research Station is a member of the Federal Laboratory Consortium for Technology Transfer, an informal network of 180 large government laboratories. It offers expertise to public and private sector users on research program administration, highway engineering, transportation planning, and traffic engineering.

Information Services

The principal products of highway R&D studies are published reports. These are distributed to State highway organizations, research information services, and many other highway-related research groups such as universities. The Office of Highway Planning also publishes the results of in-house and contract planning studies for distribution to State and local planners. As with most DOT research reports, analytical studies and technical documents are typically available through the National Technical Information Service (NTIS), with some also available from the Government Printing Office (GPO). In addition, abstracts from FHWA R&D reports go into the Highway Research Information Service (HRIS), the component of TRISNET sponsored by FHWA. (See the Research and Special Programs Administration section for further information on TRISNET).

Training

In recent years there has been much legislation in the highway field involving environmental considerations and safety factors. There have also been new advances in construction and maintenance techniques for highways, and in priority techniques for high occupancy vehicles. As these developments occur, they generate training requirements for both FHWA and State and local highway agency personnel.

As a major component of the overall FHWA technology transfer activities, the National Highway Institute (NHI) program is designed to improve the capacity of State highway agencies through formal academic training and on-site education and training programs. In each course, it is the intent of the NHI to assist State and local highway agencies in meeting legislative requirements by presenting the agencies with instruction on technologies which meet these requirements. Courses are developed and conducted where it is prohibitively expensive for individual State and/or local highway agencies to develop the expertise on their own. It is the philosophy of the Institute not to compete with those courses readily available on the open market.

Training projects are initiated when they will facilitate compliance with new Federal guidelines and will contribute to harmonious continuation of the Federal-aid program. They are also utilized to advance safety considerations and to introduce new highway technology. Training courses aimed at improving the capabilities of the States are selected by joint consultation between FHWA and State highway departments.

Specific courses cover such subjects as ecological impact of proposed highway improvements, fundamentals and abatement of highway noise, air and water quality workshops, traffic control for street and highway construction and maintenance, and pedestrian and bicycle consideratoins. NHI also serves as the focus for a series of joint FHWA/UMTA courses on urban transportation improvements. Overview courses on urban transportation alternatives and public transportation have proven especially popular in this series.

NHI is also developing two courses to support the Department's new section 18 rural and small urban transit program. A two-day overview on the general topic of rural transit, and a more detailed five-day course on system planning, operation, and management are now being evolved.

A cooperative effort of NHI and the Offices of Research and Development makes training materials developed by FHWA available to colleges and universities at no cost to them. This permits college students to gain exposure to materials developed for professionals working in the highway field, and also helps their schools maintain state-of-the-art materials in a rapidly changing area.

NHI also publishes the "Education and Training Information Exchange." This bulletin contains information on highway transportation-related training opportunities, including material on short courses, seminars, workshops, films, and other training packages. The bulletin is available on request from NHI at no charge.

In addition to NHI's efforts, UMTA and FHWA's Office of Highway Planning jointly sponsor a series of training courses for transportation planners. These urban planning courses cover several levels of technical sophistication, ranging from general planning seminars and overviews to detailed studies of technical topics, demand forecasting, and computer planning packages. The computer planning courses support the multimodal software planning package which is made available to all State and local planners by FHWA and UMTA.

The Office of Highway Planning also conducts courses for State and local personnel in statewide transportation planning, highway statistics, and highway transportation finance.

The Bureau of Motor Carrier Safety in FHWA provides specialized courses in accident investigation, safety program standardization, and safety regulation compliance. These courses are conducted at the Transportation Safety Institute at Oklahoma City.

RD&D

As mentioned previously, the Federally Coordinated Program (FCP) of Research in Highway Transportation is the main structure for managing the conduct of RD&D. Participation in the FCP is both widespread and substantial, with all the States receiving Federal aid or administrative contract funds to participate in the program. This allows States to perform research on their own problems. In addition to FHWA and State highway agencies, research is performed by commercial firms, universities, associations, and institutes, as well as by several other Federal agencies. Additionally, FHWA works cooperatively with other elements of the Department of Transportation on problems of mutual concern. Through cooperative agreements with foreign nations, international research results are also included in the RD&D program.

The FCP provides a framework for classifying highway's RD&D major program areas into their sub-elements. Major program areas are classified into *categories*, each category is divided into *projects*, and each project is subdivided into *tasks*. Individual studies within tasks are the smallest identifiable elements in the program.

There are six categories in the FCP:

1. Safety
2. Traffic Operations
3. Environment
4. Materials
5. Structures
6. Maintenance

Within the FCP there are four major programs involving federal support of highway R&D:

1. The Highway Planning and Research (HP&R) Program. Some 1½ percent of the funds authorized for the Federal-aid highway systems are allocated for planning or research.

2. The National Cooperative Highway Research Program (NCHRP). Under this program, 4½ percent of Federal-aid HP&R funds is pooled by the States on a voluntary basis to fund research activities structured to respond quickly to the needs of State highway departments.

It is administered under a 3-way contract among the American Association of State Highway and Transportation Officials (AASHTO), FHWA, and the Transportation Research Board (TRB). Research activities are selected by a special committee of AASHTO, and are overseen by TRB on a contractual basis with approval by the State highway officials.

3. The FHWA administrative contract program. FHWA uses its own money to fund research in some areas directly, using conventional contracts and procurement channels.

4. The FHWA staff research program. FHWA staff conducts research into some key areas in-house.

Work within the FCP categories accounts for most of the contract and staff effort and for approximately 70 percent of the HP&R and NCHRP programs. The remaining 30 percent of the latter seeks solutions to State problems which are not classified as having national priority.

This division of effort is fundamental to FHWA's strategy for conduct of highway R&D. The total number of problems far exceeds the R&D resources available. Individual states and research groups must continue to generate initiatives for solving local problems not selected for emphasis in the FCP. The key is properly balancing the resources available for each of these activities, and sharing the results of completed projects.

At the headquarters level, overall R&D policy direction is the responsibility of the Associate Administrator for Research and Development. The Office of Research, with four technical divisions, administers the research programs in search of new techniques and products related to highway technology. The Office of Development, with two divisions, provides the development and implementation activities needed to prepare and deliver new techniques and products to the highway community.

A "National Experimental and Evaluation Program (NEEP)" is an active component of the FHWA technology transfer effort. The main objective of the NEEP is to obtain participation of one or two States in each Federal Region in the evaluation of an experimental feature on Federal-aid construction projects. The program utilizes the expertise of FHWA and State highway agency specialists, in cooperation with private industry, to evaluate a material, a process, method, equipment item or other innovations which could benefit the highway community. Some of the features covered under this program include bridge deck protective systems, sulphur-extended asphalt pavements, asphalt emulsions, impact attenuator devices, and pavement recycling.

When on-site demonstration work is needed to stimulate usage of innovative technology, the Region 15 program of demonstration projects moves into action. Unique in the Federal Government, several factors combine to make this program unusual. Participation is purely voluntary, and application requires little or no red tape. The technology is taken by the project manager or demonstration team right to the State or other participating agency, where engineers can see it applied in their own environment and observe its effectiveness in handling their problems. Frequently the participants will actually operate the equipment and do other work involved in using the new technology. Managers of the program sometimes refer to their work as being the "Sesame Street" for modern transportation engineering technology.

Prior to being selected for inclusion in the demonstration program, a new technology must meet several criteria. In particular, it must first satisfy a widespread recognized need. The technology must then be practical and suitable for use by most transportation agencies. It must also offer either savings in time, money, or manpower, or enable the agency to do a required task that it could not previously do. Finally, the Demonstration Projects Division must be able to locate a project manager who is interested and capable of becoming a nationally recognized expert in the technology.

A few of the current highly successful projects, each involving different specific methods of demonstration, are asphalt pavement recycling (offering technical assistance and incentive funding), highway photomontage (offering technical assistance and computer software), and hydraulic design of energy dissipators for culverts and channels (offering design manuals, model demonstrations, and lectures).

Information Packages

Sometimes a document or summary report is the most effective way to communicate with a wide audience. FHWA's emphasis on application of research results then manifests itself in a series of Implementation Packages and Technology Sharing Packages. These materials may originate from various sources including FHWA staff, contractors, and State highway departments. Their distribution is promoted through wide dissemination of informative brochures which describe the packages and offer them free of charge to State (or local) highway personnel. The States themselves have prepared many of the packages, which lends them further credibility. In addition, some can be purchased from NTIS and GPO. The following listing of recently introduced information packages illustrates the types of materials available:

- *The Railroad-Highway Grade Crossing Handbook* provides a compendium of applicable concepts, technology and practice that can be utilized to improve the safety and efficiency of railroad-highway grade crossings.
- *A Bridge Deck Drain Cleanout* device, which eliminates ponded water quickly and safely.

- *A Noise Barrier Handbook*, which provides design information for noise abatement barriers. It also includes methods for predicting noise exposure and assessing noise impact, as well as describing other methods of noise control.
- *A Summary of Highway Facilities Where Hazardous Materials Are Restricted*, identifies highways which restrict or prohibit transport of hazardous materials, and describes the restrictions.
- *A Roadway Lighting Handbook* provides a guide in virtually all aspects of planning, designing and operating roadway lighting systems.
- *A Pile Driving Analysis* and a manuscript for tape slide presentation describe how complex problems encountered in pile driving, particularly to predict compressive and tensile strengths and soil resistance, can now be solved more easily with computer assistance. New computer programs for both diesel and air/stream hammers are available in these publications.
- *A Safety and Location Criteria for Bicycle Facilities* package provides user materials on how to implement bicycle safety lanes.

In addition, the office of Highway Planning provides a wide range of computer software planning methodologies, manuals, guides, and suggestions for procedures to be used in carrying out the planning process in State and urban areas.

Special Mechanisms

Supplementary delivery of FHWA's R&D outputs is accomplished through support or working relationships with other organizations. These include the Urban Consortium for Technology Initiatives, the National Association of Counties, the American Public Works Association, and the Institute of Transportation Engineers.

9. The cartoon character "Mr. T" is featured on many of the FHWA information packages.

Further Information and FHWA Contacts

For further information, the following publications are available from the Federal Highway Administration, U.S. Department of Transportation, Washington, D.C. 20590.

Documents:

Federally Coordinated Program of Research and Development in Highway Transportation, Introduction and Summary, October 1977. Offices of Research and Development.

1979 Federally Coordinated Program of Highway Research and Development, January 1980, Offices of Research and Development (Annual Report).

FHWA Research and Development Implementation Catalog, January 1980, Offices of Research and Development.

Active Planning Contracts and Studies, (Annual Publication, free.) Office of Highway Planning.

Brochure:

The National Highway Institute, 1974.

Pamphlet:

A Statement of National Highway Transportation Policy, 1976. Federal Highway Administration.

Contacts in FHWA:

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Office of Highway Planning, HHP-1
Federal Highway Administration
400 Seventh Street, S.W., Room 3306
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Urban Mass Transportation Administration (UMTA)

The Urban Mass Transportation Administration (UMTA) became a component of DOT in 1968. At that time, a reorganization transferred most of the functions and programs under the Urban Mass Transportation Act of 1964, as amended, from the Department of Housing and Urban Development to DOT.

The goals and objectives of UMTA are the following:

- To assist in the development of improved mass transportation facilities, equipment, techniques, and methods;
- To encourage the planning and establishment of urban mass transportation services needed for economical and desirable urban development, to provide mobility for transit dependents, and to maximize productivity of urban transportation systems; and
- To provide assistance to State and local governments and their instrumentalities in financing such services and systems.

These missions are accomplished in part through various forms of assistance and stimulation including funding for State and local governments to apply and operate technology; technical studies grants to help State or local governments in planning which technology to apply; a research, development and demonstration program to provide the urban transit technology that can be applied; and managerial training grants and university research training grants that provide funds for expanding urban transit knowledge and research at the local level and at universities.

Areas of Research

UMTA RD&D projects are conducted under the authority of Section 6 of the Urban Mass Transportation Act of 1964. This statute authorizes the Secretary of Transportation "to undertake research, development, and demonstration projects in all phases of urban mass transportation . . . which he determines will assist in the reduction of urban transportation needs, the improvement of mass transportation service, or the contribution of such service toward meeting total urban transportation needs at minimum costs." The Act also authorizes "the development, testing, and demonstration of new facilities, equipment, techniques and methods."

The projects may be conducted in-house, by grant, or by contract (including working agreements with other Federal departments and agencies). RD&D projects are generally initiated and planned by UMTA and implemented by means of contracts with private firms, grants to public bodies and working agreements with other Federal agencies. Analytical and planning tasks are usually performed by the UMTA staff.

Needs Determination Mechanisms

UMTA works directly with a number of State and local governments and interest groups to help determine which areas of research and development to emphasize. As part of this effort, UMTA co-sponsors the Urban Consortium's Transportation Task Force to help it stay abreast of the pressing transportation issues and transit needs of urban areas. Also, UMTA sponsors an annual R&D Priorities Conference in association with the Consortium and the American Public Transit Association to stimulate two-way communication on research and development needs, plans and priorities between managers and sponsors of R&D at UMTA, users and potential users, and performers of R&D. Additional input on problem areas is provided by UMTA's regional staff.

Technology Sharing

The products of innovative mass transit RD&D must be well documented and widely disseminated if communities with transit problems are to make intelligent choices. Further, it is crucial that the data be structured so as to be transferable and understandable to the responsible officials in other urban areas. Products and findings from UMTA RD&D projects are aimed at a variety of audiences, including transit planners, operators, and city officials. Both conventional and new channels of communication are considered and evaluated for their suitability before a final choice of dissemination mechanisms is made.

Direct Assistance

UMTA has established a field organization with representatives in each of the ten Federal regions, and has now tested and implemented a new, extensive regional structure. These regional offices have a general knowledge of UMTA programs and new research materials, and can serve as conduits for further information.

At UMTA headquarters, a major area for direct assistance is planning. The UMTA Urban Transportation Planning System (UTPS) provides new computerized and manual techniques to assist Federal, State, and local agencies in planning and implementing urban transportation systems. UTPS products include training packages for local professionals, manuals to aid planners and operators, and computer programs for transportation planning and decision making.

FHWA has joined with UMTA in the sponsorship of UTPS, which has received wide use and acceptance in State and local agencies. There are now over 300 users of the computer programs, and more than 50 courses in UTPS usage have been conducted by UMTA and FHWA. The computer-based program for multi-modal transportation planning is continually revised on the basis of experience gained from local applications, and from symposia which bring together experienced transportation professionals.

Supplementing UTPS assistance is a "DIAL UTPS" service. It gives field users direct access to UMTA Headquarters via their computer terminals to let them ask questions about problems they have encountered. Answers are returned on the terminal within a day. Other UTPS users have access to both questions and the answers via their own terminals.

In the area of safety, UMTA funds the Transportation Systems Center (TSC) to evaluate safety and system assurance practices for both existing and newly installed transit systems. In support of UMTA's program, TSC revises and refines existing drafts of system assurance guidelines. These guidelines provide transit managers with specifications, data resources, and analysis and testing techniques. The American Public Transit Association works with TSC to fuse the operational experience of their transit managers with the technical competence of TSC personnel. This cooperation helps stimulate transit officials nationwide to address safety and system assurance issues more effectively.

TSC also serves as a technical repository and delivery system for information on management-related computer software products.

Information Services

UMTA operates the Transit Research Information Center (TRIC), which collects data from UMTA-sponsored research, development and demonstration projects, technical studies, university research, and operational and financial data from UMTA grantees and contractors. After incoming data is prepared, it is disseminated to requestors in the forms of abstracts or statistics. Report abstracts are published on a bi-monthly basis and collected in the annual publication *Urban Mass Transportation Abstracts*. Individual reports themselves may be purchased from NTIS. The collection of the statistical information in TRIC results from the reporting requirements of those transit operators receiving UMTA grants under Section 5 of the UMTA Act. Reports from the operators are required annually under Section 15 of the Act to provide operating and financial data for each transit system every fiscal year. This reporting system will generate standard reports annually. Its products will be distributed to State departments of transportation, metropolitan planning organizations, transit operators, and other interested parties.

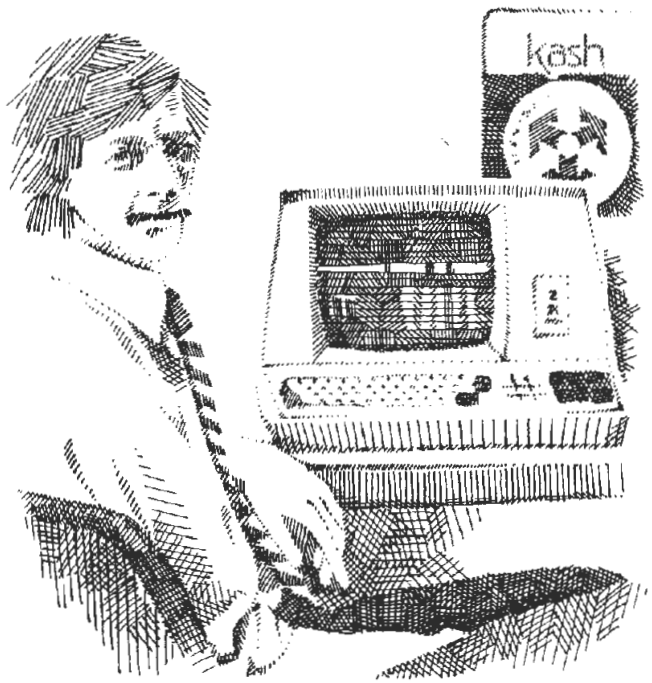
In cooperation with the Transportation Task Force of the Urban Consortium for Technology Initiatives, UMTA fosters information dissemination and technology sharing on its demonstration activities through a project known as *SMD Briefs*. These one-page summaries provide up-to-date information about key problems and solutions encountered on continuing Service and Methods Demonstration projects. The *SMD Briefs* are developed for UMTA's Office of Service and Methods' Demonstration, which can provide further information on how to receive them.

Training

With the cooperation of FHWA, UMTA has conducted over 40 courses for local planners in support of the UTPS Planning packages. Also, several courses are held at the Transportation Safety Institute on safety and system assurance. Other types of UMTA training efforts include holding special regional seminars to assist the transit industry by presenting results of management improvement studies; providing a forum for discussing management and marketing techniques; and sponsoring training courses for technical and supervisory personnel on the latest skills and techniques required by technological advances.

UMTA's Office of Transit Management cooperates with FHWA's National Highway Institute in developing and conducting a series of overview courses on urban transportation. Sessions to date have included urban transportation alternatives, public transportation, and transit policy for transit board members.

UMTA's Service and Methods Demonstration Program has sponsored seminars and workshops to discuss technical results or assess needs and priorities for future development in the area of demonstrations. Six regional seminars on small community transit provided a forum both for the presentation of case study findings, and for the sharing of experiences in all aspects of public transportation for small cities. Some of the materials from these workshops, notably a set of system case studies, are still available through NTIS. Other workshops have dealt with applications of bus priority techniques, transportation for the handicapped and elderly, and the utility of attitudinal survey techniques in transportation planning and evaluation.



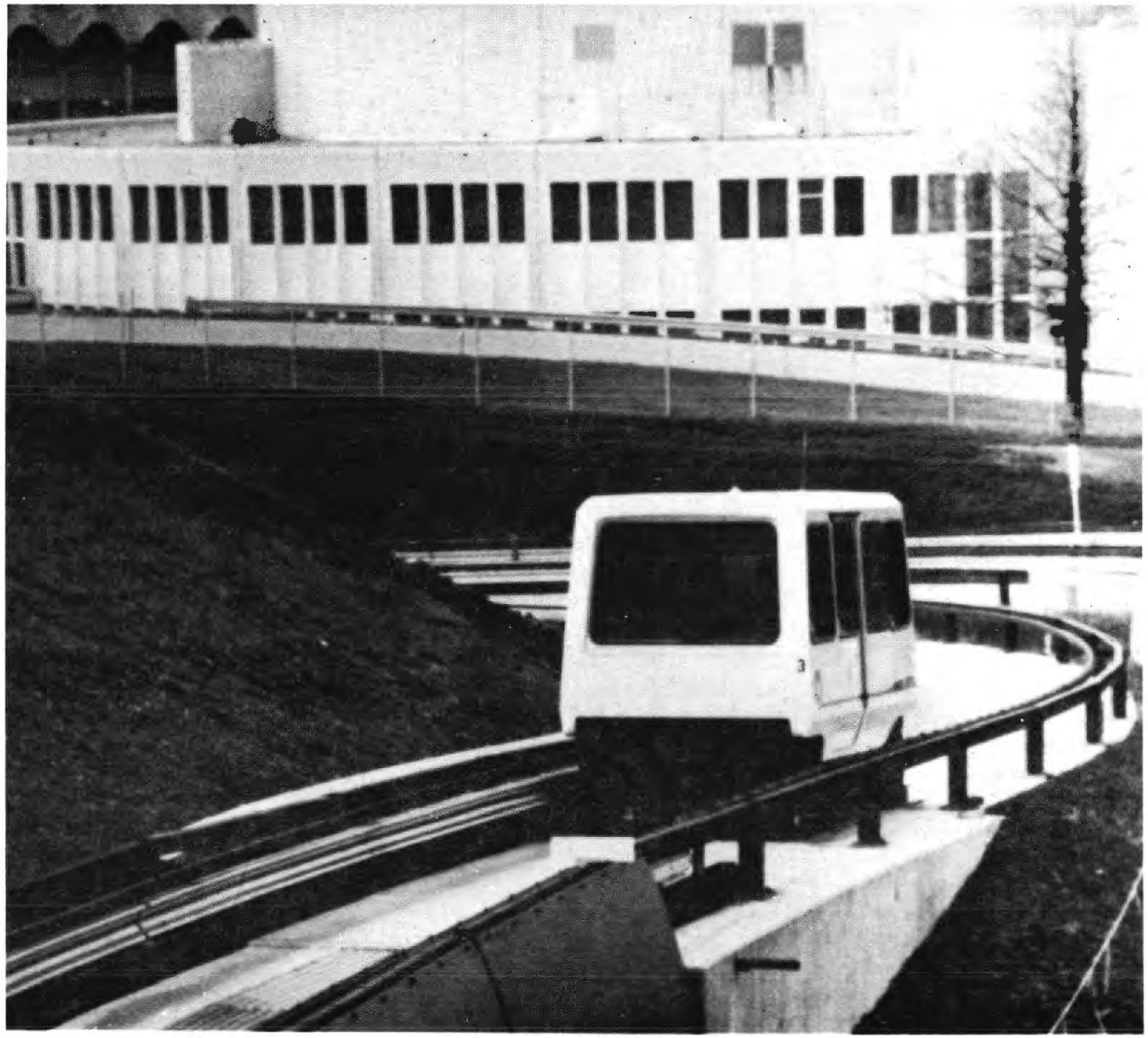
10. Service and Methods Demonstration (SMD) project in Knoxville, Tennessee used this mini-computer for carpool matching and transit brokerage.

