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ABSTRACT

Government agencies should investigate alternative service delivery systems in rural areas in order to overcome the problems of scope and distance. In examining alternative technologies, questions of feasibility, efficiency and effectiveness should be addressed. Numerous experiments, demonstrations, random innovations, and research studies have explored the match between specific telecommunications technologies and the delivery of specific services. Some have produced information on the effects of using comprehensive telecommunications systems to deliver various services. Others have indicated that certain results cannot be generalized across localities. Implementation of a program to bring broadband communications to unserved and underserved rural areas should begin as soon as possible. However, before deciding whether to begin large scale broadband system demonstrations in rural areas, two research tasks should be completed--the integration and analysis of existing knowledge and the development of a methodology for identifying the communications requirements of localities. The Office of Telecommunications Policy has initiated a two-year program to assess the adequacy of current mechanisms for Federal assistance to rural areas seeking to upgrade their telecommunications, and to develop, if necessary, a more effective and efficient Federal program for providing such assistance. (Author/NQ)

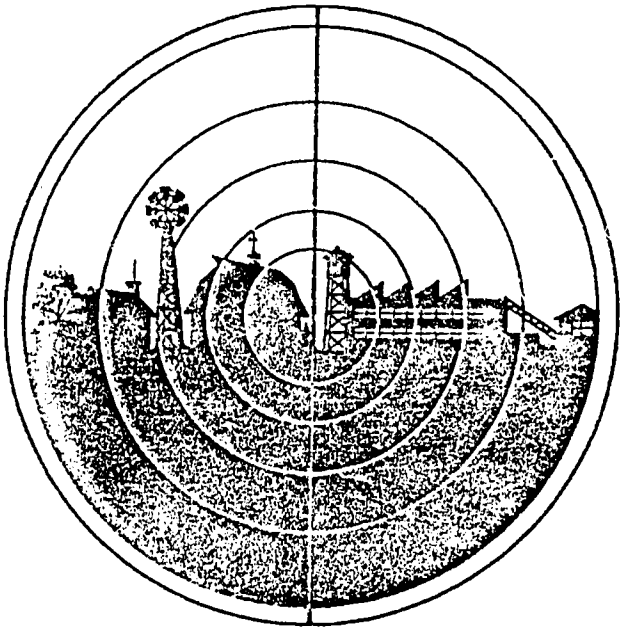
U.S. Congress

Office of
Technology Assessment

Conference on

# Communications and Rural America





November 15, 16, and 17, 1976

Washington, D.C.

# Communications and Rural America

## Purpose

In April 1976, the Office of Technology Assessment (OTA) of the U.S. Congress issued a staff report entitled *The Feasibility and Value of Broadband Communications in Rural Areas*. The purpose of the conference is to extend this effort by:

- Considering a broader range of communications technologies which might be used to meet rural needs.
- Further examining the question of whether system demonstrations aimed at achieving economic viability are needed and if so, identifying the kinds of demonstrations which might be undertaken.
- Further examining whether rural interests have been adequately considered in existing Federal communications policy.

The outcome of this effort will be a report incorporating the information and points of view presented at the conference.

## Congressional Interest

The conference is being held in response to a request for additional information on rural communications from Senator Herman Talmadge, Chairman of the Senate Agriculture Committee, as approved by the 12 member Technology Assessment Board of the U.S. Congress. Senator Pastore of the Senate Subcommittee on Communications subsequently joined Senator Talmadge in support of the conference. It is intended that the conference will be of value to the U.S. Congress in its deliberations on communications policy.

## Conference Dates and Organization

The conference will convene for 3 days, November 15–17, 1976, with about 60 invited participants. For the first 2 days, participants will be equally divided among three panels which will meet in parallel. Each panel will concentrate upon a specific topic addressed in the OTA report as follows:

- Panel 1. Rural Development and Communications.
- Panel 2. Technology, Economics, and Services.
- Panel 3. Federal Policy.

On the third day, participants from all three panels will meet together to exchange and synthesize findings and explicitly address the question of rural system demonstrations.

## Cosponsoring Institutions

The National Rural Center is cosponsoring Panel 1 (Rural Development and Communications). The Aspen Institute is cosponsoring Panel 3 (Federal Policy).

