

# NATIONAL TRANSPORTATION RESEARCH INFORMATION SERVICES NETWORK

During 1972 and 1973 the Transportation Research Information System Committee studied the possibilities for a national network of transportation research information services. The goal for the network is to provide improved access to all transportation information throughout the research community. At the 1974 Annual Meeting of the Highway Research Board, 5 panelists discussed the following aspects of the evolving network: user requirements, access to project resumes and document abstracts, access to full-text documents, network coordination, and network support. This is a report of those discussions.

Herman W. Miles, U.S. Department of Defense

Information networks have always existed; they are slow, cumbersome, and generally their existence is unknown. The utility of information transfer systems is rapidly increasing. In his book, *The Age of Discontinuity*, Peter Drucker stated that the advent of Sputnik in 1957 made it clear that building and maintaining the right knowledge base for intellectual, economic, social, and military performance are essential for national survival. Advanced information technology concepts enable persons to have access to vast amounts of information and to communicate more effectively with one another. The day is approaching when an effective discourse between a person and an information system can be accomplished by the latter acting as a knowledgeable and skillful assistant.

The number of information sources is increasing as the nation faces new problems that require technology for solution: pollution, conservation, transportation, energy, housing, and a variety of other social, political, and economic problems. The tendency is to add new information systems to cope with these problems.

Organizational responsibilities are now mission oriented. Organizations have a hierarchical structure, and as a result the information systems support organizations oriented toward vertical communications in a specialized area of interest. Science is interdisciplinary. New discoveries in one area may be applicable in others. The communication and coordination of information must be horizontal.

Networks of information transfer systems appear to be the answer to the communication of information. The rapid advances in computer technology in the sixties appear to be dissipating. Advanced communication techniques that should come into fruition in the seventies will permit the use of a computer facility in a decentralized mode easily and economically. Technology is emerging that will permit the building of information systems that transcend the present compartmentalized structure. One of these systems is the Transportation Research Information Services Network.

Benjamin Jacobson, Northwestern University Library

In this overview of TRISNET, I will give a few possible indicators affecting transportation information generation, summarize the TRIS committee's work, and conclude

with a few observations of my own.

Figure 1 shows an upward trend during a decade of transportation research and development expenditures (1, 2). The top curve combines federal and private outlays, the next curve down is for all federal agency outlays, and the bottom curve is for outlays by the U.S. Department of Transportation and its predecessors. The dip in the lowest curve could be attributed to the end of SST work. The broken vertical line through the curves is an indicator in this and other figures denoting the date when the Department of Transportation became operational, and one can judge whether it had any effect on the trend lines by examining the curves.

Figure 2 shows the information of specialized transportation libraries under all types of sponsorship. Twenty-one libraries were added in the past 7 years demonstrating that transportation organizations continue to fund in-house information facilities. Figure 2 also shows the extant academic transportation centers by date of inception; just more than half were organized after 1966.

Figure 3 shows estimated annual increase in entries of 2 abstracting services and 1 indexing service during an 8- to 9-year period. Entries in the Highway Research Abstracts increased 37 percent. The Soviet abstracting bulletin, Referativnyj Zhurnal, has 8 transportation parts and draws on both western and eastern area literature concentrating on hard technologies. Its increase in abstracts was 44 percent; the estimated annual output of 51,585 abstracts is worth noting. The Current Literature in Traffic and Transportation mainly indexes transportation socioeconomics, and has an increase of 135 percent. The increase of each journal may be simply a matter of more funding to support more pages and more work, but in any event the world generation of transportation information literature rose somewhat pronouncedly during the last decade.

Figure 4 shows an upward trend in the annual rate of doctoral dissertations on transportation subjects written at U.S. universities. There appears to be sort of a takeoff point in terms of an economy, and perhaps the linear ascent is not really very strongly affected by the Department of Transportation's coming into being.

Listed below are the titles of intermodal or multimodal English language transportation research journals and their dates of initial publication.

<u>Journal</u>	<u>Date</u>
Transportation Planning and Technology	1972
Transportation	
International Journal of Physical Distribution	1970
Transportation Law Journal	1969
Transportation Engineering Journal	
Transportation Science	1967
Transportation Research	
Journal of Transport Economics and Policy	
High Speed Ground Transportation Journal	
European Transport Law	1966
The Logistics and Transportation Review	1965

The Transportation Engineering Journal is actually a consolidation of modal journals published by the American Society of Civil Engineers. Only one existing general research journal in transportation originated before 1965. Since this list was put together, an advertisement was received announcing that another journal in this class has been born, the International Journal of Transport Economics, which is published in English and Italian but largely in English and which has a distinguished international editorial board. The rise of research journals evidences a growing market for information by the multidisciplinary transportation community.