RD&D

In the area of technology development and deployment, UMTA has established RD&D objectives to improve the safety and efficiency of conventional bus and rail transit, to support selected high-risk, high technology R&D initiatives which promise significant potential increase in productivity through the introduction of automation into transit operations, and to support national priorities, such as center city revitalization, accessibility for elderly and handicapped persons, safety, energy conservation, and environmental protection.

UMTA attempts to meet the technical information needs of client groups through conferences, seminars, workshops, technical papers, project reports, and special reports aimed at particular groups of users. The needs of client groups are ascertained, and the results of UMTA Technology Development and Deployment efforts are communicated by conferring and cooperating directly with representatives of these groups. Clients for these efforts include transit operating properties, transit equipment suppliers and developers, consultant firms, State and local government agencies, public interest groups, universities, foreign governments, and foreign industrial firms.

11. This automated system, operating in Morgantown, West Virginia, has tested the technology for downtown people movers.



11.

UMTA's Service and Methods Demonstrations program is intended to develop new techniques for using the current generation of transit equipment in providing improved service and efficiency in public transportation. The program's objectives are to reduce travel time by transit, to increase the area coverage of transit service, to improve the reliability of transit service, increase the productivity of transit vehicles, and improve the mobility of transit dependent users. In order to accomplish its objectives, the Service and Methods Demonstrations program is organized into five major functional areas: conventional transit service innovations, paratransit, service for special user groups, pricing policies, and information dissemination. Dissemination activities include formal and informal distribution of findings regarding concepts and applications through site visits, workshops, conferences, and publications.

Grants to universities, as authorized by Section 11 of the UMTA Act, are used to support research on solutions for urban transportation problems. These research and training grants also provide support for graduate and undergraduate students to study urban transportation, and, upon graduation, to seek employment in the urban transportation field. They also provide mid-career training opportunities for urban mass transportation professional and management employees. Finally, these grants promote beneficial interactions between the university and the local urban transportation agencies.

Reports from UMTA-sponsored research and development projects are typically made available through NTIS.

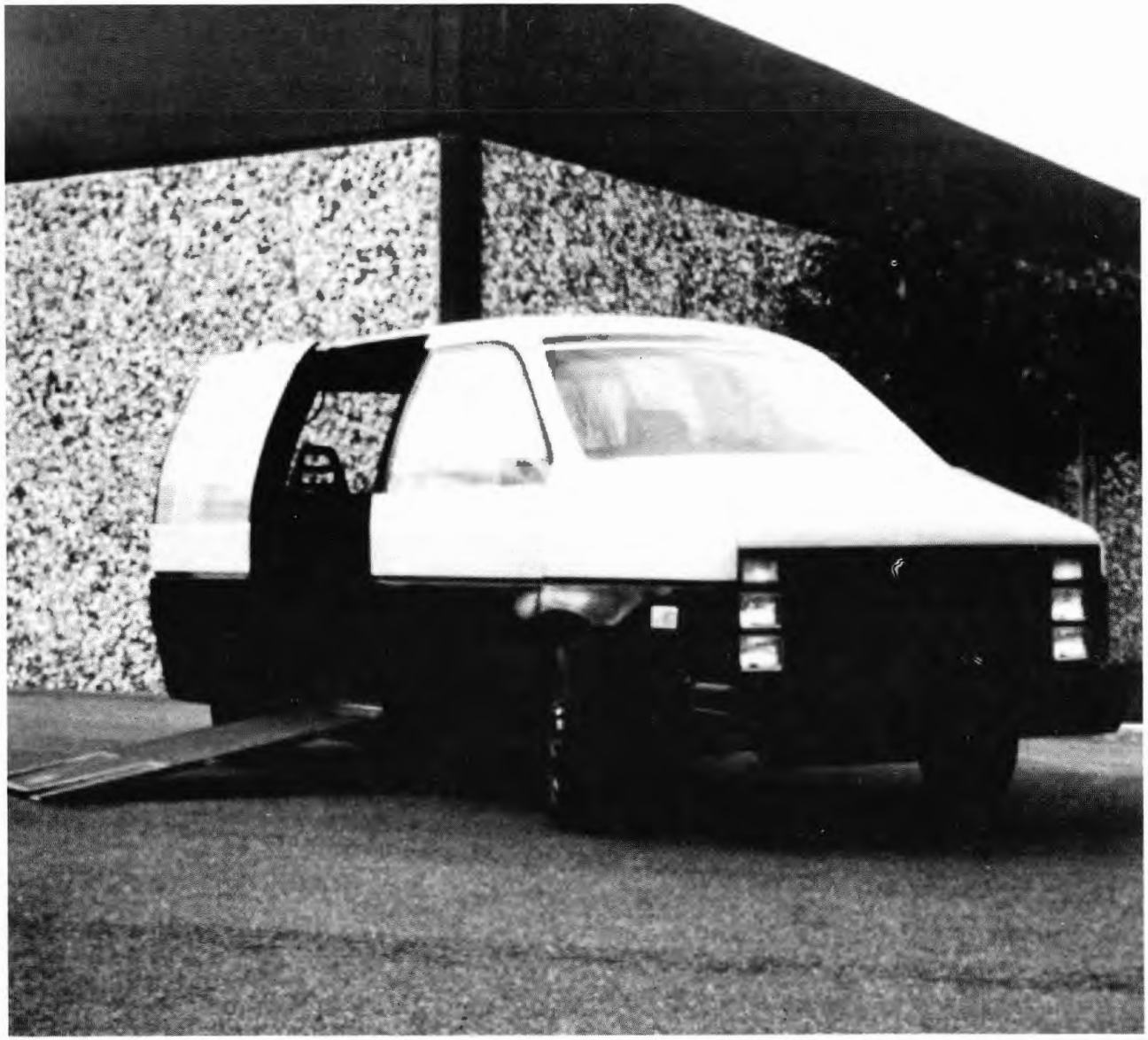
Special Mechanisms

UMTA has an active working relationship with APTA, the American Public Transit Association, to surface transit industry perceptions of public transportation needs. To make products available to local government users, UMTA sponsors the Urban Consortium for Technology Initiatives for development and distribution of information packages and for consultation activities.

With UMTA support, the Transportation Research Board (TRB) of the National Academy of Sciences has undertaken activities to encourage communities to expand their focus and involvement in current transportation issues. At UMTA's request, TRB has conducted national conferences in light rail transit and in urban transportation service innovations, including paratransit. TRB has also conducted workshops, seminars and studies in such areas as transportation for small and medium sized communities, services for elderly and handicapped, transit consumer concerns, and transit finance.

UMTA also takes full advantage of the working relationships established by the Transportation Systems Center with State and local users.

12. UMTA funded the development of this paratransit vehicle, which can provide taxi services in downtown areas.



12.

Information Packages

UMTA publishes an annual report on its research and development activities entitled *Innovation in Public Transportation.* This document provides an overview of the entire UMTA program and provides detailed instructions for obtaining RD&D products.

UMTA also develops information packages on specific topics of interest to State and local users. In cooperation with the Urban Consortium for Technology Initiatives, UMTA publishes case studies on such areas as center city revitalization and transportation problems of the elderly, and conference proceedings. In addition, UMTA publishes state-of-the-art reports through the Transportation Systems Center (TSC).

UMTA also produces audio-visual products such as slide presentations, films, and videotapes to illustrate innovative transit concepts. For example, a film depicting four transit service concepts appropriate to small communities was shown at regional seminars and is being distributed through the Audio-Visual Division of the OST Office of Public Affairs and UMTA regional offices.

Further Information and UMTA Contacts

For further information, the following publications are available from the Urban Mass Transportation Administration, U.S. Department of Transportation, Washington, D.C. 20590:

Booklets:

Urban Mass Transportation Act of 1964 and Related Laws as amended through December 1978, and related laws, UMTA Office of Public Affairs.

UMTA: Federal Assistance for Urban Mobility, April 1979 UMTA Office of Public Affairs.

Documents:

Innovation in Public Transportation: A Directory of Research, Development and Demonstration Projects, September 30, 1977, UMTA Office of Public Affairs or TSC's Technology Sharing Office.

Urban Mass Transportation Abstracts, available from the National Technical Information Service, Springfield, Va.
Vol. 5: December 1978, in preparation
Vol. 4: December 1977 PB 277 290
Vol. 3: July 1976 PB 264 906
Vol. 2: September 1973 PB 225 368
Vol. 1:October 1972 PB 213 212

Service and Methods Demonstration Program Annual Report, August 1979, UMTA Office of Service and Methods Demonstration.

Fact Sheet:

Availability of Information on Federal Research and Development in Urban Transportation, UMTA Office of Technology Development and Deployment.

Department of Transportation News Release:

Information of the Transit Marketing Project, UMTA Office of Transit Management.

Contacts in UMTA:

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400 7th Street, S.W.
Washington, D.C. 20590

Federal Aviation Administration (FAA)

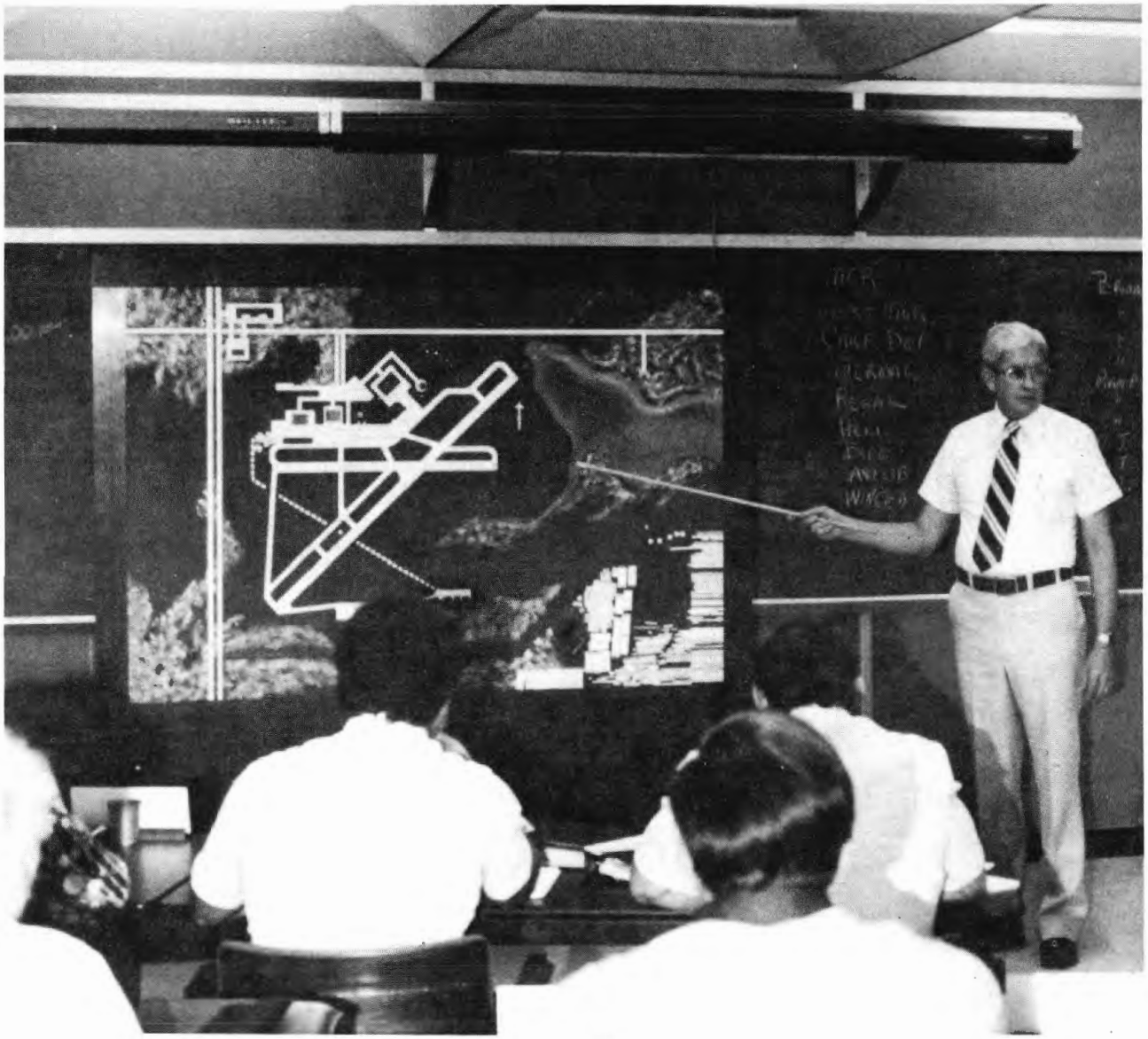
The Federal Aviation Administration is charged with:

- Regulating air commerce to foster aviation safety;
- Promoting civil aviation and a national system of airports;
- Achieving efficient use of navigable airspace; and
- Developing and operating a common system of air traffic control and navigation for both civilian and military aircraft.

Air traffic control is a major function of FAA, involving nearly half of its 50,000-plus employees. In order to keep pace with the rapid growth of aviation, the agency has implemented a computer-based semiautomated air traffic control system at all enroute centers serving the domestic United States and at all major terminal facilities.

Another major FAA function is the Flight Standards program, which is directed to assure safety of flight. This program establishes and enforces safety rules and standards governing the airworthiness and operations of aircraft and the competence of airmen; conducts in-flight inspections of air navigation facilities; develops flight procedures; and manages the FAA aircraft fleet.

13. FAA offers a wide variety of courses dealing with airport planning, development, and security.



13.

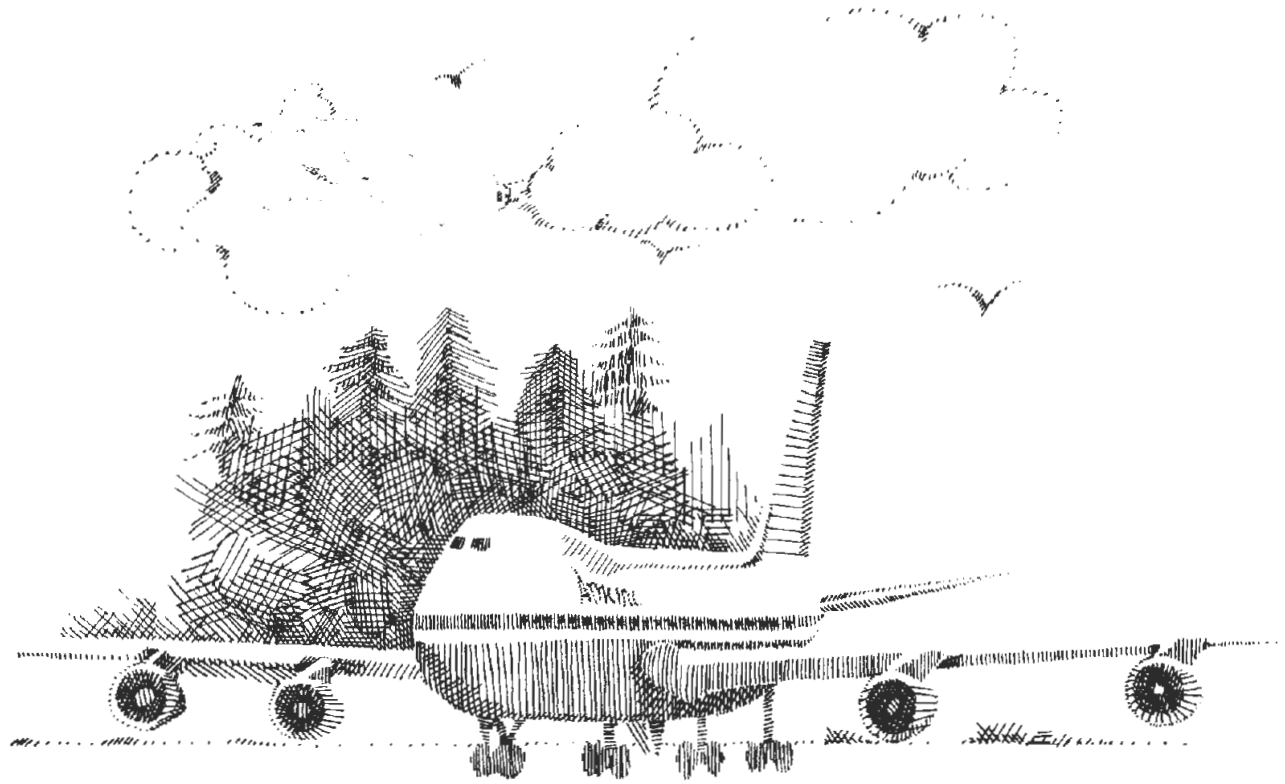
14. FAA has developed technical changes and operational changes to minimize noise impacts around airports.

FAA's Airport Development Aid Program (ADAP) provides financial assistance for the development of a nationwide system of airports. Grants are made for the purpose of general airport development (land acquisition, construction, alteration, etc.) as well as for establishing and improving air navigation facilities. The agency's Planning Grant Program (PGP) contributes toward the effective location and development of airports as well as the development of an adequate National Airport System Plan. PGP Grants can be made to planning agencies to perform airport system planning and to public agencies to engage in airport master planning.

Areas of Research

FAA Research, Development, and Engineering (RD&E) activities cover all aspects of aviation operations—air traffic control, communications and navigation functions, aviation weather data collection and dissemination, airport design and operations criteria, aircraft (vehicle) safety design and operations criteria, environmental (noise and emissions) control, aviation medicine, and facilities engineering and development. The end products of this work are usually studies and analyses, including test results and evaluation, leading to specifications, technical standards and recommended procedures and criteria for regulatory implementation. For some facilities and equipment, prototype or "first article" hardware/software may be an end product.

Much of the FAA RD&E is produced for the agency's own use, which serves as the basis for improvement, modernization, and upgrading of its own operational responsibilities and regulatory functions.



14.

15. The ARTS III equipment pictured here is used in training air traffic control and electronic technician students.

Technology Sharing

The performance of FAA's operational, regulatory and planning functions entails continuing direct relationships with agencies and users at the local level. Some technologies developed by the agency are therefore designed specifically for application by those groups, particularly in connection with airports and the environment.

Needs Determination Mechanisms

FAA conducts an annual series of conferences, which provide a forum where users, industry, and State and local governments exchange ideas and develop cooperative methods in planning the aviation system. Emphasis is on new techniques and technologies in air traffic control, airport development and environmental policy and planning.

15.

Direct Assistance

FAA participates in annual meetings held by organizations such as the National Association of State Aviation Officials and the Airport Operators Council International to share FAA technology advances. Also, the FAA regional directors meet annually with State and local officials to plan for new types of equipment affecting aircraft movement within specified regions.

FAA's National Aviation Facilities Experimental Center, or NAFEC, is located in Atlantic City, New Jersey. As an active member of the Federal Laboratory Consortium for Technology Transfer, NAFEC is a major source of expertise on electronics and aerospace technology. NAFEC is especially well versed to answer questions dealing with air traffic control, simulation and analysis, communications, guidance, aircraft safety, and airport safety.

Information Services

Part of FAA's RD&E is devoted to developing and updating information and information services in the fields of airport safety and airport design/layout/construction for use by airport operators, owners, and planners. Advisory circulars are developed and distributed to the aviation community on all facets of airport design, construction, and maintenance. Adherence to these standards is mandatory on Federally aided projects. FAA also publishes and disseminates handbooks on the planning process and procedures of grant applications.

Under contract from FAA the Transportation Research Board maintains the Air Transportation Research Information Service (ATRIS), an element of TRISNET. Still in the process of evolution, ATRIS has developed a bibliography on airport-related topics, and a bibliography based on the entire data base is planned. (The system is currently not maintained on a computer which is accessible to outside users.) FAA is currently consulting with the aviation industry and other users on the form the service should eventually take.

All scientific and technical reports developed under FAA sponsorship are available for purchase through NTIS. Notice of availability of technical reports is publicized by regular quarterly news releases distributed widely to aviation media, user organizations, and the general public.

FAA provides a free loan film service to pilots, aviation organizations, educational institutions, civic and business groups, other government departments, FAA employees, and the public-at-large. The agency uses a commercial film distribution network, and current FAA films have been assigned to the distributor's regional libraries throughout the United States. Films should be requested by mail from the following address: FAA Film Service, 2323 New Hyde Park Road, New Hyde Park, N.Y. 11042.

Training

FAA provides training for FAA employees and other government and non-government personnel, including representatives of State and local governments. FAA provides training specifically for non-FAA personnel on a full-cost reimbursable basis. These course offerings include training in airways facilities planning, air traffic control, airport operations and environmental impact assessment. Also open to non-FAA personnel on a space-available basis are a series of courses designed for FAA personnel in airport training and logistics training.

Of particular relevance to State and local users are FAA's orientation courses in airport planning and engineering. The courses are for non-Federal personnel, municipal officials, airport planners, and consulting engineers interested in airport planning and development.

In addition, internal FAA courses which appear relevant are available to State and local governments under the provisions of the Intergovernmental Personnel Act. FAA's Management Training School (MTS) in Lawton, Oklahoma, and the FAA Academy in Oklahoma City are among the facilities providing such training.

FAA also offers training courses in accident investigation, hazardous materials management, and aviation security for industry personnel through the Transportation Safety Institute in Oklahoma City.