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# COMMUNICATIONS IN RURAL AREAS

Office of Planning and Policy

OFFICE OF TELECOMMUNICATIONS POLICY

A Staff Research Paper

October, 1976

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# COMMUNICATIONS IN RURAL AREAS*

## Introduction

The Rural Development Act of 1972 called for efforts "to make rural America a better place to live and work." 1/ This goal implies a reasonable parity of opportunity and services between rural and urban areas. Entirely consistent with the Act, was a recommendation of the Cabinet Committee on Cable Communication's Report to the President, to the effect that "Governmental authorities should assure that basic cable or other broadband communications are available to residents of rural areas ...." 2/

However, such parity does not imply that the method by which opportunities and services are made available be precisely the same in both rural and urban areas. The difficulties entailed in satisfying the needs of rural America are exacerbated by factors of scale and distance. 3/ That is, in small towns there is not the local population base necessary to support many needed and desired services; and in outlying areas it is often infeasible to travel the distances required to obtain them. If energy conservation continues to be a national goal, the distance factor will become increasingly important.

It would therefore seem to be incumbent upon government agencies to investigate alternative delivery systems that may overcome some of the problems of scale and distance. Because the use of telecommunications offers some promising solutions, enhancement of telecommunications capability in rural areas is a priority endeavor of the Office of Telecommunications Policy.

## Traditional Government Roles

Federal, state and local governments have traditionally intervened in the provision of opportunities and services in the fields of education, health, welfare, public safety, recreation, and commerce. Transportation and communications are the networks that permit concourse in any of those fields. Goods, people, and/or information must be brought together in order to teach, to cure, to protect, to inform, to carry out any of the myriad activities associated with the

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* The intent of this paper is to provide points of departure for this panel's consideration and should not be interpreted as representing a policy position of OTP.

traditional functions of government. There are obviously many different ways to achieve this -- railroads, telephones, automobiles, television, the mail, all enable goods, people and information to meet. In examining the match between any particular type of meeting and a technology that may bring it about, three basic questions must be asked:

Is it possible to effect this meeting with this technology?

How efficient is it to use this technology?

How effective is it to use this technology?

Demonstrations and Studies of Innovative Uses of Telecommunications Technologies

Numerous trials and studies have added to our store of knowledge about the feasibility, efficiency, and effectiveness of telecommunications in the delivery of services. In education, for instance, Spartanburg (S. Car.) Technical College, working with the Rand Corporation, is offering high school equivalency education on cable television, employing one-way video with digital return from the students. Kutztown (Pa.) State College has just begun to offer college credit courses to accelerated students in three neighboring towns up to thirty-five miles away. A hybrid system of cable and over-the-air microwave is carrying completely interactive video signals.

In the health field, a well-planned series of experiments and demonstrations (by the National Institutes of Health) has tested the delivery of a variety of health services via a variety of telecommunications modes including the Picturephone, microwave, lasers, and cable, both in black and white and color.

Telecommunications technologies have also been extensively tested for public service applications. In urban areas, the use of computer technologies for instant information transfer is becoming almost as familiar as the two-way patrol car radio. The National Science Foundation has sponsored a project to train firefighters in Rockford, Ill., where Michigan State University will compare the relative advantages of several delivery modes -- not all of them telecommunications systems. The results of this project will be of particular interest to rural areas, which typically depend on volunteer fire departments.

Satellite technology has obvious potential for overcoming the barriers of distance and scale in rural areas. Federal support of demonstrations in this field is evident in the recent ATS-6 experiments in the delivery of educational and health care programs to the rural areas of Appalachia, the Rocky Mountains region, and Alaska. Innovative commercial uses of telecommunications technology, particularly accessing computers, abound.

Experiments, demonstrations, and naturally developing uses of telecommunications have shown the feasibility of delivering many kinds of services via a large number of telecommunications modes. Both formal evaluations and informal observations have addressed themselves to issues of effectiveness and efficiency, drawing comparisons both among telecommunications technologies and between telecommunications and other more traditional methods of delivery.

The above discussion has been concerned with the match between particular applications and particular technologies. In order to be most useful, however, the area of inquiry must be broadened to include:

- How do various combinations of services and technologies affect the efficiency/effectiveness comparisons?

- What factors can be expected to change from locality to locality?

Several investigations of telecommunications technologies performed for the National Institutes of Health developed information about aspects of these two questions. In the study, "A Cost-Performance Analysis of Alternative Manpower/Technology Combinations for Delivering Primary Health Care," the Mitre Corporation concluded that when primary health care delivery was considered by itself, augmented narrowband systems (i.e., medical diagnostic equipment coupled to telephone) "appear to offer the maximum potential for reducing cost and time required of patients ... in isolated rural areas." 4/ However, if other transactions share the costs of the telecommunications system, the relative advantage of narrowband decreases. At the point where other uses bear slightly more than half the costs, broadband technology becomes the more advantageous telecommunications mode for primary health care delivery.