The Office of the Assistant Secretary for Systems Development and Technology in the U.S. Department of Transportation has taken the initiative to improve the organization and logistics of transportation information. The office contracted with the Transportation Research Board to establish committees in 1972 and 1973 to identify needs and recommend ways and means for structuring and implementing a national transpor-

Figure 1. Transportation research and development expenditures in the United States.

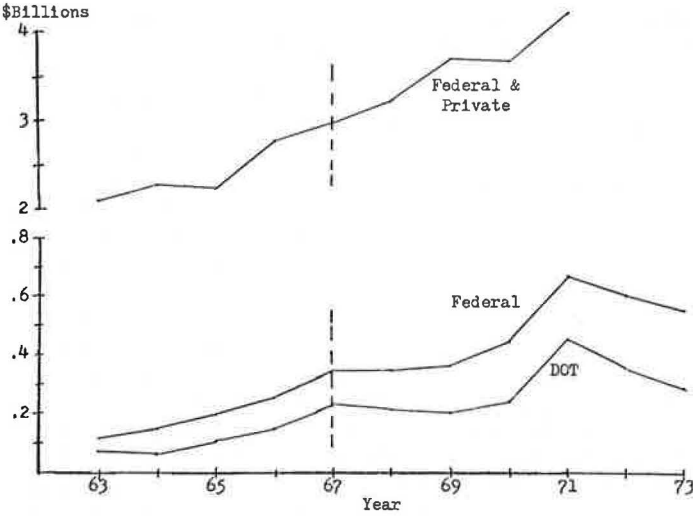


Figure 2. Existing academic transportation research centers and libraries grouped by founding date.

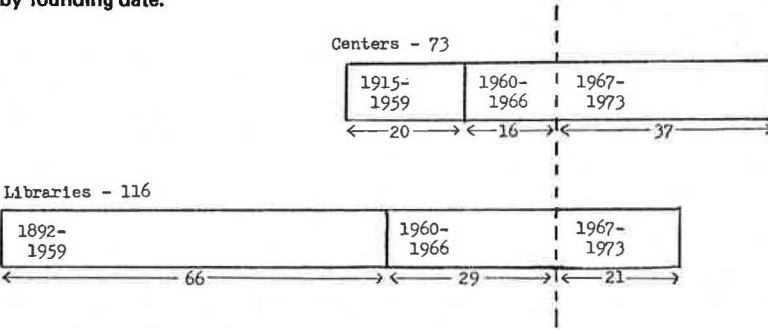
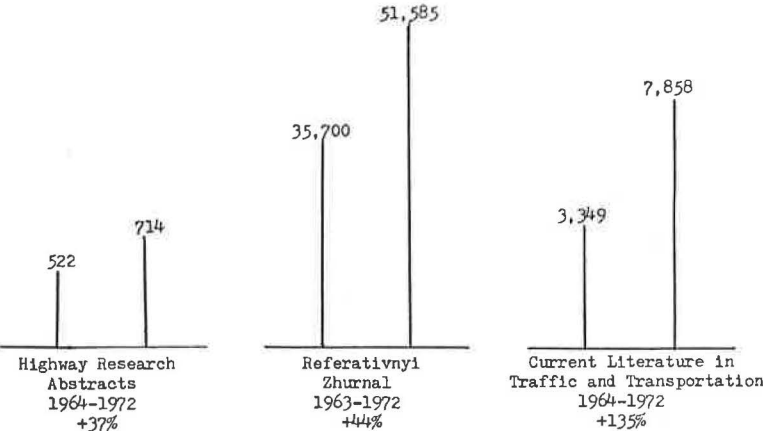


Figure 3. Growth in annual entries for 3 abstracting-indexing services.



tation research information system. Both of these committees were chaired by William Harris of the Association of American Railroads.