In addition to formal training activities, some FAA elements sponsor special seminars on research results. For example, in November 1976, at FAA's request, the Transportation Research Board of the

National Academy of Sciences conducted a conference to present findings of recent FAA pavements R&D. Participants at this three-day conference included airport sponsors and engineers, architect-engineer contractors, and State and local government officials.

RD&E Programs

Research and development programs of interest to State and local governments are initiated primarily for FAA's Airports Service, which is responsible for administering the Airport Development Aid Program, the Planning Grant Program, the Airport Certification Program, and the Airports Engineering Program. Nevertheless, RD&E activity results in other major program areas—air traffic control and environmental research—produced for FAA Operational Services may be of interest to State and local governments. Results of FAA research can be made available to State or local governments through their aviation or transportation departments and user organizations, and all research reports are released to NTIS.

Further Information and FAA Contacts

For further information, the following publications are available from the Federal Aviation Administration, U.S. Department of Transportation, Washington, D.C. 20591:

Booklet:

Federal Aviation Administration, 1975.

Pamphlet:

Aviation Education Services and Resources, May 1973, GA-300-2.

Catalog:

FAA Catalog of Training Courses, May 2, 1977.

Documents:

An Overview of the FAA Engineering and Development Programs with Highlights of FYs 1975-1976, Report Number FAA-EM-75-4 (NTIS No. ADA 010 266), available from National Technical Information Service, Springfield, Virginia.

Guide to Federal Aviation Administration Publications, Report Number FAA-APA-PG-2, June 1979

The National Aviation Systems Challenges of the Decade Ahead, 1977-1986, available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Contacts in FAA:

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Federal Railroad Administration (FRA)

FRA was created in 1966 by the Act which established DOT. Its functions are:

- To assure rail safety;
- To provide major policy guidance on legislative matters affecting rail transportation;
- To sponsor research and development to improve railroad safety; and
- To advance the capability of both conventional and advanced concept rail freight and passenger systems.

The agency administers financial assistance to eligible railroads, and assists State and local governments on rail-related matters. It also operates the Alaska Railroad.

The Federal role in the rail mode has been primarily a regulatory one. The Regional Rail Reorganization Act of 1973 (3R Act), however, provides Federal funds to affected Railroads and states of the Northeast and Midwest for operating subsidies, line maintenance and rehabilitation, line acquisition, alternatives to rail service, and planning. Similar Federal support was extended to the rest of the railroads and states in the Railroad Revitalization and Regulatory Reform Act (4R Act) of 1976.

Areas of Research

The vast majority of FRA's current research and development efforts are directed toward near-term improvements in railroad products and processes. First priority is placed on improving the safety of railroad operations. Other objectives of this research are to improve the economic viability and efficiency of the nation's railroads, assist Amtrak, and reduce adverse environmental impact of railroad operations.

In addition to the near-term conventional railroad R&D, FRA is also working on longer-term improvements in three areas: advanced systems technology, electrification and intermodal systems technology. The look in the advanced system technology is however limited to keeping abreast with the state-of-the-art as it is progressed in other countries.

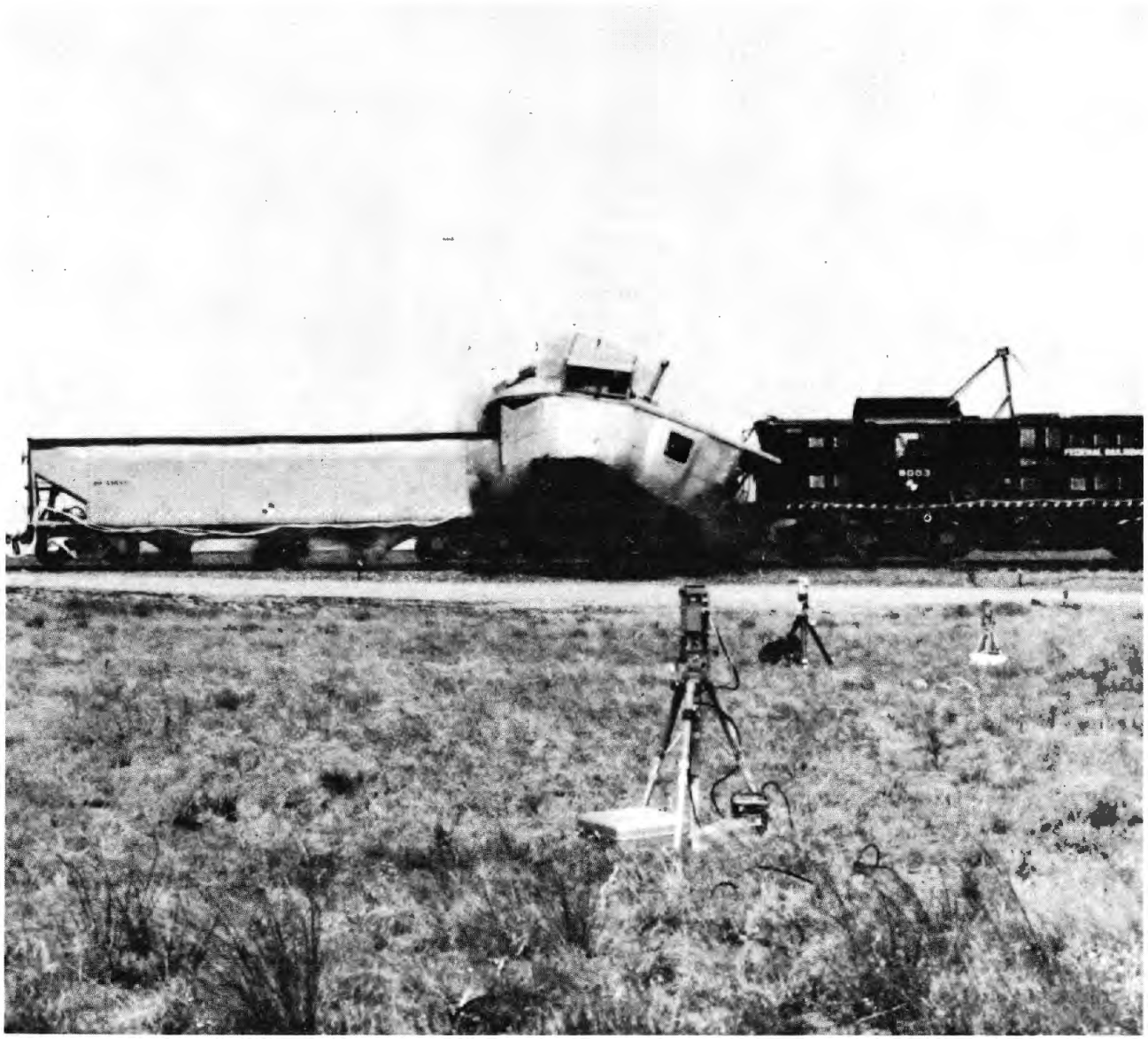
The FRA R&D programs fall in the major areas of improved rail freight service, improved passenger service, and rail safety research. A major accomplishment of the R&D program is the construction of the Facility for Accelerated Service Testing (FAST) at the Transportation Test Center near Pueblo, Colorado. FAST, which is being used to simultaneously test track structures (rail, ties, ballast, fasteners, switches) and equipment components (wheels, trucks, roller bearings) under heavy demand conditions, may be used by industry and State and local governments.

Other significant R&D accomplishments in recent years include the development of performance specifications for improving the safety of certain types of hazardous material tank cars; the development of performance specifications for rail vehicle glazing materials; and completed tests of Amtrak locomotives to assess derailment processes. These latter tests resulted in a decision by the manufacturers to modify the locomotives to resolve the derailment problem.

In addition to the safety and efficiency of rail freight and passenger service, the FRA R&D program is dedicated to ensuring that the country's system of railroads remains viable and in the private sector.

FRA has a large and varied list of users of its R&D results, which includes rail carriers, suppliers, universities, R&D companies, government agencies, States and other organizations engaged in railroad research and planning.

16. FRA conducts a wide variety of research and test projects to improve the safety of rail services.



16.

Needs Determination Mechanisms

As part of the Field Visit Program, FRA funds the National Academy of Sciences (NAS) to reach out to State and local government officials and to the academic community for their participation in rail R&D needs identification. In 1975, NAS conducted a four-week Rail Research Study Conference on R&D needs. The results of this activity are included in the document *Rail Transportation Research Needs, Final Report of the Railroad Research Study,* December 1976. Contributions to this significant effort were made by all sectors of the rail research community.

In 1976, the States created the National Conference of State Railway Officials (NCSRO). FRA consults with this organization, as well as with other user federations and organizations, in the development of effective programs to meet their needs.

Technology Sharing

Direct Assistance

FRA technical assistance to States and cities is largely in the areas of safety and planning. The Federal Railroad Safety Act of 1970 authorized the FRA to promulgate standards in any area of railroad safety deemed necessary, and to develop a nationally uniform set of those standards. To this end, State railroad safety standards were generally preempted as Federal standards were adopted in each area. States were given an active role in carrying out the investigative and surveillance activities associated with standards prescribed under authority of the Act. The Federal Government retained primary authority to impose penalties for violation of the standards. Federal financial assistance to the States was authorized by providing reimbursement of up to 50 percent of State expenditures for inspection activities. By the end of FY 1979, some 20 States were participating in this rail safety program, which depends upon direct Federal/State communication. Another move toward improved communication was the establishment of an informal joint Federal/State committee to review program procedures on a continuing basis and to resolve future problems.

The 4R Act of 1976 authorizes rail service assistance to be allocated to the States to meet the costs of establishing and implementing State rail plans. The role of State and local governments in rail planning, as indicated in the 4R Act, is primarily in the field of local rail service.

Information Services

FRA has established and provides financial support to the computerized Railroad Research Information Service (RRIS) to provide ready access to information about past and ongoing railroad-related research. The information in RRIS is international in scope and covers a broad range of topics such as research, development, planning, building, maintaining, operating rail transportation systems. The RRIS file managed by the NAS/Transportation Research Board, now contains more than 17,000 references with approximately 1,500 new items being added every six months. Included in the file at present are 200 computer program references. By arrangement with the International Union of Railways, reports of its Office for Research Experiments (ORE) are also incorporated into the RRIS file. These reports began appearing in the Spring 1975 issue of the *Railroad Research Bulletin.*

RRIS semiannually publishes its *Railroad Research Bulletin* listing all new references placed in its file during the preceding six months. The major sections of the Bulletin contain abstracts of reports and journal articles and progress reports on ongoing research. The Bulletin, which is 80 percent federally supported, is available for a $40.00 annual subscription from the National Academy of Sciences Transportation Research Board. More recent back issues may be obtained from the Transportation Research Board, Railroad Research Information Service, 2101 Constitution Avenue, N.W., Washington, D.C. 20418. The *RRIS Special Bibliography* dated March 1973, and the Railroad Research Bulletins of Autumn 1973 and Autumn 1974 may be purchased from the National Technical Information Service (NTIS), 5285 Port Royal Rd., Springfield, VA 22161.

FRA has established procedures for insuring maximum dissemination of its R&D results. All FRA's published R&D reports are widely distributed to groups engaged in railroad research, and who can benefit from the research findings. The issuance of new reports is announced publicly for the benefit of the user community, and subsequently they are indexed in the semi-annual *Railroad Research Bulletins.*

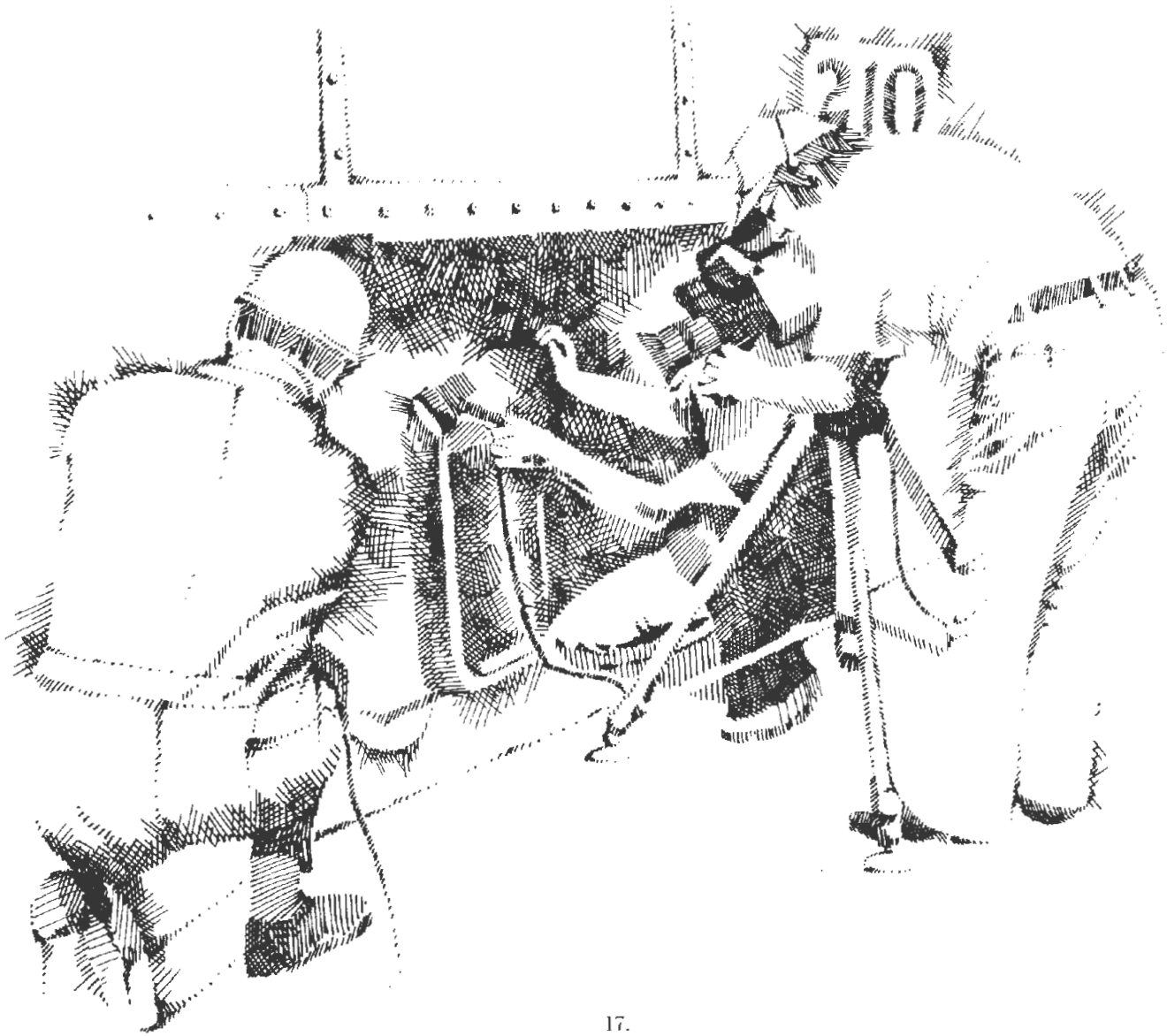
FRA also produces and distributes information through regular reporting services, such as accident statistics and material developed in general railroad research studies and technology development reports made available to the public through NTIS. To assure the necessary flow of safety information, FRA has established a Safety Information Service (SIS). A major element of this operation is the computerized Railroad Accident Information Reporting System (RAIRS). Carriers are required to supply data on rail accidents to FRA within 30 days after the month in which the accident occurs. Data from this file are published by FRA's Office of Safety in a summary bulletin, and copies of the file's computer tapes are available for sale at cost to interested parties.

Research in grade crossing safety has brought about development of a comprehensive, centralized highway grade crossing information system for State and local governments.

Training

In support of the Rail Planning Support Program, the FRA Office of State Assistance programs has conducted a number of informational seminars and workshops on State planning issues. The Office has completed a series of orientation seminars for FHWA field employees on the assistance program, and the possibility of training sessions for State employees is being explored.

17. A large number of training courses and information packages on rail safety are developed through the Transportation Safety Institute in Oklahoma City.



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FRA sponsors classroom safety training, conducted under the Rail Safety State Participation Program, at the Transportation Safety Institute in Oklahoma City. Courses are offered to railroad inspectors, accident investigators, and supervisors. In addition, FRA sponsors an annual Railroad Engineering Conference at which railroad experts discuss pressing problems facing the industry and recommend their solutions.

RD&D Programs

FRA's Office of Research and Development engages in R&D aimed at increasing the efficiency, safety, and effectiveness of conventional rail transport, and exploring the potential of advanced systems. Examples of research topics dealing with conventional rail include the Metroliners operating between Washington, D.C. and New York, track geometry measurement cars, improved track structures investigations, and the testing of equipment and component performance. Areas of FRA's advanced systems research include linear motors and power conditioning equipment, and technology for non-contacting suspension systems. More recently, freight systems research has included investigations into automatic car identification, supporting research on fuel consumption of intermodal systems, aerodynamic drag, and lighter weight rolling stock. Safety research has been oriented to alleviating the dangers of transporting hazardous materials in tank cars. Passenger system research has concentrated on improvements in the reliability and ride quality of passenger equipment.

FRA is the executive manager of the DOT-wide Transportation Test Center (TTC) near Pueblo, Colorado. This Center is one of the most sophisticated test and evaluation facilities of its kind in the world. TTC tests and evaluates all types of rail vehicles, maintenance equipment, and track structures. The Pueblo facilities are available for DOT testing programs as well as for use by other government agencies and private industry. Test facilities for UMTA's Urban Rail Supporting Technology (URST) program are located at TTC, and are made available to transit properties for required evaluation of prototype and production vehicles.

As a result of joint efforts by FRA, the American Association of Railroads, the Railway Progress Institute, and many individual railroads and supply firms, the Facility for Accelerated Service Testing (FAST) was initiated at TTC. FAST is intended to shorten the time necessary to obtain life-cycle performance data on equipment and components by continuous testing on a special loop of track. With FAST, the performance of structures and components can be evaluated seven to ten times more rapidly than before, thereby permitting more rapid adoption of improvements in safety and efficiency.

In the Grade Crossing Safety Program, conducted jointly by FRA and FHWA, FRA contributed funds for grade-crossing protection in Maryland, Delaware, Connecticut, Rhode Island, and Massachusetts. The improvements included changes in highway approaches, removal of sight obstructions and approaches, and installation of train-activated warning devices and advance warning highway signs. The national program continued this type of action through the Association of American Railroads. A national inventory has been created, and the FHWA receives annual appropriations for grants to States to improve crossing protection. FRA, as a part of its safety R&D program, is developing improved hardware, especially lower cost devices, so that the available funding can be used to protect the maximum number of crossings.

Information Packages

Under the provisions of the 3R and 4R Acts, FRA prepared a Planning Manual in two volumes. Volume I, *A Guide to Decision Makers*, and a bibliography were distributed in 1977. Volume I contains a broad discussion of the issues and problems to be addressed in the rail planning process. Its intended audience is those executive, officials, and others whose interest in the program requires a general knowledge of the objectives of rail planning, but who will have no direct involvement in the day-to-day planning process. Volume II is a much more extensive and technical description of all phases of rail planning and is directed at the people who will actually design, direct, and carry out the rail planning process.

18. The Transportation Test Center, or TTC, is the focus of DOT trials of urban and intercity rail systems and subsystems.

18.

FRA technical reports typically are available through NTIS.

Further Information and FRA Contact

The Office of Research and Development in FRA is responsible for performing the Technology Sharing functions. For additional information on FRA R&D activities, the following publications are available:

The Tenth and Final Report on the High Speed Ground Transportation Act of 1965. By the Secretary of Transportation to the President, the Senate, and the House of Representatives. Available through NTIS, Report Accession No. PB 271 508. Price: $6.50 (Domestic), $13.00 (Foreign).

Rail Planning Manual. Volume I, A Guide to Decision Makers, 1977. Available through NTIS, Report Accession No. PB 263 182.

Rail Planning Manual. Volume II, Guide for Planners, 1978. Available through NTIS, Report Accession No. PB 288 426.

Contact in FRA:

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Office of Research and Development
Federal Railroad Administration
Washington, D.C. 20590

19. As part of the Military Assistance to Safety in Traffic (MAST) Program, military paramedics render assistance to traffic crash victims.

National Highway Traffic Safety Administration (NHTSA)

NHTSA's legislative mandate—to reduce highway fatalities and injuries—was established in the National Traffic and Motor Vehicle Safety Act and the Highway Safety Act, both passed by Congress in 1966. NHTSA sets the safety standards for motor vehicle performance, and provides technical support to the traffic safety activities of states and communities.

Current high NHTSA priorities are encouraging compliance with the 55 mph speed limit; improving automotive fuel economy; reducing the number of drivers whose abilities are impaired by alcohol; and increasing the use of seat belts.

In the Highway Safety Act of 1973, Congress expressed a special interest in bicyclist safety, evaluation of driver education programs, and the adjudication of traffic law infractions. These have become other focuses of NHTSA activity.