Other investigations for NIH showed that certain results cannot be generalized from locality to locality. A video consultation pilot project at Mt. Sinai Hospital indicated that the role of nurse practitioners "expanded" when the system was used. However, a similar project at the Cambridge Hospital showed that the nurse-practioners role "contracted". 5/

The Philadelphia Police Department has installed a complete institutional cable network which is used for such purposes as training, fingerprint transmission, document facsimile transmission, and legal counseling.

The Office of Technology Assessment of the United States Congress recently issued the report "The Feasibility and Value of Broadband Communications in Rural Areas" (April, 1976), which suggested that several demonstration broadband systems be established in rural areas. Such a program would provide information both about combinations of services and technologies and about the effects of local conditions.

Recommended Approach

There is reason to believe that the approach suggested in the Office of Technology Assessment's generally excellent report has two critical implications -- both of them concerning timing. In the first instance, the start-up time required for large-scale systems demonstrations(possibly as long as five years) may perpetuate the delay of some services which are clearly needed in rural areas today. 6/ In the second instance, an immediate commitment to systems demonstrations would fail to take advantage of information currently available or readily developed. The two points will be taken up separately.

NEED FOR IMMEDIATE IMPLEMENTATION

Two studies, 7/ performed by Denver Research Institute for OTP, investigated technological options for bringing broadcast television to presently unserved and underserved areas. The reports estimated that over one million households (about 1-1/2% of all American households) are able to receive no adequate television service. Also 9% of all households receive television service on fewer that three television channels. DRI concluded that, through the use of a hybrid system of cable and translators, three channels of television

[illegible] to all but 150,000 households in the United States. This could be accomplished within an acceptable range of average costs, although the regional variations can be substantial.

Since it is probable that the areas currently underserved by television are likely to be the same areas that are underserved by print media, the implications of the lack become obvious. The fundamental assumption of a democratic society is that it depends on an informed electorate. Approximately 9% of our electorate does not have ready access to vital information sources.

OPI noted that one barrier to immediate implementation was financial and the reports suggested several feasible mechanisms for funding. Federal regulation posed more serious barriers in the forms of prohibitions on common ownership, operation, or control of translators and cable systems, barriers to frequency modulated translator relay systems, and barriers to the use of microwave for signal importation.

These regulations should be re-examined by the FCC to determine whether needless barriers to rural telecommunications growth can be removed. A rulemaking stemming from a petition by the National Translator Association concerning restrictions on relay techniques for translators (Docket 20539) has been under consideration for two years since the original petition.

NEED FOR FURTHER RESEARCH 8/

It would seem that at least two specific research tasks should be completed before a decision is made on whether to implement large scale demonstration projects in rural areas.

First, that information already available should be collected, codified, and analyzed for its applicability to rural areas. Literally hundreds of demonstrations have been carried out and research reports written on aspects of delivering services via telecommunications. One report 9/ contained a bibliography of over one hundred publications dealing with social service delivery excluding health and in-school education on cable television alone.

[illegible] research is not trivial. Reported projects [illegible] locally tailored programs, for instance, often record [illegible] information but not method of delivery. This creates extreme difficulty in identifying even significant telecommunications efforts. As an example, the SACSEM project, which delivered adult basic education to rural areas, using radio [illegible], does not appear in a recent GAO listing of U.S. Government expenditures for telecommunications. However, as the Social Services report cited above demonstrates, a search such as we suggest can be accomplished with reasonable success.

Apart from the difficulties involved in finding available information, serious problems will almost certainly arise in cross comparisons of projects which were done under a variety of conditions with varying degrees of rigor. One would not expect a research project of this nature to provide entirely hard, incontrovertible information. One would expect, however, that a certain amount of hard data would emerge along with a great deal of "folk wisdom" which would provide useful first approximation guidance for the design of rural telecommunications systems.

The decision as to whether to proceed with large scale demonstrations might best be postponed until it can be informed by previous experience to be accomplished by the collation and distillation of existing reports.

The second essential research task is the development of a methodology for identifying the communications requirements of localities. This does not imply a service needs assessment. Localities are able to perceive their own substantive needs and, indeed, there is every indication that innovations inspired by needs designated as such by "outsiders" are rarely adopted by the community in quesiton. 10/

Many localities, however, are not sufficiently familiar with the technology to recognize which elements of their perceived needs are amenable to telecommunications solutions or to select among the technologies available. It should be noted that the match between needs and appropriate technological treatment should provide the rationale for the telecommunications system design in any given locale.

Research on this second task -- the development of a methodology for identifying the communications requirements of localities -- is currently underway at OTP. 11/

The above discussion refers only to research directly related to rural communications. It should be recognized, however, that many more general policy studies will have implications for rural areas. It might be wise to examine each study for the potential impact of its recommendations and, when appropriate, clearly spell out the possible effects.