The first committee concluded that "the technical information needs of the research community can be met most effectively and served best by a Transportation Research Information System (TRIS), that is, an evolving network of services and users whose overall scope and capabilities are coordinated at the national level." This implies that there is neither a single transportation organization or society nor a single information facility such as a national library on which to anchor a network such as we have in medicine and agriculture. The point of departure, then, is to build on existing information facility strengths and induce these to act together and to catalyze the creation of new services to meet new needs so that benefits accrue to users and to the services themselves. This conclusion also implies that users, through direct feedback and by representation on the network coordinating body, are an integral part of network governance.

Figure 5 shows the 4 major components of the network identified by the committee. Research and development users of information are also the generators of the primary literature. Information appears in various publication formats including secondary products such as reviews and references, abstracts, and research-in-progress résumés or as numerical data files. Services include computerized abstracting services, libraries, and information analyses centers that process documentary information, are linked together by the network, and interface with the users. TRISNET is the coordinating mechanism responsible for policy, protocols, standards, user needs, feedback, and charges and for marketing.

I think that this is a very marketing-sensitive network. From the documents that have been generated so far, the notion of marketing the services is quite plain, and user comments in the preceding paper indicate that marketing is a critical point of any network and at least the TRISNET is aware of that.

The lines shown in Figure 5 are channels for user requests and needs and for user feedback. Not shown, but part of the network, are connections with non-U.S. transportation information services such as the International Road Research Documentation and the incipient documentation services of the International Union of Railways.

From this general structure, the 1973 TRIS committee was charged to develop an action plan for implementing TRISNET, an acronym indicating a network organization rather than the former designation of a system or a collection of services. Briefly, the plan's principal points are these: (a) to establish and maintain a coordinating unit representative of users, sponsors, and services, initially within the National Research Council, to carry out planning, policy, and management functions; (b) to conduct user needs studies and sponsor user-network conferences and to perform marketing functions; (c) to deepen coverage of existing transportation machine-readable data bases

Figure 4. Doctoral dissertations on transportation in the United States.

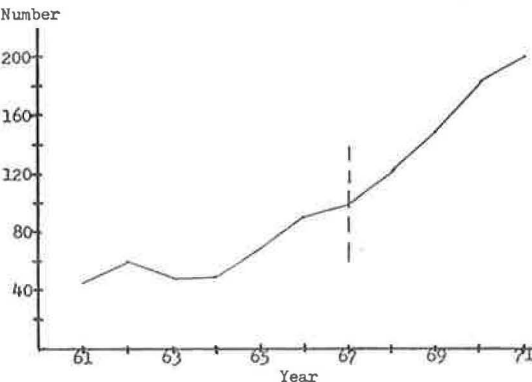
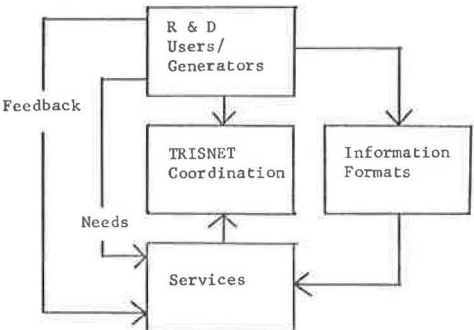


Figure 5. TRISNET elements.



such as the Highway, Maritime, and Railroad Research Information services and continue access to DOT's on-line TRAIS file of project résumés and also to foster the creation of new services such as in air transport (all data bases to be on line); (d) to provide directories to transportation information sources and services, published and numerical, and produce these in hard copy and on-line form; and (e) to develop a prototype document access subnetwork of general transportation libraries capable of providing or locating full text documents for cited material. Specific funding levels are also recommended for each of these operations.

It should be apparent that the proposed network's initial concern is with establishing a comprehensive machine-readable transportation data base of publications, abstracts, and research-in-progress résumés. An important question for network managers is, Should the data bases in hard technology areas be limited to explicit transportation applications, or should implicit or related technical information also be included? For example, should the qualities of concrete be included if they are not directly applied to transport?

The machine-readable publications data base is the keystone of the network from which many of its information products will be derived. Network credibility depends on expansion and deepening of its scope. Its producers must be given the support necessary to keep it up to date; otherwise, the on-line feature will be vitiated and the hoped-for elimination of duplicative indexing, abstracting, and cataloging among transportation information services is unlikely to happen.

The library role has been assigned mainly as a document delivery. The prototype library subnetwork is to be built on several general transportation libraries. Among the candidates are the libraries of DOT, the Transportation System Center's Technical Information Center, the Institute for Transportation and Traffic Engineering Library at the University of California, and the Transportation Center Library at Northwestern University; these are just some among other possibilities. In some cases, participation by these libraries will require an entire change in mandate. In others, such as Northwestern's transportation library, whose service load right now is 50 percent external, the transition should be somewhat easier.