Areas of Research

The purpose of the NHTSA research program is to develop a data base that will support the agency's motor vehicle and highway programs, through saving lives and reducing injuries on the nation's streets and highways. Research is planned and carried out to discover trends, to pinpoint safety problems, and to provide solutions. In addition, a major effort is currently underway to help the automotive

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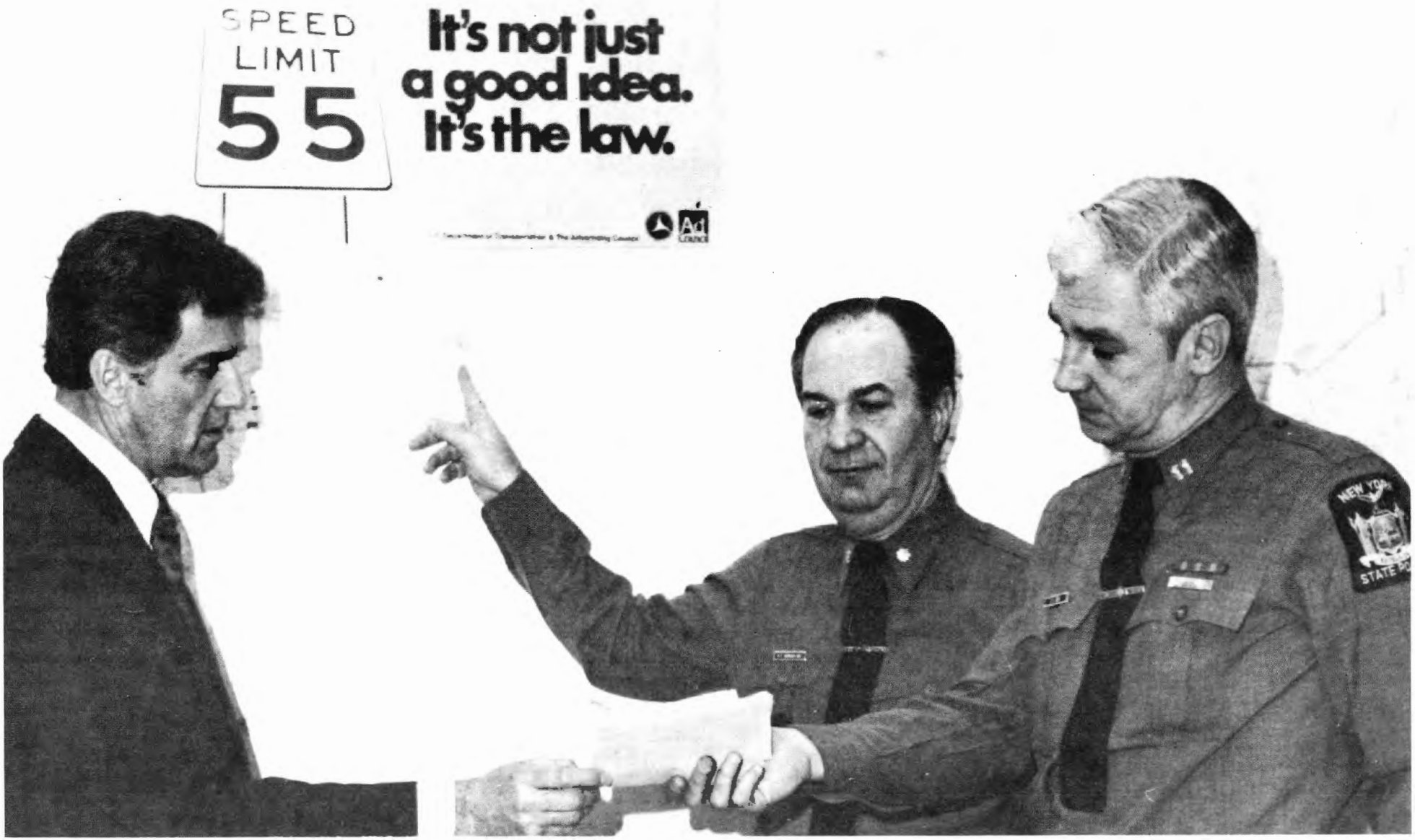
20. NHTSA works with State officials on the implementation of safety improvements, such as the national 55 MPH speed limit.



20.

industry design and produce more fuel-efficient vehicles, while still maintaining vehicle safety and integrity.

The utilization of research and development within NHTSA to solve highway safety problems ideally flows through the following phases:

- *Developing problem awareness*—Research data can trigger an alert to a new or growing problem and determine whether a real problem exists.
- *Focusing on a solution*—Once the problem is understood, research focuses on discovering promising solutions—making sure of the alternatives for breaking the causal chain of events leading to an accident, reducing the impact of the crash, or eliminating the situation in which the accident takes place.
- *Testing the solution*—After finding that a particular safety feature is feasible and appears practical, development and testing is needed to prove the effectiveness of the countermeasure and how it should be instituted. The result is a complete package that can be provided to states and communities for use, or form the basis for a new or amended safety standard.
- *Determining the effectiveness of existing programs*—Programs are utilized in real situations and the data from these programs are made available to practitioners and researchers.

Occasionally, events in traffic and safety lead to a reordering or combining of the above phases.

Need Determination Mechanisms

The National Conference of Governors' Highway Representatives, mandated by the Highway Safety Act of 1966, are designated by the Governors to be responsible for each State's highway safety program. They serve as the official link between State and Federal programs. The Governors' representatives meet frequently with NHTSA to discuss mutual problems. Communications are facilitated by the working relationships which have developed between the Governors' Representatives and the ten NHTSA Regional Offices.

The National Highway Safety Advisory Committee was created by the Congress in the Highway Safety Act of 1966, as amended, to advise the Secretary of Transportation on highway safety programs carried out by DOT. The Committee's 35 members are appointed by the President, and include representatives from State and local governments, public and private groups concerned with highway safety, research scientists, and other experts in the field. The Committee's diverse membership provides an independent forum in which highway safety policies and program direction are publicly examined.

Technology Sharing

Direct Assistance

Recommendations were made to Congress in 1977 for a shift in emphasis from a prescriptive standards approach to one stressing problem identification, countermeasures, and program evaluation. This change shifted more programming and operations responsibility to State and local organizations, and requires NHTSA's role as a technical advisor to be strengthened. In line with these trends, NHTSA is increasing its emphasis on new procedures and systems for soliciting and incorporating State and local research requirements into the Federal research program. It is also initiating legislative changes to the incentive grant program to stimulate State and local development of innovative programs and strengthening State and local management abilities in highway safety programs. As with needs determination, much of the direct assistance service is provided through the NHTSA Regional Offices.

An Auto Safety Hotline has been made a permanent facility, with toll free service handling 300 to 500 inquiries daily from consumers and other groups. The number is (800) 424-9393, except in Washington, D.C. where it is 426-0123.

21. NHTSA attempts to combine automotive fuel economy and improved safety by funding prototype Research Safety Vehicles (RSV).

21.

Information Services

The Highway Safety Information Service (HSIS) is a component of the TRISNET group, and is included in the TRIS-on-line files. Copies of all NHTSA contract research reports are disseminated to NHTSA regional offices, the DOT library, Northwestern University TRISNET repository, the University of Michigan's Highway Safety Research Institute, and NTIS.

NHTSA's National Center for Statistics and Analysis (NCSA) operates a national program for the monitoring, collection, storage, retrieval and dissemination of traffic and motor vehicle safety information on drivers, vehicles, crashes and injuries. NCSA and its investigation teams support the highway safety research work of industry, private groups, and government at all levels, and is coordinated or coordinates with other statistical centers and agencies, both national and international.

The NHTSA Traffic Records program is designed to assist states in developing statewide traffic record systems that are responsive to management information and data needs for problem identification, planning, operation, and evaluation of traffic safety programs. *The Design Manual for State Traffic Records Systems* has been developed and distributed to the states and a *Problem Identification Manual for Traffic Records Programs* had been provided to State program agencies to be used in identifying their problems and planning programs.

A monthly "Consumer Report Package" was instituted to assist consumer groups and agencies throughout the country in handling consumer problems and to answer the need for motor vehicle safety information. These packages, mailed to Federal, State, local, and private consumer agencies, contain news releases on vehicle defect investigation recalls and on tire and equipment recalls. The packages may be obtained by writing to NHTSA's Office of Consumer Participation. A new service to the consumer is the publication of "Consumer Advisories" in the form of press releases, to get out information on safety problems as quickly as possible. Queries on this service should be addressed to NHTSA's Office of Public Affairs.

Training

In 1977, NHTSA's support to the states in training traffic safety professionals included holding workshops, seminars, and instructor institutes; developing new curricula; updating existing curricula; and making assistance on training topics available when required. Some examples of topics covered are instructor institutes for emergency medical technician basic training, dispatcher training, and traffic court judge training. Other training initiatives have included seminars in traffic case adjudication and training in their driver licensing administrative hearing processes, workshops in multidisciplinary accident investigation and alcohol-highway safety, and the graduate program in Traffic Safety Program Management, offered at three universities.

In addition, NHTSA sponsors Transportation Safety Institute courses in highway safety program management and highway safety program evaluation, and an executive seminar in management for the Governors' Representatives. Curricula have been developed for operation of emergency vehicles, presentence investigation, and medical diagnosis evaluation for driver licensing examiners.

RD&D Programs

The NHTSA demonstration program utilizes the results of research efforts and is designed to test the effectiveness and utility of new countermeasures to safety hazards. Research studies are typically undertaken as precursor work to the development of major demonstration projects. Current NHTSA demonstrations include the Safe Performance Curriculum Demonstration Project, a driver education evaluation program in Dekalb County, Georgia; the Comprehensive DUI (Driving Under the Influence of Alcohol) Offenders Treatment Demonstration in Sacramento County, California; and the DUI Probation Follow-up Demonstration Projects in Memphis, Tennessee and the State of Mississippi.

22. Among the new technologies made available to state and local law enforcement officials is this alcohol breath tester.

22.

Special Mechanisms

NHTSA became a Federal Sponsor of the Urban Consortium for Technology Initiatives in 1979. Traffic safety is a special focus of this work.

Information Packages

In the administration of the State and community program, NHTSA develops its products principally for needs expressed by the State highway safety agencies. Additionally, materials are prepared by NHTSA for the use of the consumer/citizen and community components of State programs. The following products are examples of materials produced for State, community and citizen application:

Highway Safety Management Guidelines, September 1978, Report # DOT HS 803 565. This publication is designed to assist States in establishing highway safety programs in a logical and systematic way and in providing for their implementation in keeping with classical management principles. It is available for no charge from: The National Highway Traffic Safety Administration, General Services Division, NAD-42, U.S. Department of Transportation, Washington, D.C. 20590.

Guidelines for Planning and Developing State and Community Alcohol Safety Programs, November 1973, Report # DOT HS 800 995. This publication is designed to help public officials

analyze the alcohol-involved traffic accident problem in their States and communities and plan effective action to combat it. It is available for no charge from The National Highway Traffic Safety Administration, General Services Division, NAD-42, U.S. Department of Transportation, Washington, D.C. 20590.

Citizen Participation in Highway Safety, April 1978, Report # DOT HS 802 515. This is a study of ways and means for encouraging greater citizen participation and involvement in highway safety programs. It is available for no charge from The National Highway Traffic Safety Administration, General Services Division, NAD-42, U.S. Department of Transportation, Washington, D.C. 20590.

55 MPH Fact Book, annual publication, Report # DOT HS 803 577. This report provides facts and figures regarding the 55 mph speed limit and its effect on lives saved and fuel conserved. It is available for no charge from The National Highway Traffic Safety Administration, General Services Division, NAD-42, U.S. Department of Transportation, Washington, D.C. 20590.

Safety Belts—Facts or Fiction? 1977, No. 008919. This *slide-tape program* gives the facts and dispells misconceptions about safety belts. It contains fifty 35mm color slides, an audio-tape cassette with automatic advance, and a script booklet. It is available for purchase at $15.00 (No loans, rentals, or previews). To order, send remittance by check or money order (payable to National Archives Trust Fund (NAC) to: National Audio Visual Center, General Services Administration, Order Section, Washington, D.C. 20409.

In addition to the references cited, there are many other products available from NHTSA. These products, in the form of publications, films, and audio tapes, address the various program areas supported by NHTSA which are reflected, in the most part, in the Highway Safety Program Standards. The Standards which NHTSA administers are as follows:

Standard Number*	Title
1	Periodic Motor Vehicle Inspection
2	Motor Vehicle Registration
3	Motorcycle Safety
4	Driver Education
5	Driver Licensing
6	Codes and Laws
7	Traffic Courts
8	Alcohol in Relation to Highway Safety
10	Traffic Records
11	Emergency Medical Services
14	Pedestrian Safety
15	Police Traffic Services
16	Debris Hazard Control and Cleanup
17	Pupil Transportation Safety
18	Accident Investigation and Reporting

*Standards 9, 12, and 13 are administered by the Federal Highway Administration. Standard 14 is administered jointly by NHTSA and FHWA. A booklet, "Local Participation in State and Community Highway Safety Programs," and leaflets on the program standards NHTSA administers, are available to local traffic officials free of charge. Also available are a document, "Highway Safety Program Standards," and volumes of the Highway Safety Manual (guidelines to implementation of each of the standards).

Further Information and NHTSA Contact

For further information, the following publications are available from The National Highway Traffic Safety Administration, U.S. Department of Transportation, Washington, D.C. 20590:

Documents:

Highway Safety. A Report Under the Highway Safety Act of 1966 as amended January 1, 1978-December 31, 1978.

Motor Vehicle Safety 1978. A Report on Activities Under the National Traffic and Motor Vehicle Safety Act of 1976 and the Motor Vehicle Information and Cost Savings Act of 1972. January 1, 1978-December 31, 1978.

Highway Safety Program Standards. 45 cents, available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

NHTSA Research and Development Programs. National Highway Traffic Safety Administration, U.S. Department of Transportion, March 1976.

Contact in NHTSA:

Mr. George Reagle (202) 426-0068
Director, Office of State Program Assistance
(NTS-20)
U.S. Department of Transportation
National Highway Traffic Safety Administration
Washington, D.C. 20590

23. This is a test of an oil spill containment barrier used by the U.S. Coast Guard.

United States Coast Guard (USCG)

With units based in 44 states as well as in Puerto Rico, Guam, American Samoa, and the Virgin Islands, the U.S. Coast Guard (USCG) serves as the nation's chief maritime law enforcement arm. A branch of the United States Armed Forces, the USCG is an executive agency within DOT, except when operating as part of the Navy in time of war or as the President directs. Its most dramatic and best known peacetime activities are associated with its search and rescue mission, which saves over 3,000 lives annually. It also operates the National (Pollution) Response Center, and responds to accidental or deliberate pollutant discharges into navigable waters, both national and international. A recreational boating safety program is also active, and utilizes the Coast Guard Auxiliary consisting of some 45,000 volunteer boating enthusiasts.

The Coast Guard's icebreakers also open passageways in the Great Lakes, Arctic, and Antarctic in support of commerce and the Department of Defense. In addition, the long range radio and navigation (LORAN-C) network provides reliable electronic navigational fixes in Atlantic, Pacific, and European waters.

23.

24. Operational services provided by the Coast Guard include icebreaking to keep sea lanes open.

24.

Besides its influence on all aspects of marine transportation, Coast Guard RD&D covers two broad categories of marine safety and environmental protection. Emphasis is on development of rescue vehicles and equipment, on boat, equipment, and personnel safety and on vessel and cargo safety technology. RD&D is also directed to water pollution—its abatement, its prevention, the enforcement of laws which control it, and field response to oil and chemical spills. Other efforts deal with vessel traffic control systems, advanced navigation-aid technology, buoy systems development, recreational boating and deepwater ports.

Technology Sharing

Coast Guard research and development efforts are, for the most part, tailored to support the basic missions of the service. Those activities generate technology which can be applied in ways that go well beyond the immediate operational responsibilities of the Coast Guard. Coast Guard researchers are experts in marine pollution prevention, control of major spills of petroleum and hazardous chemicals, boating safety, buoy technology, marine hull coatings, electronic aids-to-navigation, and marine fires and explosions. The Coast Guard is therefore quite active in technology diffusion on these topics.

25. Men of the Boating Safety Detachment from the Coast Guard Station at Annapolis, Maryland check the flotation devices on board a runabout.

The Coast Guard's technology transfer process, while extensive, is not formally centralized in a single office with specially budgeted funds. Rather, the process is decentralized in order to simplify and enhance the dialog between the specific consumer and the section of the Coast Guard most involved with that particular technology. The Chief, Office of Research and Development does provide, however a common point of contact for technology transfer that cuts across the various technical offices at Coast Guard Headquarters.

Interaction with Outside Groups

Coast Guard R&D personnel interact with committees of the National Academy of Sciences, programs of the National Science Foundation, international committees, interagency committees, industry advisory groups, universities, professional societies, and State and local governments. Coast Guard funding provides part of the continuing support used by such key committees of the National Research Council as the Maritime Transportation Research Board, the Ocean Sciences Board, and the Marine Engineering Board. The Coast Guard is responsible for implementation of the Federal Boat Safety Act of 1972 via consultation and fund-sharing with the States, particularly through cooperation with the National Association of State Boating Law Administrators.

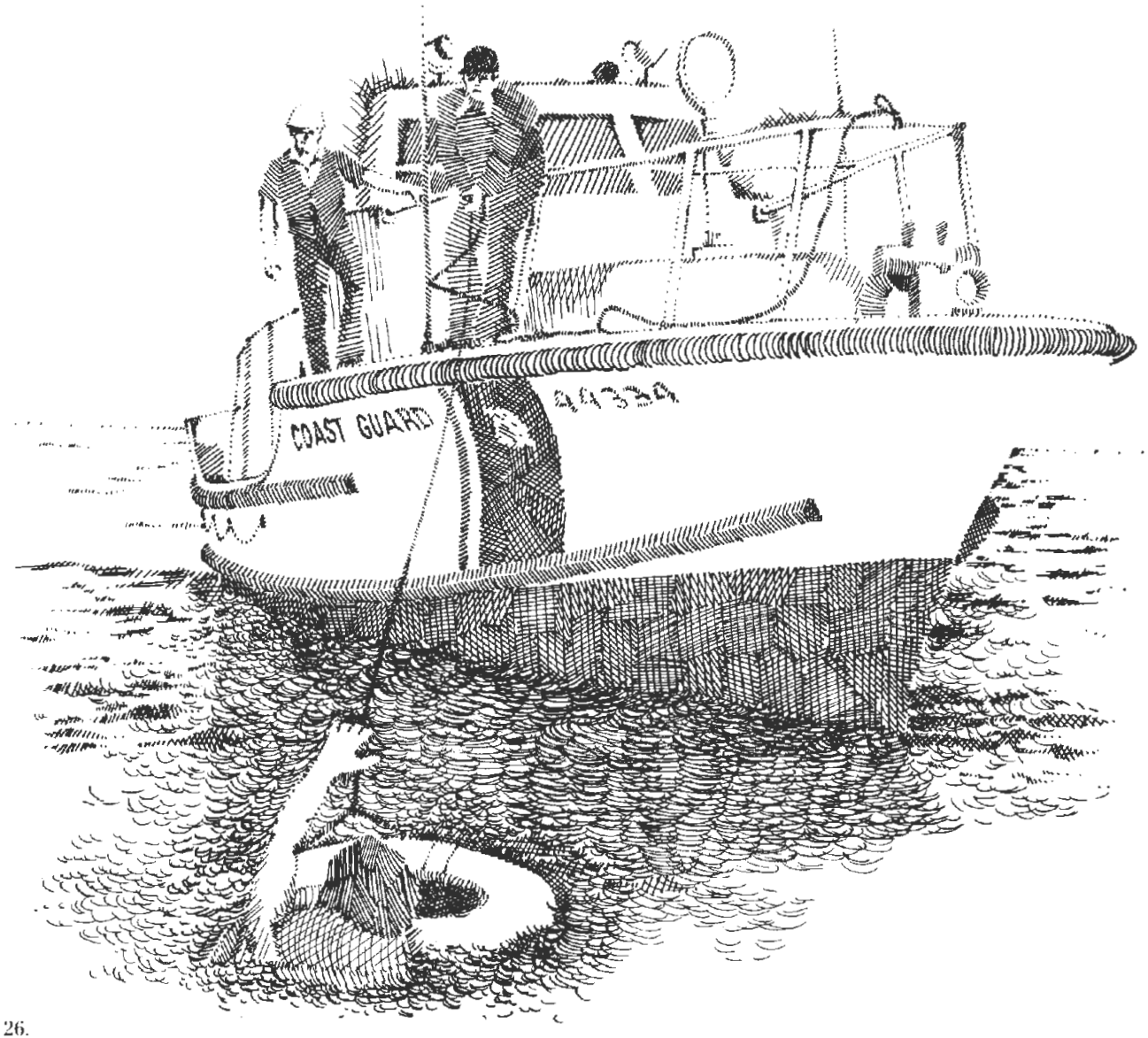
25.

Direct Assistance

Through various acts of Congress, the Coast Guard has been assigned a broad range of marine and environmental responsibilities both as an operator and as a regulator. This authorizing legislation includes the Federal Water Pollution Control Act as amended in 1972; the Port and Waterways Safety Act of 1972; the Marine Protection, Research and Sanctuaries Act of 1974; the Deepwater Ports Act of 1974; and the Port and Tanker Safety Act of 1978.

In some cases State assumption of specific powers and responsibilities is not appropriate, such as some spills into navigable waters. In those cases, States can help the Coast Guard carry out its Federal marine environmental protection responsibilities. This is especially true when State participation will improve the overall effectiveness of the national program, producing lower costs than if performed by the Coast Guard alone. States are also encouraged to participate in regional planning and preparedness functions conducted by Regional Response Teams established by the National Oil and Hazardous Substances Pollution Contingency Plan. Additionally, States can be reimbursed for costs incurred in the removal of oil and hazardous substances from U.S. waters, when these activities are conducted under the authority of a designated Federal On-Scene Coordinator.

26. A Coast Guard 44-foot steel motor lifeboat crew rescues a boatman near Lorain, Ohio.



26.

Information Services

Coast Guard research reports are included in the Maritime Research Information Service of TRISNET. All published RD&D reports are made available through NTIS.

For general marine safety information, the Office of Boating Safety publishes a Boating Safety Circular approximately six times a year. The circular is mailed to State and local governments, manufacturers, and dealers, and contains notices of proposed rulemaking and final rulemaking. It also includes explanatory and technical material on boating standards established under the Federal Boat Safety Act. The Act also establishes a Boating Safety Advisory Council with State officials constituting one-third of its membership.

Training

Sharing of knowledge in small boat technology is furthered through regional seminars on boating safety. In addition, special training is offered to both State and local marine police activities by the Coast Guard Boating and Safety School located at the Reserve Training Center, Yorktown, Virginia, and by the National Search and Rescue School operated at the Coast Guard Support Center, New York City. Boating safety training courses, including the latest techniques in signaling and boat maintenance, are offered to the general public throughout the country by local Coast Guard Auxiliaries.

The Coast Guard actively sponsors the diffusion of new knowledge pertaining to maritime technology by frequently sponsoring with industrial, academic, and other governmental groups technical conferences and symposia on matters of special interest. For example, since 1970, Coast Guard Headquarters has joined with the American Petroleum Institute and the U.S. Environmental Protection Agency to sponsor biennial conferences on "Prevention and Control of Oil Pollution." It also collaborates with the National Research Council to sponsor similar biennial conferences on "Transport of Hazardous Cargoes by Sea and Inland Waterways."

In addition, District Headquarters of the Coast Guard located in Boston, New York, Portsmouth (Virginia), Miami, New Orleans, St. Louis, Cleveland, San Diego, San Francisco, Seattle, Juneau, and Honolulu, maintain free film loan libraries on boating safety and related nautical topics.

The Coast Guard Research and Development Center at Groton, Connecticut has also served as a "center of expertise" in areas such as marine pollution technology, marine navigation technology, domestic and polar ice technology, maritime safety research, search and rescue technology, and marine traffic management. It is an active member of the Federal Laboratory Consortium for Technology Transfer, an informal network of 180 large Federal laboratories which assist in meeting public or private sector technology needs.

RD&D Programs

Technology diffusion by the Coast Guard is both vertical (helping States, localities, and industry apply federally developed systems, such as oil containment and recovery systems, Long Range Radio and Navigation (LORAN-C), and emergency position indicators), and horizontal (finding new uses for available technologies, such as solar-powered buoy battery packages, vessel traffic systems, and pollutant identification movement prediction techniques).

All technical reports resulting from Coast Guard R&D efforts are on file and available for purchase from NTIS. The document numbers and titles of these reports prior to 1975 can be found in *U.S. Coast Guard Reports, 1945-1974* published in July 1975, as NTIS Document AD-098 and its supplements.

Further Information and USCG Contacts

Other Coast Guard publications directly pertinent to technology sharing and available from the Public Information Division of the Coast Guard Headquarters are:

Document:

Directives, Publications and Reports Index, July 1974, CG-236.

Booklets:

United States Coast Guard—Ships, Planes, and Stations, CG-214, Public Information Division.

U.S. Coast Guard—Efforts in Research and Development.

Fact Sheet:

United States Coast Guard.

Serial Publications:

Proceedings of the Marine Safety Council (Monthly)

On Scene—The National Maritime SAR Review (6 Issues Yearly)

Engineer's Digest (Quarterly)

Boating Safety Newsletter (Quarterly)

Environmental Protection Newsletter (Quarterly)

Contacts in USCG:

Chief, Plans & Evaluation Staff —(202) 426-1030
Office of Research and Development
U.S. Coast Guard (G-DP/TP53)
Washington, D.C. 20590

Commanding Officer—(203) 445-8501
Coast Guard Research and Development Center
Avery Point
Groton, Connecticut 06340

Research and Special Programs Administration (RSPA)

The Research and Special Programs Administration is a newly formed agency incorporating the Materials Transportation Bureau (MTB), the Transportation Systems Center (TSC), and the Transportation Programs Bureau. This latter group administers a number of programs, including those of the DOT University Research Program and Transportation Safety Institute. Cutting across the jurisdictional lines of the operating administrations, RSPA serves as an advanced research, analysis, and technical development arm of DOT, and also conducts special programs as directed by Departmental management. Particular emphasis is given to intermodal research and development activities, including programs within the university community. RSPA is also the Department's focal point for research on safety, security, and transportation of hazardous materials.

Areas of Research

RSPA's Transportation Systems Center (TSC) located in Cambridge, Massachusetts, is involved in all fields of transportation research and development. It conducts research and analysis in transportation planning and socio-economic effects of transportation changes to support DOT policy formulation, and provides program management and technological support to the DOT operating administration activities. Particular efforts are made to resolve transportation system problems, and facilitate effective links between several modes of transportation. TSC develops and maintains a general statistical data base on transportation topics, and serves as an operational focal point for the Department's program to share transportation information and understanding with the transportation community. Particular emphasis in these sharing activities is placed on the needs of State and local governments.

Within RSPA the Transportation Programs Bureau develops, coordinates and manages those transportation programs related to transportation security, facilitation of cargo movement, advanced technology, navigation and communications, university research, and transportation safety and security training.

RSPA's Materials Transportation Bureau addresses mandates in the Hazardous Materials Transportation Safety Act of 1974, focusing on offshore pipelines and the siting of liquified natural gas facilities. MTB ranks RD&D priorities according to the current likelihood and frequency of accidents or loss of human life, health, and property in a given safety program area. Two top priority programs for hazardous materials are currently cargo tank safety and tank car (rail) safety. Liquid Natural gas (LNG) safety and highly volatile liquids pipeline safety are the current pipeline safety priority program areas.

Needs Determination Mechanisms

The research activities conducted by TSC for the Department's operating administrations take advantage of the needs material developed by each administration itself. RSPA also conducts special surveys in conjunction with the TSC technology sharing operations, and also reviews the general pattern of assistance requests to determine topics of particular interest.

One continuing area of concern is that of hazardous materials and pipeline transportation safety. The Materials Transportation Bureau issues an annual Regulatory Review and Development Plan and Schedule of Rulemaking Actions. MTB has a current backlog of 300 petitions, and receives annually 70 new petitions and proposals for substantive rulemaking actions. These proposals originate from carriers, shippers, pipeline operators, trade associations, State regulatory agencies, hazardous materials packaging and container manufacturers, DOT's own operating administrations, and interested members of the public. These petitions and proposals serve as significant input to the ordering of the MTB's planning and priority setting.

MTB also holds occasional hearings and conferences both within DOT and before Congress on such topics as tank car and tank truck integrity and hazardous materials in aircraft.

27. One of the top priorities of the Materials Transportation Bureau (MTB) is improving tank car safety.

27.

Technology Sharing

Direct Assistance

The Transportation Systems Center is also a member of the Federal Laboratory Consortium for Technology Transfer. It has expertise in a broad number of areas, including command and control technology, energy conservation, air and noise pollution and control, the technology of all modes of transportation, navigation, transportation safety, and transportation planning.

TSC also serves as one of DOT's main focal points for the sharing of data with State and local governments and, as appropriate, with private industry. For these users, TSC operates the OST-supported direct assistance toll free line referenced earlier which permits broad national access to needed transportation expertise. As necessary, TSC will assign its own staff to give on-site assistance in technology-related activities and analyses.

On topics related to hazardous materials, MTB has frequent contacts with State agency safety officials, industry personnel, and members of the public. The MTB field organization consists of five regional officials, whose principal function is to assure compliance with the Federal pipeline safety standards. These offices also facilitate direct communications with users throughout the country. In addition, MTB operates a "hotline" for hazardous materials information: (202) 426-9280. This center fields questions from government, industry, universities, the legal community, and the general public.

Each year MTB holds Federal/State Office of Pipeline Safety Regulation meetings which are linked to its grant program

28. Courses on hazardous materials and pipeline safety are offered at the Transportation Safety Institute.

Information Services

RSPA is functionally responsible for coordinating DOT's TRISNET system, including the Transportation Research Information Service (TRIS) on-line computer files, a network of regional document delivery centers, and a series of referencing agreements. Each DOT operating administration and element of OST provide information on new research projects it undertakes for input to the TRIS-on-line files. In addition, vast amounts of published transportation material are available through the TRISNET repository libraries. These regional centers, located in Cambridge, Massachusetts; Evanston, Illinois; and Berkeley, California also can provide a wide variety of services to the transportation community.

On topics related to hazardous materials, the Accident Analysis Branch of MTB compiles a computerized statistical data base on significant accidents in materials transportation. Requestors may obtain general statistical information on accidents and reports on specific accidents. This information has been used by industry, the general public, and State departments of transportation. TSC performs a follow up data analysis on this information.

MTB also publishes two current awareness tools at no cost, *The Pipeline Safety Advisory Bulletin* and the Office of Hazardous Materials' *OHM Newsletter* on hazardous materials regulation.

28.

Training

The Transportation Safety Institute (TSI), located at the FAA Aeronautical Center Facility in Oklahoma City, conducts safety training for all DOT operating administrations. Personnel from Federal agencies, State and local governments, industry, and foreign governments are also trained at the Institute. Specific course areas for development are established by TSI and the operating administrations based on evaluation of existing courses, operating administration perceptions of training needs, State and local government suggestions and comments, and new program initiatives.

Training is conducted through lectures, written material, discussion, motion pictures, and video and slide/tape presentations. There are usually opportunities to apply the information to practical situations through group or individual work projects.

A large number of TSI's trainees are typically State or local employees. This centralized training gives transportation safety personnel at all levels of government the basic knowledge and tools to perform specific tasks. In addition, centralized training permits standardization of training practices and procedures, and assures general compliance with DOT safety policy.

As part of MTB's programs, RSPA sponsors pipeline safety courses at TSI for state inspectors. Course offerings include safety evaluation of gas pipeline corrosion control systems (fundamental and advanced), safety evaluation of gas pipeline systems, failure and non-compliance investigative techniques, joining of natural gas pipeline systems, and pressure regulations and overpressure protection. Also conducted are a two-day industry seminar, and classes in LNG (liquid natural gas) and regulation compliance requirements for gas pipeline operators.

TSI also offers courses for RSPA in hazardous materials designed for Federal employees, but with some openings for State and industry personnel. Courses are conducted in the areas of air, motor, and rail transportation of hazardous materials.

Within MTB, periodic training seminars are held throughout the U.S. These seminars are intended to provide instruction and training on the transport of hazardous materials to shippers, carriers, freight forwarders, and Federal, State, and local government personnel. Seminars are either multimodal or single-mode oriented, ranging from one to four days' duration.

To disseminate information on hazardous materials, MTB answers questions from the public, and distributes training material abstracted from regulations in the form of pamphlets and training fact sheets. In more selective efforts, MTB has distributed the 87-page *Emergency Action Guide for Selected Hazardous Materials*, to local fire departments and others with the need to know.

MTB's Information Office also makes available a slide and tape program on the handling of hazardous materials and a free 23-minute film, *All Involved*, which describes the involvement of DOT's individual modal administrations in the safe handling of hazardous materials. Further, Federal personnel are called upon to lecture on various aspects of hazardous materials transportation at meetings and seminars sponsored by State and local agencies and scientific/technical associations.

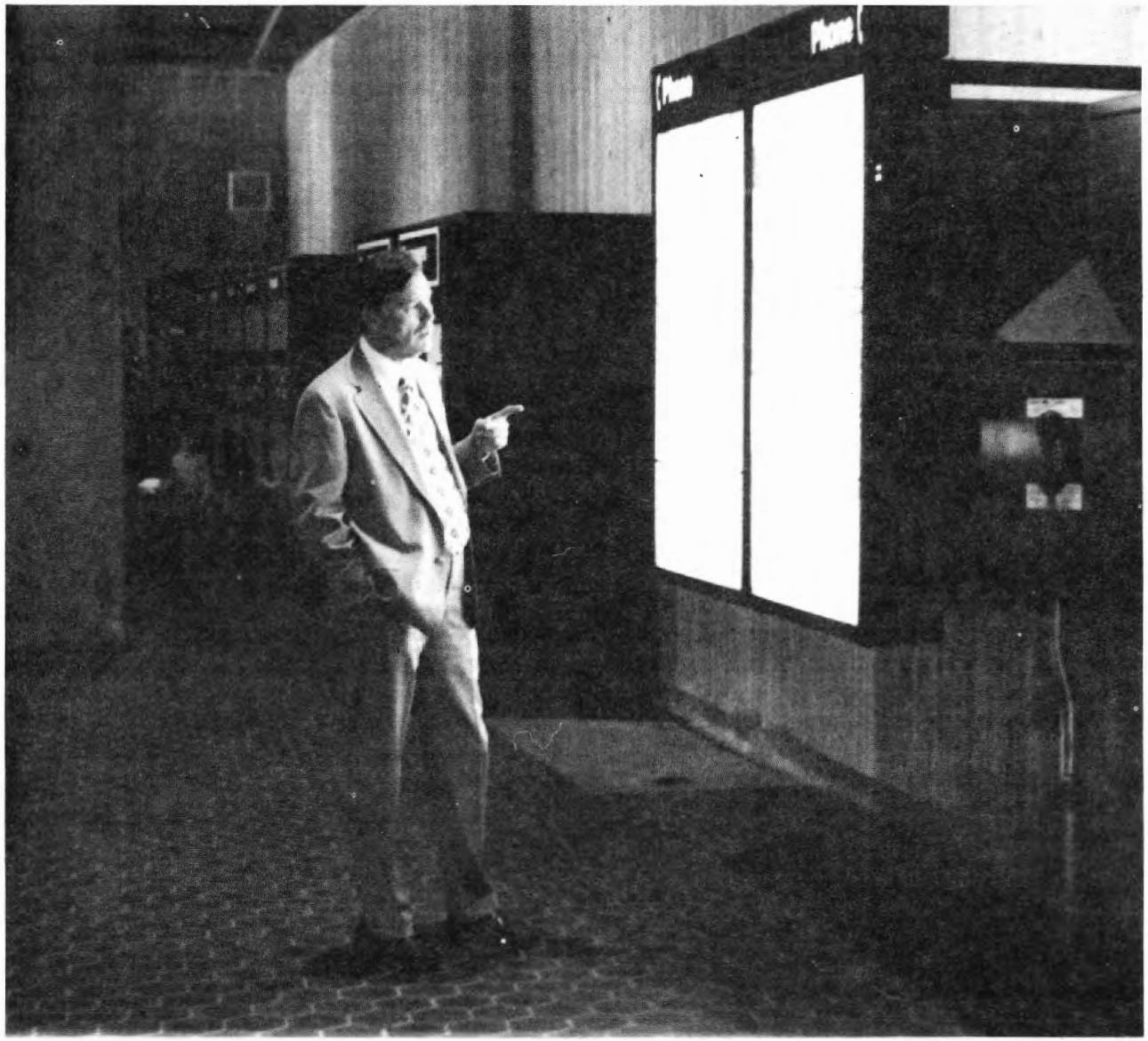
TSC also makes provision for bringing State and local people to Cambridge for training courses, seminars, and periods of residency on general transportation topics.

R&D Program

RSPA administers DOT's Program of University Research, which is designed to bring the resources of the higher education community to focus on transportation problems. The program also encourages greater involvement of colleges and universities with DOT, State and local governments, and the transportation industry. Since its inception in 1972, the Office of University Research has sponsored contracts in diverse areas of transportation research. Research is typically focused on a number of key problem areas each year, described in an annually updated solicitation document. Research results have been generated which are being applied in planning agencies, in private industry, and in DOT.

RSPA coordinates, on a multi-administration basis, new applications of the LORAN-C (Long Range Navigation) radio navigation system. LORAN-C, operated by the Coast Guard, has been used in marine application, and is now being demonstrated in land applications. It has been shown that LORAN-C can technically, operationally, and economically satisfy many precise position requirements for State and local governments. Assistance programs for the LORAN-C systems are active within the States of Tennessee, Kentucky, and New York, with one being developed for the State of Georgia.

29. RSPA's University Program has sponsored research on a wide variety of topics including design of transit terminals.



29.

In the safety area, current hazardous materials research and development programs in MTB are directed primarily into three areas:

1. classification of hazardous materials;
2. development of performance-oriented packaging criteria; and
3. support projects relating to safe transportation of hazardous materials.

Current pipeline safety research and development programs are directed toward specific problem areas such as the dispersion of gas clouds resulting from the release of liquefied natural gas on land surfaces.

Information Packages

The Transportation Systems Center makes available state-of-the art reports upon request to any State or local government representative. Surveys of State and local information needs are conducted by TSC to determine priority areas for development of technical documents.

Generally, reports listed in TRIS-on-line are available from NTIS. RSPA and the other operating administrations may also distribute some copies of these reports, or abstract summaries of them. The program of University Research has an especially active dissemination program.

Further Information and RSPA Contacts

For more detailed information on the programs described here, the following publications are available from the Research and Special Programs Administration, U.S. Department of Transportation, Washington, D.C. 20590:

University Research

Brochures:

Today's Research/Tomorrow's Transportation, Research and Special Programs Administration, Program of University Research (DPB-50).

Opportunities for Universities to Conduct Research Under the DOT Program of University Research, January 1979, Research and Special Programs Administration, Program of University Research (DPB-50).

Document:

Summary of Awards: FY1978 Program of University Research, October 1, 1978, Research and Special Programs Administration, Program of University Research (DPB-50).

Information Services

Document:

TRISNET: A Network of Transportation Information Services and Activities, June 1976, Assistant Secretary for Systems Development and Technology, Office of R&D Plans and Resources. Available from DPA-26 contact listed.

Hazardous Materials

Documents:

Eighth Annual Report of the Secretary on Hazardous Materials Control, Calendar Year 1977, DOT/RSPA/MTB-7813, Research and Special Programs Administration, Materials Transportation Bureau.

A Review of the Department of Transportation Regulations for Transportation of Radioactive Materials, October 1977, Materials Transportation Bureau, Office of Hazardous Materials Operations.

Emergency Action Guide for Selected Hazardous Materials, 1978, Research and Special Programs Administration and National Highway Traffic Safety Administration.

Newsletter:

Hazardous Materials Newsletter, periodically issued by the Research and Special Programs Administration, Materials Transportation Bureau.

Miscellaneous Training Sheets and Handout Materials: A series of training sheets, etc., used in conjunction with the regional training seminars sponsored by the Office of Hazardous Materials Operations are available from MTB on request.

Contacts in RSPA:

RSPA
Dr. Alex Hoshovsky
Research and Special Programs Administration, DPA-26
U.S. Department of Transportation
Washington, D.C. 20590
(202) 426-4211

MTB
Mr. Charles S. Loucks
Chief, Information Services Division, DMT-43
Materials Transportation Bureau
U.S. Department of Transportation
Washington, D.C. 20590
(202) 426-2301

TSC
Rudolph V. (Bud) Giangrande
Technology Sharing Program Office (TSC/151)
Transportation Systems Center
Kendall Square, Room 1132
Cambridge, Massachusetts 02142
(617) 494-2486

Office of University Research
Robert J. Ravera
Director, DPB-50
Office of University Research
U.S. Department of Transportation
Washington, D.C. 20590
(202) 426-0190

Saint Lawrence Seaway Development Corporation (SLSDC)

The Saint Lawrence Seaway Development Corporation (SLSDC) is a wholly owned Government enterprise responsible for the construction, development, operation, and maintenance of those parts of the Seaway between Montreal and Lake Erie within the territorial limits of the United States. It has approximately 200 employees and is financially self-supporting. SLSDC's operations are financed by the U.S. share of tolls and other charges assessed for the use of the Seaway facilities, which are managed by the Corporation and the St. Lawrence Seaway Authority of Canada.

As an operational and development-oriented organization, SLSDC conducts studies and planning efforts to support these responsibilities. In this capacity, SLSDC focuses on such areas as cargo origin-destination patterns in the Great Lakes region; analyses of world trade routes; and the relative effectiveness of proposed physical and operational improvements to increase system capacity and utilization, such as efforts to extend the navigation season.

For further information, the following publication is available from the Saint Lawrence Seaway Development Corporation, U.S. Department of Transportation, P.O. Box 520, Massena, NY 13662:

Document:

Saint Lawrence Seaway Development Corporation Annual Report

Contact in SLSDC:

Madelyn Pruski (315) 764-0271
Public Information Officer
Saint Lawrence Seaway Development Corporation
P.O. Box 520
Massena, New York 13662

Appendix A: DOT Grant and Financial Assistance Programs

Federal Highway Administration

Highway Research, Planning, and Construction

General

This program is designed to assist State highway departments in constructing the Interstate Highway System; building or improving Primary, Secondary, and Urban Systems of roads and streets; improving urban transportation capacity of highways; and increasing highway safety. Funding is primarily provided through the Highway Trust Fund, composed of revenues from various highway users' taxes. The funds may be used for planning, research, engineering, right-of-way acquisition, construction improvements, public transit facilities, roadside beautification, and rest areas, among other things.

Transit

Under certain conditions, funds previously earmarked for Interstate projects can be replaced by a like amount in general funds for rail and bus transit capital improvements. Urban System funds are also available for the purchase of buses and the construction, reconstruction, and improvement of rail transit facilities and purchase of rail and bus rolling stock. In addition, Trust Fund apportionments may be used for the construction of exclusive bus lanes, highway traffic control devices, bus passenger loading areas and facilities, and fringe and transportation corridor parking to serve mass transportation passengers.

Planning and Research

Two categories of funds are available to States for planning and research:

1. Highway Planning and Research funds (HPR)—equal to 1½ percent of the funds authorized for the Federal-aid systems.
2. Metropolitan Planning Funds (PL)—based on ½ percent of the funds authorized for the Federal-aid systems.

Highway Safety

In addition to the more generalized programs financed from the Trust Fund, specific categories of funds have been earmarked for safety programs protection of railroad-highway grade crossings, improvements at high-hazard accident locations, pavement marking, and repair and replacement of unsafe bridges.

For program information: contact regional or State offices of the Federal Highway Administration, State highway departments, or the Federal Highway Administration, U.S. Department of Transportation, Washington, D.C. 20590.

Non-Urbanized Transit Program

The Surface Transportation Assistance Act (STAA) of 1978 includes a formula grant program for public transportation in non-urbanized areas (that is, rural and small urban areas with populations under 50,000). Referred to as the Section 18 program, funds are allocated to the states based on the number of people who live in non-urbanized areas.

Funds may be used for capital and operating assistance by State agencies, nonprofit organizations, and operators of public transportation services. Ratios for assistance are up to 80 percent Federal and 20 percent local share for capital and administrative expenses, and up to 50 percent Federal and 50 percent local share for net operating expenses. Up to 15 percent of the State apportionment may be used for State administrative and technical assistance activities with the Federal share for these funds at 100 percent.

The Federal Highway Administration (FHWA), and the Urban Mass Transportation Administration (UMTA) will implement this program, jointly developing guidelines and regulations.

Contact:
Mr. Sheldon G. Strickland, Chief
Rural and Small Urban Public Transportation
Branch (HHP-31)
Federal Highway Administration
Washington, D.C. 20590
(202) 426-0153

Urban Mass Transportation Administration

Capital Improvement Grants

These assist State and local public agencies in providing adequate mass transportation—encouraging the application of new technology—and promoting transit improvement programs that are consistent with regional goals and objectives.