The 4 candidate TRISNET library nodes had an aggregate expenditure of more than \$1.2 million in 1971. This investment represents more than just a document access activity. Through the network, the total range of information services provided by these resources can be made accessible to transportation research on a nationwide basis. One step further for the libraries would be to act as a nexus between users needing information analyses and expertise in the libraries' sponsoring organizations. This would represent a second phase in library subnetwork development leading to transportation libraries functioning as regional information centers.

Current planning for TRISNET is a modest beginning for an information network to serve as large an activity as transportation. A modest beginning, however, is right when we know little about information practices and needs of the transportation community.

#### REFERENCES

1. An Analysis of Federal R&D Funding by Function, Fiscal Years 1963-1973. National Science Foundation, Washington, NSF 72-313, 1972.
2. Research and Development in Industry 1971. National Science Foundation, Washington, NSF 73-305, 1973.
3. Transportation Research and Education at Northwestern. Northwestern University, Department of University Relations, Evanston, Ill., App. 7, May 1971.
4. Palmer, A. M., ed. Research Centers Directory, 4th Ed. Gale Research Co., Detroit, 1972.
5. Horne, E. L., ed. Directory of Transportation Libraries and Information Centers. Transportation Division, Special Libraries Association, New York, 1969.
6. Directory of Transportation Libraries in the United States and Canada. Transportation Division, Special Libraries Association, New York, 1973.
7. Ash, L., ed. A Guide to the World's Abstracting and Indexing Services in Science and Technology. Science and Technology Division, Library of Congress, 1963.

8. Doctoral Dissertations on Transportation: A Bibliography, 4th Issue, 1971-1972. Transportation Center Library, Northwestern University, Evanston, Ill., Sept. 1973.

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TRISNET is a cooperative program for "hooking together" already existing, organized segments of transportation information to improve access to and utility of the total available information. It is intended not to supplant or operate existing services but to make them more available to a larger audience. These segments include those that either specialize in transportation areas or process substantial quantities of transportation information within a larger subject scope. The services vary widely among themselves: Some are governmentally sponsored, some are financed completely by private organizations, some include only research-in-progress information, and some are predominately indexing and abstracting services. Some of the information is available in machine-readable format; the remainder is in a manual form. There are libraries organized to provide access to the indexed documents.

TRISNET would, thus, be made up of 2 subsystems: a network of services that collects, organizes, and processes information for résumés or abstracts and a network that provides document access and delivery to the transportation research community.

Since the transportation information is so broad in nature and is included in many research disciplines, a necessary first step in the organization of TRISNET is preparing a directory that gives all transportation information services and an in-depth definition of each service. This directory would be similar to a detailed version of the phone company yellow pages. For each service, the directory should include specific identification and contact points; subject scope; types, formats, and quantities of information holdings; vocabulary and access-control methods; data elements and their formats; information products and their formats and frequencies; processing and output capabilities; transfer procedures and their costs and limitations; accessibility, including type, procedures, required equipment, and availability; and response time. The directory should be available in a variety of formats, i.e., machine-readable form for quick updating, on-line retrieval form for those with available equipment, and hard-copy form with frequent revisions.

Concurrent with the development of knowledge as to where the transportation information is available is work on the 2 subsystems of the network: (a) résumés and abstracts and (b) document access and delivery.

### RÉSUMÉS AND ABSTRACTS

Approximately 5,000 transportation research and development projects are under way in the United States at the present time, and the annual production of transportation research reports and articles is in the order of 15,000 documents. Worldwide estimates are 3 times these figures. TRISNET users should have access to all of these pieces of information. The set of services within the network should be that necessary for covering on an in-depth basis all major modal technologies, such as highway and rail transport, and for covering major subject specialties, such as economics and transport safety. Likewise, services should be developed for transportation modes and specialties, such as pipeline or inland waterway transport, that are not well covered by existing services. Transfer linkages are a necessary ingredient so that each component is better informed about other members of the system and thus each can serve its users from a larger reservoir of information.

The initial project for this subsystem is the compilation of an on-line data base from existing data tapes of component services. During the developmental period, the on-line data will include résumés of research projects that are currently active or that have been completed in the past 2 years, abstracts of documents that have been