Federal funds are granted to assist in the acquisition, construction, reconstruction, and improvement of facilities and equipment for use in mass transportation service. Private transportation companies may participate through contractual arrangements with public agencies. Ratios for assistance are 80 percent Federal and 20 percent local matching share.

Loans

Capital improvement loans are made available to finance the acquisition, construction, reconstruction, and improvement of facilities and equipment for use in mass transportation service in urban areas. These are made only where no financial assistance is otherwise available.

Loans are also provided for the advance acquisition of real property to be used in planned mass transportation systems. Private transportation companies may participate through contractual arrangements with public agencies.

Technical Studies Grants

State and local public agencies are assisted in carrying out studies relating to management, operations, capital requirements, and economic feasibility—preparing engineering and architectural surveys, plans and specifications—and conducting similar activities in preparation for the construction, acquisition, or improved operation of mass transportation systems, facilities and equipment. Ratios for assistance are usually 80 percent Federal and 20 percent local matching share.

Research, Development and Demonstrations

RD&D projects are authorized to assist in reducing urban transportation needs, improving mass transportation services, or in meeting total needs at minimum cost.

The projects can be directed toward improving the state-of-the-art in hardware components, equipment, facilities and systems or for software, management and operational studies. They may be undertaken directly (in-house) or through contracts and grants. Grants generally have been limited to public and non-profit organizations.

Grants for University Research and Training

These are awarded to public and private non-profit institutions of higher learning to assist in establishing or continuing programs which combine professional training in urban transportation and related fields with inter-disciplinary research efforts. The purposes are to encourage the development of educational centers for transportation research and to help meet the industry's need for both specialists and generalists who are qualified to study and develop solutions for urban transportation problems.

Managerial Training Grants

Grants are made to public agencies to provide university fellowships for up to one year of advanced training for their selected employees. The awards are made with the cooperation of both public and private transit operation entities. Recipients are persons employed in managerial, technical, and professional positions within the urban transportation field.

The managerial training activity can vary from attendance at two-week summer seminars to a full year of graduate study. For additional information, a free copy of the booklet "Information for Applicants—Grants for Managerial Training for Urban Mass Transportation," may be obtained from the UMTA Office of Public Affairs.

For information on UMTA grant and assistance programs, contact any regional office or the Urban Mass Transportation Administration, Office of Public Affairs, U.S. Department of Transportation, Washington, D.C. 20590.

Federal Railroad Administration

Research and Development

FRA technological research has been redirected and more sharply focused on near and intermediate term conventional rail problems. RD&D activities have been separated into passenger and freight systems research to assure that unique industry needs are addressed. Mechanisms have been established to promote early incorporation of proven RD&D results into field use. The objective is to explore the potential of new technology to improve ground transportation and this is accomplished through the award of contracts for research, development, and demonstrations.

FRA economic and operations research is focused on programs to improve the industry structure, to improve freight car management and utilization, to improve labor/management relations, and to improve railroad operations and logistics.

Under the Federal Railroad Safety Act of 1970, the FRA was also charged with development of a comprehensive railroad research program to solve critical railroad *safety* problems. Research covers track structures, human factors, hazardous material handling, grade crossing protection, and track/train dynamics.

For information on railroad research activities, contact the FRA Office of Research and Development, Washington, D.C. 20590.

Railroad Safety

Under the Federal Railroad Safety Act of 1970, Federal matching funds are provided as grants-in-aid to the States for participation in the railroad safety inspection program. Its objectives are to promote safety in all areas of railroad operations, to reduce railroad-related accidents, to reduce deaths and injuries to persons, and to reduce property damage caused by accidents involving any carrier of hazardous materials.

A State may participate in investigative and surveillance activities if the safety practices are regulated by a certified State agency that has regulatory responsibility and meets certain conditions as prescribed by the Secretary of Transportation.

For information contact the Associate Administrator for Safety, Federal Railroad Administration, U.S. Department of Transportation, Washington, D.C. 20590.

Federal Aviation Administration

Aviation Education

This program provides professional assistance in developing aviation programs for educational institutions, from kindergarten through universities. Educators at all levels—local, county, city, State, regional, Federal, and international—are provided, upon request, with aviation education information and counseling services to assist them in developing programs. Also, citizens interested in furthering aviation education in their community are eligible to receive this material.

Numerous publications are available for educators and students, upon request, including curricula and teaching materials. Aviation education and safety motion pictures are available on loan at no charge. For more information about this program, write to any FAA facility, area or regional office, or to Aviation Education Programs Division, AGA-300, Federal Aviation Administration, U.S. Department of Transportation, Washington, D.C. 20591.

Planning Grant Program

The purpose of the planning program is to contribute toward the effective location and development of airports and the development of an adequate National Airport System Plan. Grants can be made to planning agencies for airport system planning and to public agencies for airport master planning. State, regional, and metropolitan planning agencies responsible for airport systems are eligible, as are State, county, municipal, and other public agencies working on airport master plans. The Federal share ranges from 75 to 90 percent of the cost of the planning project.

For more information concerning this program contact the Office of Airport Planning and Programming, Federal Aviation Administration, U.S. Department of Transportation, Washington, D.C. 20591 or any FAA district or regional office.

Airport Development Aid Program

This provides financial assistance for development of a nationwide airport system adequate to meet the present and future needs of civil aeronautics. Grants are for general airport development (land acquisition, construction, expansion, etc.) and for establishing and improving air navigation facilities.

State, county, municipal, and other public agencies are eligible provided their proposed projects are included in the National Airport System Plan, with specific funding determined by formula.

For more information concerning this program and the related application process contact: Office of Airport Planning and Programming, Federal Aviation Administration, U.S. Department of Transportation, Washington, D.C. 20591.

National Highway Traffic Safety Administration

State and Community Highway Safety Programs

These programs make available both technical guidance and financial assistance to the States and their political subdivisions for the development of comprehensive highway safety programs designed to reduce traffic accidents and the resulting deaths, injuries, and property damage. The programs are developed around the national highway safety standards for which NHTSA is responsible. (The highway-related standards—Identification and Surveillance of Accident Locations, Highway Design/Construction/Maintenance, Traffic Engineering Services, and the highway portion of Pedestrian Safety—are the responsibility of the Federal Highway Administration.)

Planning and Administration

Grant assistance is made available to State and key local governments to strengthen the planning and administrative functions of the agencies which are involved in driver performance and vehicle safety.

Federal funds are available from both NHTSA and FHWA for implementing approved programs based on the national standards. It is required that at least 40 percent of the Federal funds be expended by the State's political subdivisions. Each governor has the responsibility for administering this program in his/her State. Funds are made available through an annual grant agreement, supported by a highway safety plan, which outlines the activities to be taken during the fiscal year by State agencies and local jurisdictions and also provides a multi-year plan for future actions.

Research and Development Program

This program develops and provides a data base to support the development of technology to help States and communities modernize, improve and implement safety improvement. Research is planned and carried out to discover trends, identify problems, provide solutions and develop data to support near-term and future automotive and traffic safety standards.

The bulk of NHTSA research is performed by private industry and universities. NHTSA policy favors competitive procurement rather than the use of grants.

For additional information, contact the appropriate regional administrator or the National Highway Traffic Safety Administration, Associate Administrator for R&D, Washington, D.C. 20590.

Manpower Development

This program develops and produces training program resources for use in projects conducted by States and communities and trains instructors capable of utilizing previously developed training materials. It also provides special training and pilot programs in support of selected traffic safety program priorities and research fellowships.

For information contact State and local highway safety officials or the appropriate regional administrator, National Highway Traffic Safety Administration.

Research and Special Programs Administration

Natural Gas Pipeline Safety Program

This program provides Federal financial assistance in advancing natural gas pipeline safety. The recipient State agency cooperates with DOT in safety activities and responsibility for stringent safety standards. For program information contact the Chief, State Programs Division, Office of Pipeline Safety Operations,Materials Transportation Bureau, U.S. Department of Transportation, Washington, D.C. 20590.

University Research Contracts

The purpose of the Program of University Research is to assure that resources of the higher education community are effectively brought to bear on transportation problems and, in particular, on those problems related to national transportation policy.

Each year the Department identifies specific program areas that it wishes to solicit proposals on. Any accredited nonprofit institution of higher education may submit proposals to the Program of University Research but such proposals must address one of the identified research priority topics. Funding is provided through competitively awarded contracts.

For additional information contact Director, Office of University Research (DPB-50), 400 7th Street, S.W., Washington, D.C. 20590.

Appendix B: Intergovernmental Personnel Programs

DOT's participation in the Intergovernmental Personnel Act (IPA) was implemented in DOT Order 1230.3. This order sets forth the policy of personnel exchange and attendance of non-Federal Government personnel at Federal training courses in DOT.

Additional information on the provisions and use of the Intergovernmental Personnel Act is contained in the following publications, available from the U.S. Office of Personnel Management, Office of Intergovernmental Personnel Programs, P.O. Box 14184, Washington, D.C. 20044.

Booklets:

The Intergovernmental Personnel Act of 1970, Public Law 91-648, 91st Congress, January 5, 1971.

The IPA Intergovernmental Assignment Program, BIPP 152-64, Revised December 1977, U.S. Office of Personnel Management, Office of Intergovernmental Personnel Programs.

The Intergovernmental Personnel Act: Improving Public Service Delivery, BIPP 152-80, January 1978, U.S. Office of Personnel Management, Office of Intergovernmental Personnel Programs.

Guidelines for the IPA Grant Program, BIPP 151-1 (Revised), August 1976, U.S. Office Of Personnel Management, Office of Intergovernmental Personnel Programs.

IPA in Action: A Survey of Exemplary Grant Projects, BIPP 152-98, July 1978, U.S. Office of Personnel Management, Office of Intergovernmental Personnel Programs.

Contact for further information:

Mr. Robert S. Smith (202) 426-4088
Director of Personnel and Training, M-10
U.S. Department of Transportation
400 Seventh Street, S.W.
Washington, D.C. 20590

Appendix C: DOT Program Inventory and Analysis

To give some feel for the structure and historical levels of funding of the U.S. Department of Transportation's programs, the following appendix is provided. It contains tabular summaries of the programs for all the Secretarial offices and the operating elements of the Department broken down to the lowest level budget line items identified in the DOT Budget submissions to the Congress.

The Table is an excerpt from the document *Department of Transportation Research and Special Programs Administration (RSPA) Workbook: Fiscal Year 1979, DOT Program Analysis.* The complete document contains more detailed, element by element descriptions of the programs and their objectives. It is available on request to State and local governments by sending a self-addressed mailing label to this address:

Technology Sharing Program I-25
U.S. Department of Transportation
400 Seventh St., S.W.
Washington, D.C. 20590

PROGRAM STRUCTURE WITH OSTIS CLASSIFICATION

BUDGET LINE CODE	BUDGET LINE TITLE	DOLLARS IN $000 FY 76	76/77	FY 77	FY 78	FY 79
OFFICE OF THE SECRETARY OF TRANSPORTATION		41,417	14,251	42,671	44,251	45,800
1.	SALARIES AND EXPENSES	29,417	9,743	31,194	32,010	33,335
1.	GENERAL ADMINISTRATION/DEPARTMENTAL HEADQUARTERS	24,965	9,367	30,448	32,010	33,335
2.	REGIONAL RAIL REORGANIZATION (NORTHEAST CORRIDOR PROJECT)	4,452	376	746	0	0
2.	TRANSPORTATION PLANNING, RESEARCH AND DEVELOPMENT	11,952	4,480	11,143	12,241	12,465
1.	TRANSPORTATION POLICY AND PLANNING	10,459	4,042	6,673	11,873	11,015
A.	ECONOMIC VIABILITY OF THE TRANSPORTATION INDUSTRY	334	99	674	996	2,400
B.	RESEARCH TO IMPROVE SERVICE AND PRODUCTIVITY	553	489	208	762	2,060
C.	TRANSMODAL TRANSPORTATION PLANNING	4,766	1,011	1,979	5,072	1,565
1.	FEDERAL APPROACH TO INTERMODAL PLANNING	1,486	652	549	2,504	350
a.	NATIONAL PLANNING	276	0	448	1,788	350
b.	NATIONAL SYSTEM ASSESSMENT	1,210	652	101	399	0
c.	APPLICATION OF PERFORMANCE MEASURES	0	0	0	317	0
2.	REGULATORY BARRIERS TO INTERMODAL PLANNING	1,510	289	521	1,022	150
3.	DEVELOPMENT OF FEDERAL PORT POLICY AND DEEPWATER PORTS	0	0	272	480	425
4.	EMERGENCY IMPACT ANALYSIS AND FORECASTING	91	0	123	239	325
5.	POLICY INFORMATION/DATA BASE	1,679	70	514	827	315
D.	ENERGY CONSERVATION AND EFFICIENCY	1,574	1,010	610	1,400	1,175

BUDGET LINE CODE	BUDGET LINE TITLE	FY 76	TQ 76/77	FY 77	FY 78	FY 79
		DOLLARS IN $000				
E.	TRANSPORTATION SAFETY AND ENVIRONMENT	206	512	625	460	600
1.	TRANSPORTATION AND THE ENVIRONMENT	146	410	445	320	400
a.	TRANSPORTATION MEASURES TO ACHIEVE AND MAINTAIN AIR QUALITY	94	42	25	0	200
b.	TECHNICAL ASSISTANCE TO IMPROVE ENVIRONMENTAL ASSESSMENT PROCESS	15	27	100	242	100
c.	TRANSPORTATION OF THE HANDICAPPED AND ELDERLY	0	139	16	78	100
d.	BICYCLING	7	143	159	0	0
e.	COMPLETE EVALUATION OF URBAN CORRIDOR DEMONSTRATIONS	30	0	28	0	0
f.	ALTERNATIVE USES OF ABANDONED RR RIGHTS-OF-WAY	0	59	52	0	0
g.	HISTORIC PRESERVATION	0	0	65	0	0
2.	TRANSPORTATION SAFETY	60	102	180	140	200
a.	TRANSPORTATION SAFETY INFORMATION SYSTEM	60	102	130	104	135
b.	MASS TRANSIT SAFETY	0	0	0	0	15
c.	FIRE SAFETY TECHNOLOGY	0	0	50	36	50
F.	ADMINISTRATIVE COSTS	2,546	805	2,418	3,183	3,215
G.	IMPACT ANALYSIS (BART)	480	116	159	0	0
2.	SPECIAL PROGRAMS	1,493	438	4,470	368	1,450
A.	PROGRAM EVALUATION AND SYSTEM DEVELOPMENT	0	0	0	0	500
B.	TECHNOLOGY AND KNOWLEDGE SHARING	500	188	500	368	400
C.	STATE AND LOCAL LEVEL PLANNING	0	0	0	0	250
D.	SERVICES AND PRODUCTIVITY	0	0	0	0	100
E.	ADMINISTRATIVE COSTS	31	0	70	0	200
F.	NOISE ABATEMENT	962	250	900	0	0
1.	SURFACE TRANSPORTATION VEHICLE NOISE REDUCTION	625	160	600	0	0
2.	NOISE MEASUREMENT, INFORMATION AND ANALYSIS	337	90	300	0	0
G.	SOUTH BEND INDIANA DEMONSTRATION PROJECT	0	0	3,000	0	0
3.	TRANSPORTATION RESEARCH ACTIVITIES OVERSEAS	48	28	334	0	0
UNITED STATES COAST GUARD		1,040,089	305,289	1,265,133	1,455,350	1,484,467
1.	OPERATING EXPENSES	727,675	220,363	836,272	945,463	944,585
2.	ACQUISITION, CONSTRUCTION AND IMPROVEMENTS	131,046	22,325	228,861	238,800	289,700
3.	ALTERATION OF BRIDGES	6,554	1,625	10,900	15,100	15,100
4.	RETIRED PAY	122,158	32,742	139,181	157,800	173,500
5.	RESERVE TRAINING	31,738	10,530	35,638	40,560	39,000

BUDGET LINE CODE	BUDGET LINE TITLE	DOLLARS IN $000 FY 76	76/77	FY 77	FY 78	FY 79
6.	RESEARCH, DEVELOPMENT, TEST AND EVALUATION	12,306	5,097	19,488	22,888	20,000
1.	SEARCH AND RESCUE	238	527	987	1,525	900
a.	SEARCH AND RESCUE SYSTEMS	0	527	946	1,200	500
b.	COMMUNICATION SYSTEMS	238	0	41	325	400
2.	AIDS TO NAVIGATION	1,268	440	1,814	2,200	1,770
a.	SHORT RANGE AIDS TO NAVIGATION	60	140	973	900	800
b.	RADIO AIDS TO NAVIGATION	1,208	300	841	1,300	970
3.	MARINE SAFETY	2,828	2,133	5,685	5,915	3,950
a.	COMMERCIAL VESSEL SAFETY	841	613	2,113	3,500	2,390
b.	RECREATIONAL BOATING SAFETY	1,123	316	1,138	400	660
c.	PORT SAFETY AND SECURITY	864	1,204	2,434	2,015	900
1.	VESSEL TRAFFIC SERVICES	276	35	1,153	1,340	900
2.	FIREFIGHTING	294	15	181	75	0
3.	DEEPWATER PORTS	294	1,154	1,100	600	0
4.	MARINE ENVIRONMENTAL PROTECTION	3,019	667	4,778	5,829	5,500
a.	PREVENTION AND ENFORCEMENT	1,270	309	2,503	3,304	2,000
b.	RESPONSE	1,527	337	2,008	2,375	3,450
c.	ABATEMENT	222	21	267	150	50
5.	ENFORCEMENT OF LAWS AND TREATIES	0	0	0	120	190
a.	ENFORCEMENT OF LAWS AND TREATIES	0	0	0	120	190
6.	MARINE SCIENCE AND POLAR ICE OPERATIONS	150	35	244	645	480
a.	ICE OPERATIONS	150	35	169	495	380
b.	MARINE SCIENCE ACTIVITIES	0	0	75	150	100
8.	MULTIMISSION R&D	167	0	577	854	1,025
a.	BROAD PROGRAM RESEARCH	167	0	332	374	675
b.	ENERGY RESEARCH AND DEVELOPMENT	0	0	245	480	350
9.	RDT AND E ADMINISTRATION	4,636	1,295	5,403	5,800	6,185
7.	STATE BOATING SAFETY ASSISTANCE GRANT	6,071	786	6,474	5,790	3,000
8.	POLLUTION FUND	6,833	8,485	8,644	8,500	7,000
9.	COAST GUARD SUPPLY FUND	621	13	1,184	98	100
10.	COAST GUARD YARD FUND	-4,884	3,330	-21,513	20,269	-7,600
11.	COAST GUARD GENERAL GIFT FUND	7	2	4	30	30
12.	MISCELLANEOUS TRUST REVOLVING FUNDS	-36	-9	0	52	52

BUDGET LINE CODE	BUDGET LINE TITLE	DOLLARS IN $000 FY 76	76/77	FY 77	FY 78	FY 79
	FEDERAL AVIATION ADMINISTRATION	1,829,379	991,990	2,560,905	2,816,999	2,945,227
1.	OPERATIONS	1,566,683	415,492	1,735,450	1,905,977	2,010,305
1.	OPERATION OF TRAFFIC CONTROL SYSTEM	779,424	203,345	849,705	938,206	984,647
2.	INSTALLATION AND MATERIAL SERVICES	153,769	40,550	212,974	229,108	263,164
3.	MAINTENANCE OF TRAFFIC CONTROL SYSTEMS	400,014	108,805	433,148	478,052	497,521
4.	ADMINISTRATION OF FLIGHT STANDARDS PROGRAM	179,021	47,553	186,463	203,627	207,691
5.	ADMINISTRATION OF MEDICAL PROGRAM	10,210	2,734	10,984	11,804	12,321
6.	DEVELOPMENT DIRECTION	17,950	5,150	14,985	15,181	14,091
1.	PLANNING, DIRECTION AND EVALUATION	6,129	1,758	7,837	8,299	7,058
2.	CENTRALIZED TRAINING	91	29	20	19	19
3.	DIRECTION, STAFF AND SUPPORTING SERVICES	11,730	3,363	7,128	6,863	7,014
7.	ADMINISTRATION OF AIRPORTS PROGRAM	26,264	7,244	27,159	29,922	30,870
11.	FACILITIES AND EQUIPMENT	31	111	1	76	0
12.	ENGINEERING AND DEVELOPMENT	0	0	31	1	0
2.	FACILITIES, ENGINEERING AND DEVELOPMENT	11,382	3,567	18,886	19,663	19,411
1.	ENGINEERING AND DEVELOPMENT	10,792	3,174	18,536	18,363	16,445
a.	AIRCRAFT SAFETY	4,628	1,293	7,147	6,031	8,495
b.	AVIATION MEDICINE	1,122	444	1,844	2,242	2,000
c.	ENVIRONMENT	5,042	1,437	9,545	10,090	5,950
2.	FACILITIES AND EQUIPMENT	590	393	350	1,300	2,966
3.	OPERATIONS AND MAINTENANCE, METROPOLITAN WASHINGTON AIRPORTS	17,816	5,144	21,370	22,293	23,858
4.	CONSTRUCTION, METROPOLITAN WASHINGTON AIRPORTS	1,053	4,698	4,085	15,396	6,280
5.	GRANTS-IN-AID FOR AIRPORTS (AIRPORT AND AIRWAY TRUST FUND)	7,289	418,631	517,934	555,015	590,000
6.	FACILITIES AND EQUIPMENT (AIRPORT AND AIRWAY TRUST FUND)	157,326	126,741	201,911	211,432	220,000
1.	AIR ROUTE TRAFFIC CONTROL CENTERS	40,457	29,886	50,437	69,343	33,122
2.	AIRPORT TRAFFIC CONTROL FACILITIES	62,350	53,602	80,276	55,878	95,896
3.	FLIGHT SERVICE FACILITIES	10,634	15,506	14,478	20,364	16,071
4.	AIR NAVIGATION FACILITIES	21,687	18,292	31,652	45,917	49,025
5.	HOUSING, UTILITIES AND MISCELLANEOUS FACILITIES	10,482	9,155	16,646	10,700	17,136
6.	AIRCRAFT AND RELATED EQUIPMENT	10,984	0	5,914	3,230	7,450
7.	DEVELOPMENT, TEST AND EVALUATION FACILITIES	732	300	2,508	6,000	1,300
a.	BUILDINGS, CONSTRUCTION AND IMPROVEMENTS	0	0	128	5,700	1,000
b.	EQUIPMENT	732	300	2,380	300	300

BUDGET LINE CODE	BUDGET LINE TITLE	DOLLARS IN $000 FY 76	76/77	FY 77	FY 78	FY 79
7.	RESEARCH, ENGINEERING AND DEVELOPMENT	67,733	17,705	68.839	86,986	75,373
1.	AIR TRAFFIC CONTROL	41,170	11,748	51,329	62,936	58,949
1.	SYSTEM	5,748	1,348	6,844	10,194	9,619
2.	RADAR	0	0	0	503	0
3.	BEACON	4,226	3,009	10,847	11,475	9,873
5.	AIRCRAFT SEPARATION ASSURANCE	2,014	138	3,927	6,763	5,848
6.	COMMUNICATIONS	1,814	447	699	2,944	2,835
8.	AIRPORT/AIRSIDE	6,473	1,702	5,436	3,400	2,782
9.	AIRPORT/LANDSIDE	182	38	356	421	400
11.	ATC SYSTEM COMMAND CENTER AUTOMATION	762	119	460	210	658
12.	ENROUTE CONTROL	5,945	1,472	6,945	7,044	8,903
13.	FLIGHT SERVICE STATIONS	3,023	1,404	3,317	3,328	3,895
14.	TERMINAL/TOWER CONTROL	4,392	860	7,641	12,632	10,536
16.	TECHNOLOGY	730	154	248	2,027	1,800
17.	SATELLITES	4,740	1,010	2,167	443	0
21.	SUPPORT	1,121	47	2,442	1,552	1,800
2.	NAVIGATION	22,996	4,692	11,617	16,093	11,097
4.	NAVIGATION	2,424	672	1,776	2,836	2,400
7.	LANDING SYSTEMS	20,572	4,020	9,841	13,257	8,697
3.	AVIATION WEATHER	2,337	1,142	4,760	6,575	4,527
15.	WEATHER	2,337	1,142	4,760	6,575	4,527
4.	AVIATION MEDICINE	1,230	123	1,133	1,382	800
8.	CIVIL SUPERSONIC AIRCRAFT DEVELOPMENT TERMINATION	97	12	-7,570	0	0
9.	U.S. INTERNATIONAL AERONAUTICAL EXPOSITION	0	0	0	237	0
FEDERAL HIGHWAY ADMINISTRATION		4,689,183	1,699,186	7,249,650	8,169,703	8,064,150
A.	LIMITATION ON GENERAL OPERATING EXPENSES	128,143	48,142	156,676	175,758	172,465
1.	MANPOWER AND ADMINISTRATION	106,019	28,995	116,366	138,983	134,385
2.	DEMONSTRATION PROJECTS PROGRAM	2,373	594	2,550	2,775	2,830
A.	ENVIRONMENTAL PROTECTION AND ENERGY CONSERVATION	1,018	271	924	975	930
B.	HIGHWAY SAFETY	206	106	508	500	590
C.	ENGINEERING AND CONSTRUCTION	1,027	210	1,036	1,200	1,210
D.	CONSTRUCTION EFFICIENCY STUDIES	122	7	82	100	100

BUDGET LINE CODE	BUDGET LINE TITLE	DOLLARS IN $000 FY 76	76/77	FY 77	FY 78	FY 79
3.	CONTRACT PROGRAMS	19,751	18,553	37,760	34,000	35,250
A.	SKILL TRAINING	6,410	3,356	11,475	10,000	10,000
B.	HIGHWAY SAFETY RESEARCH & DEVELOPMENT	4,772	5,723	11,010	9,000	9,000
1.	SAFETY IN CONSTRUCTION AND MAINTENANCE ZONES AND MAINTENANCE OF SAFETY FEATURES	0	0	500	815	910
2.	TRAFFIC BARRIERS AND PROTECTIVE DEVICES	885	1,831	2,621	1,270	1,270
3.	SAFETY ASPECTS OF PAVEMENT CONDITION	0	0	825	750	600
4.	SAFETY ASPECTS OF INCREASED SIZE AND WEIGHT OF HEAVY VEHICLES	88	431	527	875	850
5.	RURAL HIGHWAY OPERATIONAL SAFETY IMPROVEMENTS	0	0	0	500	700
6.	IMPLEMENTATION OF RESULTS FROM SAFETY PROJECTS	509	1,378	2,198	780	320
7.	HIGHWAY SAFETY PROGRAM SUPPORT	129	0	235	195	450
8.	FEASIBILITY OF ADVANCED TECHNOLOGY FOR HIGHWAY SAFETY	0	0	0	0	370
9.	DETECTION AND COMMUNICATION FOR TRAFFIC SURVEILLANCE SYSTEMS	0	0	1,235	900	900
10.	ACCIDENT ANALYSIS AND SAFETY PROGRAM EFFECTIVENESS EVALUATION	0	0	0	1,335	1,150
11.	TRAFFIC AND PEDESTRIAN SAFETY IMPROVEMENTS	1,699	893	2,133	1,580	1,480
12.	COPING WITH ADVERSE ENVIRONMENTAL CONDITIONS	593	1,084	0	0	0
13.	DEALING WITH DISORDER IN FREEWAY TRAFFIC	829	106	0	0	0
14.	RAILROAD HIGHWAY GRADE CROSSING RESEARCH	40	0	0	0	0
15.	COMPLETED PROJECTS	0	0	736	0	0
C.	RESEARCH AND DEVELOPMENT HIGHWAYS	8,569	9,474	15,275	15,000	16,250
1.	NEW AND IMPROVED DESIGNS FOR BRIDGES AND FOUNDATIONS	0	0	0	650	1,125
2.	METROPOLITAN TRAFFIC MANAGEMENT SYSTEM	127	35	1,933	970	1,140
3.	HIGHWAY CONSTRUCTION AND MAINTENANCE TECHNOLOGY FOR IMPROVED PERFORMANCE AND ECONOMY	0	0	371	900	870
4.	IMPROVED OPERATIONAL EFFICIENCY OF FREEWAYS	727	684	977	825	940
5.	IMPROVING PLANNING METHODOLOGY	838	841	1,262	1,000	1,115
6.	IMPROVEMENT OF CONDITIONS IN SOIL MASSES AND FOUNDATIONS FOR HIGHWAY STRUCTURES	316	762	198	570	750
7.	IMPLEMENTATION OF RESULTS FROM COMPLETED HIGHWAY RESEARCH PROJECTS	2,197	462	700	965	310
8.	PROTECTION OF HIGHWAY STRUCTURES FROM NATURAL HAZARDS	312	973	813	1,050	1,000
9.	DEVELOPMENT AND EVALUATION OF POLICY AND PROGRAM ALTERNATIVES	0	0	0	350	325
10.	NEW CONCEPTS DEVELOPMENT AND SYSTEM CHARACTERIZATION	365	362	1,143	750	850
11.	RESEARCH AND DEVELOPMENT SUPPORT AND OVERHEAD	958	165	952	950	950
12.	USE OF WASTE PRODUCTS AND SUBSTITUTE MATERIALS IN HIGHWAYS	427	498	936	1,600	1,150
13.	POLLUTION REDUCTION AND IMPROVING THE HIGHWAY ENVIRONMENT	238	1,225	1,071	1,130	1,100

BUDGET LINE CODE		BUDGET LINE TITLE	FY 76	TQ 76/77	FY 77	FY 78	FY 79
			DOLLARS IN $000				
	14.	IMPROVED HIGHWAY PAVEMENTS	475	1,164	1,633	1,300	1,500
	15.	TUNNELING TECHNOLOGY FOR FUTURE HIGHWAYS	629	1,409	2,142	1,500	1,400
	16.	MEASURING AND IMPROVING SYSTEM PERFORMANCE	398	490	675	490	400
	17.	LIGHT DUTY ROADWAYS	0	0	0	0	525
	18.	IMPROVED TRAFFIC SIGNING AND MOTORIST INFORMATION SYSTEMS	0	0	0	0	300
	19.	INTERJURISDICTIONAL TRUCKING PROGRAM	0	0	0	0	500
	20.	DEVELOPMENT OF NEW TEST PROCEDURES & IMPROVED TESTING PROGRAMS	188	112	0	0	0
	21.	PRACTICALITY OF AUTOMATED HIGHWAY SYSTEMS	135	109	0	0	0
	26.	COMPLETED PROJECTS	0	0	469	0	0
	27.	DETECTION AND COMMUNICATION FOR TRAFFIC SURVEILLANCE SYSTEMS	239	183	0	0	0
B.		MOTOR CARRIER SAFETY	6,220	2,028	7,268	8,372	13,351
	1.	MOTOR CARRIER SAFETY OPERATIONS	5,324	1,383	5,913	6,753	7,261
	2.	CONTRACT PROGRAMS (MOTOR CARRIER SAFETY)	97	445	556	632	1,000
	3.	DEMONSTRATION PROGRAMS	0	0	0	0	4,000
	4.	MOTOR CARRIER SAFETY ADMINISTRATIVE SUPPORT	,799	200	799	987	1,090
C.		HIGHWAY BEAUTIFICATION	28,125	5,275	29,389	25,246	0
D.		HIGHWAY-RELATED SAFETY GRANTS	19,045	4,885	21,000	28,000	0
E.		RAILROAD-HIGHWAY CROSSINGS DEMONSTRATION PROJECTS	5,291	4,281	7,930	36,367	11,430
	1.	RAILROAD-HIGHWAY CROSSINGS DEMONSTRATION PROJECTS	3,510	4,084	2,699	25,000	11,430
	2.	RAIL CROSSING DEMONSTRATION PROJECTS	1,781	197	5,231	11,367	0
F.		TERRITORIAL HIGHWAYS	4,588	1,143	5,593	5,600	0
G.		DARIEN GAP HIGHWAY	-2,279	3,176	459	21,273	20,000
H.		ALASKA HIGHWAY	0	0	7,702	12,123	0
I.		OFF SYSTEM ROADS	53,166	25,951	108,564	252,978	100,000
J.		NATIONAL SCENIC & RECREATIONAL HIGHWAY	0	370	24,130	50,000	50,000
K.		ACCESS HIGHWAYS TO PUBLIC RECREATION AREAS ON LAKES	129	532	1,396	11,000	10,360
N.		FEDERAL-AID HIGHWAYS	4,531,586	1,625,073	6,965,006	7,578,835	7,800,000
O.		RIGHT-OF-WAY REVOLVING FUND	32,642	19,261	-24,201	24,858	0
P.		HIGHWAYS CROSSING FEDERAL PROJECTS	0	0	49,546	20,454	16,000
Q.		BALTIMORE-WASHINGTON PARKWAY	0	950	0	0	2,094
R.		OVERSEAS HIGHWAY	500	348	5,673	23,979	17,000
S.		MISCELLANEOUS TRUST FUNDS - DEMONSTRATION PROJECTS	0	0	12,671	34,579	0
T.		FEDERAL HIGHWAY ADMINISTRATION MISCELLANEOUS APPROPRIATIONS	6,768	3,274	4,748	8,201	0
U.		MISCELLANEOUS FHWA TRUST FUNDS	3,402	2,639	4,594	16,138	14,915
V.		ALASKA ROADS STUDY	0	0	0	200	0
X.		HIGHWAY PLANNING AND RESEARCH (RESEARCH PORTION)	18,900	4,250	17,000	17,000	17,000
Y.		BALANCING ENTRY (RESEARCH PORTION OF HP&R AND LIMITATION ON OPERATING EXPENSES)	-147,043	-52,392	-155,494	-181,258	-180,465

BUDGET LINE CODE	BUDGET LINE TITLE	DOLLARS IN $000 FY 76	76/77	FY 77	FY 78	FY 79
FEDERAL RAILROAD ADMINISTRATION		831,195	203,229	1,110,395	1,608,292	1,572,739
1.	OFFICE OF THE ADMINISTRATOR	5,821	1,696	5,140	7,817	9,215
2.	RAILROAD SAFETY	16,825	4,635	17,584	25,678	24,955
1.	SALARIES AND RELATED EXPENSES	10,920	3,564	12,307	14,075	14,790
2.	AUTOMATED TRACK INSPECTION PROGRAM	4,120	942	3,079	6,922	5,100
3.	GRANTS-IN-AID FOR RAILROAD SAFETY	613	68	705	1,920	2,740
4.	STANDARDS AND PROCEDURES	0	0	400	100	100
5.	DATA MANAGEMENT	0	0	460	600	700
6.	INFORMATION SUPPORT	775	0	616	1,061	525
7.	PLANNING AND EVALUATION	0	0	0	1,000	1,000
8.	FRA GRADE CROSSING INVENTORY	250	0	17	0	0
9.	OTHER PROGRAMS	147	61	0	0	0
3.	RAILROAD RESEARCH AND DEVELOPMENT	59,471	11,567	57,902	74,916	55,670
1.	ECONOMIC ANALYSIS	1,405	49	495	442	900
a.	INTERMODAL COMPETITIVE AND ENVIRONMENTAL ANALYSIS	0	0	0	0	800
b.	ECONOMIC IMPACT OF SAFETY REGULATIONS	0	0	0	0	100
c.	CARRIER FINANCIAL ANALYSIS	147	49	278	177	0
d.	COMMODITY SERVICE	1,258	0	217	265	0
2.	LABOR AND MANAGEMENT PRACTICES	372	272	507	382	1,500
3.	STATISTICAL SUPPORT	731	45	1,696	1,979	1,800
a.	RAILROAD NETWORK MODEL	400	45	969	1,350	1,000
b.	WAYBILL STATISTICS	331	0	727	629	500
c.	DATA BASE FOR RAIL CLASSIFICATION AND DESIGNATION	0	0	0	0	300
4.	FREIGHT CAR MANAGEMENT	4,578	621	3,214	2,649	2,750
a.	SYSTEMS ANALYSIS	359	164	350	1,209	495
b.	SYSTEMS DEVELOPMENT	4,219	457	2,864	1,440	2,255
5.	INDUSTRY ANALYSIS	2,582	1,142	3,369	4,850	1,000
a.	NATIONAL SYSTEM RESTRUCTURING	1,566	562	2,808	3,789	1,000
b.	COST ANALYSIS	1,016	580	561	1,061	0
6.	IMPROVED RAIL FREIGHT SERVICE	2,770	640	5,299	9,740	7,460
a.	DYNAMIC ANALYSIS AND EVALUATION	465	0	1,385	1,467	2,150
b.	SYSTEMS ANALYSIS/TECHNOLOGY ASSESSMENT	667	279	349	696	450
c.	CLASSIFICATION YARD TECHNOLOGY	300	117	779	935	560
d.	EQUIPMENT PERFORMANCE ANALYSIS	969	106	964	2,136	1,800
e.	ENERGY/ENVIRONMENT	0	0	613	1,487	650
f.	ELECTRIFICATION	0	0	583	1,367	1,350
g.	INTERMODAL SYSTEM TECHNOLOGY	369	138	626	1,652	500

BUDGET LINE CODE	BUDGET LINE TITLE	FY 76	TQ 76/77	FY 77	FY 78	FY 79
		DOLLARS IN $000				
7.	IMPROVED PASSENGER SYSTEMS	6,628	654	4,274	2,029	1,900
a.	IMPROVED PASSENGER SERVICE	3,239	0	2,233	1,066	1,650
b.	ADVANCED TECHNOLOGY	115	0	48	281	50
c.	PROPULSION TECHNOLOGY	3,274	654	1,993	682	200
8.	SAFETY RESEARCH	7,192	60	4,337	7,719	7,370
a.	ROLLING STOCK SAFETY	5,379	25	3,786	2,211	3,720
b.	HUMAN FACTORS	1,536	35	770	1,939	3,250
c.	GRADE CROSSING SAFETY	277	0	-219	3,569	400
9.	IMPROVED TRACK, INSPECTION AND DATA ACQUISITION TECHNOLOGY	9,189	3,460	5,235	9,187	9,420
a.	IMPROVED TRACK STRUCTURE RESEARCH	6,916	1,705	4,360	6,146	7,070
b.	INSPECTION AND TEST SUPPORT SERVICES	2,273	1,755	875	3,041	2,350
10.	TRANSPORTATION TEST CENTER (TTC)	8,933	1,209	16,992	17,284	15,950
11.	ADMINISTRATION	4,152	1,123	5,628	5,389	5,620
12.	INTERMODAL FREIGHT SYSTEM DEMONSTRATION	180	56	2,053	8,586	0
a.	SYSTEM DEMONSTRATION SERVICE	180	56	2,053	8,586	0
13.	TUNNELING TECHNOLOGY	375	0	0	0	0
14.	RAIL DYNAMICS LABORATORY	3,693	1,356	3,182	17	0
15.	NORTHEAST CORRIDOR DEVELOPMENT	6,426	490	998	441	0
16.	WEST COAST CORRIDOR DEVELOPMENT	0	390	110	0	0
17.	WASHINGTON UNION STATION- MODEL INTERMODAL TERMINAL	265	0	0	1,235	0
18.	INTERMODAL PASSENGER TERMINAL PLANNING	0	0	513	2,987	0
4.	RAIL SERVICE ASSISTANCE	379,618	47,856	35,771	144,516	87,210
1.	RAIL SERVICE CONTINUATION SUBSIDIES	3,428	41,470	28,174	119,677	67,000
2.	MINORITY BUSINESS RESOURCE CENTER	0	48	2,414	14,288	10,600
3.	OTHER ADMINISTRATION	92	88	4,303	10,551	9,610
a.	SALARIES AND EXPENSES	0	88	3,701	4,023	3,830
b.	CONTRACTUAL SUPPORT	92	0	167	3,306	4,260
1.	STATE RAIL PROGRAM	0	0	0	350	300
2.	STATE SAFETY PROGRAM	0	0	10	310	100
3.	RAIL FREIGHT ASSISTANCE	0	0	162	1,461	1,800
4.	AMTRAK ANALYSIS	92	0	-5	1,185	1,360
5.	CONRAIL STUDIES	0	0	0	0	700
c.	ALLOCATION TO UMTA	0	0	0	0	70
d.	ALLOCATION TO FHWA	0	0	415	2,742	1,450
e.	WASHINGTON UNION STATION MODEL INTERMODAL TERMINAL	0	0	20	480	0

BUDGET LINE CODE	BUDGET LINE TITLE	DOLLARS IN $000 FY 76	76/77	FY 77	FY 78	FY 79
4.	INTERIM OPERATING ASSISTANCE	72,097	6,250	0	0	0
5.	PAYMENTS FOR USRA OBLIGATIONS	304,001	0	880	0	0
5.	NORTHEAST CORRIDOR IMPROVEMENT	0	20,853	203,145	426,002	455,000
7.	GRANTS TO THE NATIONAL RAILROAD PASSENGER CORPORATION	359,888	114,381	727,631	664,500	660,000
9.	ALASKA RAILROAD REVOLVING FUND	9,572	2,241	5,342	2,743	1,769
10.	RAILROAD REHABILITATION AND IMPROVEMENT FINANCING FUNDS	0	0	57,880	262,120	278,920
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION		159,288	49,982	209,208	252,338	254,745
1.	TRAFFIC AND HIGHWAY SAFETY	58,349	24,874	80,208	80,338	82,745
1.	RULEMAKING PROGRAMS	3,392	1,138	3,636	4,645	5,995
A.	SALARIES AND SUPPORTING EXPENSES	2,592	586	2,684	3,555	3,555
B.	CONTRACT PROGRAM	800	552	952	1,090	2,440
1.	QUICK REACTION TESTING	521	262	555	400	400
2.	COST AND LEAD TIME ANALYSIS	0	201	204	100	100
3.	SUPPORT ENGINEERING SYSTEMS	110	89	175	100	100
4.	TITLE I (BUMPER STANDARDS)	55	0	0	340	340
5.	TITLE II (AUTOMOTIVE CONSUMER INFORMATION STUDY)	114	0	18	150	1,500
2.	ENFORCEMENT PROGRAMS	6,070	2,442	8,337	9,829	9,452
A.	SALARIES AND SUPPORTING EXPENSES	2,489	563	2,577	3,419	3,419
B.	CONTRACT PROGRAM	3,581	1,879	5,760	6,410	6,033
1.	STANDARDS ENFORCEMENT	2,951	1,509	4,684	5,600	5,223
2.	DEFECTS INVESTIGATION	630	370	1,076	700	700
3.	TITLE IV ODOMETER ENFORCEMENT	0	0	0	110	110
3.	TRAFFIC SAFETY PROGRAMS	13,508	6,645	13,892	12,264	10,660
A.	SALARIES AND SUPPORTING EXPENSES	3,826	865	3,962	4,148	2,544
B.	CONTRACT PROGRAM	9,682	5,780	9,930	8,116	8,116
1.	ADVANCED ALCOHOL COUNTERMEASURES	379	804	1,872	450	1,200
2.	COUNTERMEASURE SUPPORT	597	671	254	300	225
3.	PUBLIC EDUCATION	121	631	261	225	1,200
4.	IMPROVEMENT OF STATE PROGRAM MANAGEMENT CAPABILITY	504	429	879	810	150
5.	STATE VEHICLE PROGRAM	0	165	170	100	66
6.	ENFORCEMENT SYSTEMS	111	150	814	2,080	870
7.	YOUNG DRIVER SAFETY PROGRAMS	235	1,121	1,000	1,400	1,200
8.	PEDESTRIAN SAFETY PROGRAMS	311	76	804	280	335
9.	EMERGENCY MEDICAL SERVICE	800	296	625	325	370

BUDGET LINE CODE	BUDGET LINE TITLE	FY 76	DOLLARS IN $000 76/77	FY 77	FY 78	FY 79
10.	STATE RECORDS AND INFORMATION SYSTEMS	187	601	808	850	860
11.	NATIONAL DRIVER REGISTER	312	43	848	1,200	1,640
12.	ALCOHOL SAFETY ACTION PROJECT (ASAP)	4,372	524	0	0	0
14.	TRAFFIC AND SAFETY RESEARCH (HIGHWAY SAFETY STUDIES)	92	9	0	0	0
15.	SYSTEMS OPERATION	231	129	256	96	0
16.	(DIAGNOSTIC INSPECTION)	1,430	131	1,339	0	0
4.	RESEARCH AND ANALYSIS	23,865	11,534	41,686	39,318	41,841
A.	SALARIES AND SUPPORTING EXPENSES	4,470	1,012	4,630	6,276	5,976
B.	CONTRACT PROGRAM	19,395	10,522	37,056	33,042	35,865
1.	MOTOR VEHICLE RESEARCH	12,807	4,492	15,442	12,315	14,015
a.	CRASH SURVIVABILITY	3,463	2,135	4,858	3,550	3,566
1.	VEHICLE STRUCTURES	776	620	1,974	900	1,100
2.	OCCUPANT PACKAGING	593	921	915	750	850
3.	BIOMECHANICS	2,094	594	1,969	1,900	1,616
b.	HEAVY DUTY VEHICLE RESEARCH	0	0	0	0	1,050
c.	OPERATING SYSTEMS	901	1,082	1,922	1,300	1,140
1.	ELECTROMAGNETIC INTERFERENCE/COMPATIBILITY	92	70	161	150	120
2.	VEHICLE HANDLING	428	522	1,410	700	610
3.	BRAKING	287	415	231	450	410
4.	SUPPORT FUNCTIONAL SYSTEMS	94	75	120	0	0
d.	TIRES	722	128	654	165	480
e.	INTEGRATED VEHICLE SYSTEMS/RESEARCH SAFETY VEHICLE	7,009	310	6,121	5,400	6,300
f.	DRIVER-VEHICLE INTERACTION	256	608	780	700	700
g.	VEHICLES-IN-USE	226	139	470	100	83
h.	AUTOMOTIVE RECORDER RESEARCH	35	0	351	800	317
i.	SCHOOL BUS SAFETY	195	90	286	300	129
j.	TRUCK RIDE QUALITY	0	0	0	0	250
2.	TRAFFIC SAFETY RESEARCH	2,234	1,661	5,238	4,250	3,738
a.	DRUGS AND ALCOHOL RESEARCH AND TEST	843	550	1,008	1,750	1,488
b.	DRIVER/PEDESTRIAN FACTORS	1,215	1,111	3,802	2,400	2,250
1.	VEHICLE OPERATOR EDUCATION AND IMPROVEMENT	180	152	421	232	232
2.	DRIVER LICENSING	230	193	865	420	320
3.	MOTORCYCLIST AND MOTOR DRIVEN CYCLIST SAFETY	128	152	375	250	200
4.	PEDESTRIAN SAFETY AND BICYCLIST SAFETY RESEARCH	335	327	1,013	834	834

BUDGET LINE CODE	BUDGET LINE TITLE	DOLLARS IN $000 FY 76	76/77	FY 77	FY 78	FY 79
5.	SAFETY BELT USAGE	123	106	678	265	265
6.	SAFE DRIVING CONFORMANCE RESEARCH	219	181	450	399	399
c.	ADVANCED INSPECTION TECHNIQUES	176	0	428	100	0
3.	RESEARCH AND DEVELOPMENT	4,221	2,869	10,644	9,145	9,218
a.	NATIONAL ACCIDENT DATA COLLECTION PROGRAM	1,608	1,790	6,876	4,755	5,800
b.	SPECIFIC RULEMAKING SUPPORT PROGRAM	17	486	1,049	2,012	1,020
c.	MANAGEMENT AND SUPPORT PROGRAM	2,596	593	2,719	2,378	2,398
4.	AUTOMOTIVE FUEL ECONOMY RESEARCH	0	1,500	5,732	7,332	8,894
a.	ENERGY RESEARCH ENGINEERING	0	1,118	4,274	3,100	3,912
b.	ENERGY RESEARCH STANDARDS ANALYSIS	0	0	0	1,300	1,300
c.	ENERGY RESEARCH SYSTEMS ANALYSIS	0	44	165	1,050	1,150
d.	ENERGY RESEARCH ECONOMIC ANALYSIS	0	130	498	1,150	1,400
e.	ENERGY RESEARCH MARKET ANALYSIS	0	208	795	732	1,132
5.	ENGINEERING FACILITY	133	0	0	0	0
5.	GENERAL ADMINISTRATION	11,514	3,115	12,657	14,282	14,797
A.	SALARIES AND SUPPORTING EXPENSES	11,174	2,527	11,571	12,053	12,053
B.	CONTRACT PROGRAM	340	588	1,086	2,229	2,744
1.	PROGRAM DIRECTION AND COORDINATION	34	320	742	1,429	1,819
a.	COMMITTEE ON THE CHALLANGES OF MODERN SOCIETY	25	0	7	15	15
b.	COST AND COST EFFECTIVENESS	9	83	672	100	100
c.	COMPLIANCE REVIEWS	0	0	0	100	100
d.	PROGRAM EVALUATION	0	237	0	1,214	1,354
e.	CITIZENS PARTICIPATION FOR RULEMAKING	0	0	63	0	250
2.	STAFF AND ADMINISTRATION SUPPORT (CENTRALIZED COMPUTER SUPPORT)	306	268	344	800	925
2.	STATE AND COMMUNITY HIGHWAY SAFETY	100,939	25,108	129,000	172,000	172,000
URBAN MASS TRANSPORTATION ADMINISTRATION		1,919,768	569,338	2,406,484	3,154,000	2,896,900
1.	CAPITAL FACILITIES GRANTS	1,091,404	246,990	1,250,000	1,400,000	1,400,000
2.	FORMULA GRANTS	390,261	52,102	621,619	775,000	850,000
3.	TECHNICAL STUDIES	38,102	9,647	43,192	55,000	55,000
4.	RESEARCH, DEVELOPMENT AND DEMONSTRATION	48,605	17,181	58,873	67,500	68,000

BUDGET LINE CODE	BUDGET LINE TITLE	DOLLARS IN $000 FY 76	76/77	FY 77	FY 78	FY 79
A.	TECHNOLOGY DEVELOPMENT AND DEPLOYMENT	30,127	9,196	36,523	43,600	42,600
1.	BUS AND PARATRANSIT TECHNOLOGY	4,707	1,048	7,059	6,800	9,200
a.	BUS TECHNOLOGY	2,220	548	2,480	2,600	5,700
1.	TRANSBUS PRODUCT SUPPORT	0	0	0	200	700
2.	ARTICULATED TRANSBUS	0	0	100	100	1,000
3.	HEAVY DUTY SMALL TRANSIT BUS	0	0	0	200	400
4.	BUS SUPPORTING TECHNOLOGY AND PRODUCT QUALIFICATION	440	248	870	600	1,100
5.	COMPLETED WORK	0	0	35	0	0
6.	ADVANCED, AREA COVERAGE AUTOMATED VEHICLE MONITORING (AVM)	1,500	300	1,475	1,500	2,000
7.	ONBOARD DATA COLLECTION SYSTEMS	0	0	0	0	500
8.	TRANSBUS	280	0	0	0	0
b.	PARATRANSIT TECHNOLOGY	2,267	500	3,302	2,860	2,000
1.	PARATRANSIT VEHICLE DEVELOPMENT	377	0	1,049	1,000	0
3.	PARATRANSIT INTEGRATION	1,890	500	2,253	1,860	2,000
c.	ENERGY AND PROPULSION TECHNOLOGY	220	0	1,277	1,340	1,500
1.	FLYWHEEL ENERGY STORAGE SYSTEMS	220	0	910	1,140	1,000
2.	BATTERY BUS APPLICATIONS	0	0	367	0	0
3.	GAS TURBINE URBAN BUS	0	0	0	200	500
2.	URBAN RAIL TRANSIT TECHNOLOGY	13,949	5,026	13,742	14,000	14,600
a.	RAIL RAPID	10,059	1,884	5,924	5,250	5,300
1.	ADVANCED CONCEPT TRAIN (ACT-1)	5,663	1,018	2,206	1,378	700
2.	STATE-OF-THE-ART CAR	500	0	357	0	0
3.	ADVANCED SUBSYSTEM DEVELOPMENT	3,646	866	2,847	1,722	535
4.	SUBSYSTEM TECHNOLOGY APPLICATIONS	0	0	0	1,325	2,365
5.	NATIONAL GUIDELINES AND STANDARDS	250	0	514	825	700
6.	PRODUCT INTRODUCTION	0	0	0	0	1,000
b.	COMMUTER RAIL	0	0	0	500	100
1.	ACCESSIBILITY TO THE ELDERLY AND HANDICAPPED	0	0	0	0	100
2.	GT/E CAR TEST AND EVALUATION	0	0	0	500	0
c.	LIGHT RAIL	300	0	263	0	200
1.	SLRV TEST AND EVALUATION	190	0	246	0	0
2.	WHEELCHAIR ELEVATOR	110	0	17	0	200
d.	URBAN RAIL SUPPORTING TECHNOLOGY	3,590	3,142	7,555	8,250	9,000

BUDGET LINE CODE	BUDGET LINE TITLE	DOLLARS IN $000 FY 76	76/77	FY 77	FY 78	FY 79
1.	GENERAL ENGINEERING SUPPORT	1,025	306	1,118	650	700
2.	TRANSPORTATION TEST CENTER (PUEBLO)	1,040	2,411	2,606	2,925	2,000
3.	NOISE ABATEMENT TECHNOLOGY	265	50	575	650	1,100
4.	TRACK STRUCTURES AND WAYSIDE TECHNOLOGY	0	0	390	750	1,000
5.	UNDERGROUND CONSTRUCTION TECHNOLOGY	1,095	275	2,036	2,000	2,000
6.	SAFETY AND RELIABILITY TECHNOLOGY	165	100	760	800	1,200
7.	VALUE ENGINEERING	0	0	70	475	1,000
3.	NEW SYSTEMS AND AUTOMATION	9,943	2,833	13,798	19,450	15,500
a.	AUTOMATED GUIDEWAY TRANSIT	9,647	2,833	13,798	18,773	14,300
1.	AGT SOCIO-ECONOMIC RESEARCH	487	648	964	750	800
2.	AUTOMATED GUIDEWAY TRANSIT TECHNOLOGY	3,660	485	2,820	1,523	2,000
3.	ADVANCED GROUP RAPID TRANSIT (GRT)	3,000	1,500	5,093	9,525	8,000
4.	DOWNTOWN PEOPLE MOVER (DPM)	1,000	200	2,921	1,975	3,500
5.	AIRTRANS UPGRADING	0	0	2,000	5,000	0
6.	MORGANTOWN (PRT)	1,500	0	0	0	0
b.	OTHER	296	0	0	677	1,200
1.	ACCELERATING WALKWAY DEMONSTRATION	200	0	0	677	1,200
2.	COMPLETED WORK	96	0	0	0	0
4.	SAFETY AND PRODUCT QUALIFICATION	1,072	60	784	1,300	1,400
a.	PROGRAM SUPPORT	745	35	375	750	800
b.	TRANSIT SAFETY AND ASSURANCE TRAINING	177	10	163	200	200
c.	TRANSIT MATERIALS FIRE SAFETY STANDARDS	0	0	146	175	250
d.	PROGRAM PLANNING SUPPORT	0	0	100	75	100
e.	SAFETY RESEARCH PROJECTS	150	15	0	100	50
5.	SYSTEM STUDIES, SUPPORT AND DEVELOPMENT	456	229	1,140	1,050	1,400
6.	COOPERATIVE TRANSIT RESEARCH AND DEVELOPMENT	0	0	0	1,000	500
B.	SERVICE AND METHODS DEMONSTRATIONS	2,803	5,642	14,000	15,500	16,500
1.	CONVENTIONAL TRANSIT SERVICE INNOVATIONS	500	1,000	3,600	4,000	5,450
2.	PARATRANSIT INNOVATIONS	517	3,142	4,250	4,500	4,000
3.	PRICING POLICY	500	0	2,500	3,250	4,750
4.	TRANSPORTATION DISADVANTAGED	1,086	1,500	3,500	3,750	2,300
5.	SUPPORT ACTIVITIES	200	0	150	0	0
C.	PLANNING METHODOLOGY AND TECHNICAL SUPPORT	2,560	872	3,200	3,250	3,200
D.	POLICY DEVELOPMENT AND PROGRAM EVALUATION	2,320	652	2,200	2,150	2,200
1.	POLICY DEVELOPMENT	658	162	505	655	655
2.	PROGRAM EVALUATION	1,373	295	1,350	1,095	1,145
3.	POLICY RESEARCH	289	195	345	400	400

BUDGET LINE CODE	BUDGET LINE TITLE	FY 76	TQ 76/77	FY 77	FY 78	FY 79
		DOLLARS IN $000				
E.	MANAGEMENT TECHNIQUES AND METHODS (DEVELOPMENT AND DEMONSTRATION)	3,295	819	2,950	3,000	3,500
1.	OPERATIONS AND MAINTENANCE	1,882	170	905	1,000	1,150
2.	MANAGEMENT AND MARKETING	991	558	860	935	950
3.	HUMAN RESOURCES DEVELOPMENT	397	91	1,040	950	1,000
4.	INFORMATION DISSEMINATION	25	0	145	115	400
a.	TRIS SUPPORT	0	0	114	115	125
b.	INFORMATION SEMINARS AND TECHNICAL SUPPORT	0	0	0	0	275
c.	UMTRIS IMPLEMENTATION	25	0	31	0	0
F.	BICENTENNIAL DEMONSTRATION (WASHINGTON D.C.)	7,500	0	0	0	0
5.	MANAGERIAL TRAINING GRANTS	413	303	500	500	500
6.	UNIVERSITY RESEARCH AND TRAINING GRANTS	663	1,417	2,023	2,000	2,000
7.	CAPITAL FACILITIES LOANS	816	0	0	0	0
8.	ADMINISTRATIVE EXPENSES	11,863	2,610	14,608	20,000	21,400
9.	INTERSTATE TRANSFER GRANTS	337,641	215,408	409,448	789,000	500,000
11.	COMMUTER RAIL OPERATING SUBSIDIES	0	23,400	5,521	45,000	0
12.	FARE FREE MASS TRANSPORTATION	0	280	700	0	0
SAINT LAWRENCE SEAWAY DEVELOPMENT CORPORATION		-1,398	-1,240	-886	-968	-1,464
1.	ADMINISTRATIVE EXPENSES PROGRAM	942	245	1,018	1,066	1,280
2.	OPERATIONS PROGRAM	3,283	832	4,216	4,446	4,992
3.	REPLACEMENTS AND IMPROVEMENTS PROGRAM	736	459	1,510	1,250	1,764
a.	SEASON EXTENSION AND RELATED EQUIPMENT AND STRUCTURES	200	0	550	815	812
b.	LOCK IMPROVEMENTS, MODIFICATIONS AND EQUIPMENT	536	459	960	435	952
4.	OFFSETTING RECEIPTS	-6,359	-2,776	-7,630	-7,730	-9,500
RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION		24,441	6,013	19,323	21,935	24,420
1.	OPERATIONS	3,286	794	3,035	8,505	10,670
2.	RESEARCH AND DEVELOPMENT	19,295	5,198	14,029	10,984	10,910
1.	MATERIALS TRANSPORTATION BUREAU	1,000	12	814	1,524	875
A.	OFFICE OF HAZARDOUS MATERIALS OPERATIONS	432	6	270	525	525
1.	SYSTEMATIC REEVALUATION OF THE HAZARDOUS MATERIALS REGULATORY CLASSIFICATION SYSTEMS	218	0	0	248	300

BUDGET LINE CODE	BUDGET LINE TITLE	FY 76	DOLLARS IN $000 76/77	FY 77	FY 78	FY 79
2.	PERFORMANCE-ORIENTED PACKAGING SPECIFICATIONS	167	0	118	112	125
3.	SAFE TRANSPORTATION SUPPORT PROGRAMS	23	0	146	25	100
4.	MISCELLANEOUS RD&D	24	0	6	140	0
5.	ADMINISTRATIVE COST	0	6	0	0	0
B.	OFFICE OF PIPELINE SAFETY OPERATIONS	568	6	544	999	350
1.	SAFETY CRITERIA FOR LNG FACILITIES	60	0	0	0	100
2.	TEST AND ANALYSIS OF PIPELINE COMPONENTS	10	0	20	30	0
3.	EFFECTS OF ARCTIC ENVIRONMENT ON PIPELINES	0	0	0	61	50
4.	FRACTURE MECHANICS TO ASSESS PIPELINE GIRTH WELD STANDARDS	0	0	410	200	100
5.	DEPTH FLOW MEASUREMENT	0	0	20	0	0
6.	EFFECTIVENESS OF PROGRAMS FOR THE PREVENTION OF DAMAGE TO PIPELINE BY OUTSIDE FORCES	69	0	9	0	0
7.	HYDROGEN EMBRITTLEMENT & HYDROGEN STRESS CRACKING	213	0	0	24	0
8.	TOOLS AND PROCEDURES FOR ASSESSING SAFETY OF EXISTING GAS DISTRIBUTION SYSTEMS	9	0	0	0	0
9.	PRACTICES, TECHNOLOGIES, PROBLEMS AND RECOMMENDATIONS RELATING TO SAFETY OF GAS PIPELINE DISTRIBUTION SYSTEM	5	0	0	0	0
10.	OFFSHORE PIPELINE FACILITY SAFETY PRACTICES	180	0	70	0	50
12.	STUDY OF PIPELINE SYSTEMS TRANSPORTING HIGHLY VOLATILE, TOXIC OR CORROSIVE LIQUIDS	13	0	0	0	0
13.	DEVELOP & OPERATE SYSTEM AND ANALYSIS DATA-AUTOMATED LEAK & TEST FAILURE REPORTING SYSTEMS	9	0	15	60	50
15.	ADMINISTRATIVE COST	0	6	0	0	0
16.	ALASKA NATURAL GAS PIPELINE TRANSPORTATION SYSTEM	0	0	0	624	0
2.	TRANSPORTATION PROGRAM BUREAU	18,295	5,186	13,215	9,460	10,035
A.	SECURITY AND FACILITATION RESEARCH	468	123	341	515	400
1.	TRANSPORTATION SECURITY	180	70	176	245	200
a.	TECHNICAL ASSISTANCE - NATIONAL CARGO SECURITY CONFERENCE	29	11	30	25	100
b.	TIME SERIES CARGO LOSS STATISTICS	0	0	130	100	100
c.	NATIONAL CARGO SECURITY PROGRAM	151	59	16	120	0
2.	TRANSPORTATION FACILITATION	288	53	165	270	200
a.	DOMESTIC/INTERNATIONAL FACILITATION STUDIES	0	0	0	150	50
b.	CARGO-RELATED SYMBOL SIGNS	34	23	50	65	50
c.	TRADE DATA INTERCHANGE AND DOCUMENTATION	224	13	115	55	100
d.	INLAND WATERWAYS SERVICE	30	17	0	0	0
B.	UNIVERSITY RESEARCH	2,780	767	3,350	3,700	3,900

BUDGET LINE CODE	BUDGET LINE TITLE	DOLLARS IN $000 FY 76	76/77	FY 77	FY 78	FY 79
c.	SYSTEMS ENGINEERING	13,234	3,737	7,974	3,444	3,714
1.	TRANSPORTATION ENERGY/RESEARCH FLOW MANAGEMENT	10,000	1,600	5,233	691	500
a.	ALTERNATIVE FUEL RESEARCH	5,000	800	311	281	250
b.	FLOW MANAGEMENT AND CONTROL	0	0	347	410	250
1.	FLOW MANAGEMENT AND CONTROL OF LARGE SCALE TRANSPORTATION SYSTEMS	0	0	347	410	250
c.	AUTOMOTIVE ENERGY EFFICIENCY PROGRAM	5,000	800	4,575	0	0
2.	TECHNOLOGY IMPACT ASSESSMENT	867	1,373	1,455	1,617	1,500
a.	TRANSPORTATION AIR QUALITY IMPACT ASSESSMENT AND CONTROL	300	78	0	400	350
b.	ADVANCED SYSTEMS PROJECTION AND EVALUATION	567	1,295	1,455	1,217	1,150
3.	ADVANCED TECHNOLOGIES	2,367	764	1,286	1,136	1,714
1.	TRANSPORTATION SYSTEM DESIGN	0	0	285	190	794
2.	TRANSPORTATION CONSTRUCTION PROGRAM	676	175	540	225	0
3.	RIDE QUALITY OF TRANSPORTATION SYSTEMS	343	131	0	0	0
b.	NAVIGATION SYSTEMS ANALYSIS	471	150	225	345	300
c.	FIRE SAFETY TECHNOLOGY	0	0	93	45	250
d.	NON-CONTACT SUSPENSION/PROPULSION TECHNOLOGY	0	130	100	97	370
e.	ANALYSIS OF FREEWAY CORRIDOR TRAFFIC SYSTEMS	207	48	0	0	0
f.	NETWORK FLOW ANALYSIS	339	130	0	0	0
h.	TSC-IR&D	331	0	43	0	0
i.	CARBON/GRAPHITE FIBER COMPOSITE ASSESSMENT	0	0	0	140	0
j.	FRACTURE MECHANICS ANALYSIS FOR DOT PIPELINE GIRTH WELD STANDARDS	0	0	0	94	0
D.	DATA AND INFORMATION MANAGEMENT	1,046	322	790	788	750
1.	R&D INFORMATION PROGRAM	825	259	500	0	750
2.	R&D MANAGEMENT	17	55	100	588	0
3.	SOCIO-ECONOMIC AND POLICY RESEARCH MANAGEMENT	204	8	190	200	0
E.	ADMINISTRATIVE COSTS	767	237	760	945	1,271
F.	EMERGENCY TRANSPORTATION	0	0	0	68	0
3.	GRANTS-IN-AID FOR NATURAL GAS PIPELINE SAFETY	1,860	21	2,259	2,446	2,840

Appendix D: The Standard Federal Regions