No single source of information or funding for telecommunications projects in rural areas exists within the Federal government. Rather, there are myriad sources as diverse in nature, scope and authority as the needs they are designed to meet. The sources are established by Congressional legislation and Federal regulations and programs.

Historically, the Department of Agriculture has led the way in technological and social development in rural areas. The Rural Electrification Act of 1934 and the Rural Development Act of 1972 have enabled two agencies within Agriculture to make innovative contributions to rural development through the use of telecommunications. The Rural Electrification Administration provides assistance in the form of direct loans, loan guarantees, and technical assistance for rural telephony. In addition, it has provided loans for educational television facilities. The second agency, the Farmers Home Administration, has two divisions which are able to support the development of communications systems, even though this is not a major priority. Under Title I of the Rural Development Act, both the Community Facilities Division and the Business and Industrial Division are sources of support; the first can make loans to non-profit corporations or public entities for delivery of public services such as safety, health care, and recreation; and the second can guarantee loans to businesses for the purpose of improving the quality of life in rural areas through increased job opportunities.

The Regional Development Act of 1975 has been used extensively by the Appalachian Regional Commission, in conjunction with the National Institute of Education, to provide continuing educational services via telecommunications to people in the rural areas of Appalachia.

Other agencies within the Federal government are potential sources of funding. Within the Department of Commerce, the Office of Minority Business Enterprise and the Economic Development Administration are two possibilities. And in the past, the National Institute of Education, the National Aeronautics and Space Administration and the Department of Housing and Urban development have funded communications-related project

for rural areas. The Small Business Administration and the Bureau of Indian Affairs of the Department of Interior have also given loans to cable systems when their ownership met the stated requirements.*

There is considerable evidence that if Federal assistance is to be effective, that is, responsive to the needs of the people who will administer and receive the benefits of services, it must be grounded in state and local government perceptions of their most critical needs. Following from that, the revenue sharing mechanisms of the New Federalism (such as the 1974 Title XX Amendment to the Social Security Act) should be seriously examined for their potential to serve as sources of funds to build and/or utilize telecommunications systems.

Determining the appropriate forms of assistance is the cornerstone of OTP's activity in this area over the next two years. Much of this determination will employ results of the previously mentioned task of collection and analysis of existing data on telecommunications and its applicability to rural needs.

In the next two years, OTP will be examining a number of mechanisms to improve service delivery in rural areas through the use of telecommunications technology. Specific projects include the feasibility of Rural Telecommunications Authorities, cooperatives, the effects of competition on telephone rates and services, telecommunications, employment and the quality of life, and methods of disseminating information on new developments that have significant applicability to rural telecommunications.

Summary

1. Government agencies should investigate alternative service delivery systems in rural areas in order to overcome the problems of scope and distance.

2. In examining alternative technologies, questions of feasibility, efficiency and effectiveness should be addressed.

3. Numerous experiments, demonstrations, random innovations, and research studies have explored the match between specific telecommunications technologies and the delivery of specific services.

* This, by no means, is a full account of all Federal agencies who have an interest in rural areas.

4. Some research and demonstration projects have produced information on the effects of using comprehensive telecommunications systems to deliver a variety of services. Other projects have indicated that certain results cannot be generalized across localities.

5. Implementation of a program to bring broadband communications to unserved and underserved rural areas should begin as soon as possible. Regulatory changes will be necessary.

6. Before deciding whether to begin large scale broadband system demonstrations in rural areas, two research tasks should be completed, i.e., the integration and analysis of existing knowledge and the development of a methodology for identifying the communications requirements of localities.

7. OTP has initiated a two year program to assess the adequacy of current mechanisms for Federal assistance to rural areas seeking to upgrade their telecommunications, and to develop, if necessary, a more effective and efficient Federal program for providing such assistance.

FOOTNOTES

1. House Report No. 92-385, U.S. Code, Congressional and Administrative News, V.1, 92 Congress, 2nd Session, p. 3150.

2. Cable -- Report to the President: The Cabinet Committee on Cable Communications. 1974 Recommendations 11, p. 46.

3. See Rainey, Kenneth D. Fellow, Academy for Contemporary Problems. "Public Services in Rural America." p. 7.

4. H. Dhillon and A. Bennett. A Cost Performance Analysis of Alternative Manpower Technology Combinations for Delivering Primary Health Care. MTR-7068. McLean: The Mitre Corporation. October, 1975.

5. Rockoff, Maxine. "An Overview of Some Technological/Health Care System Implications of Seven Exploratory Broadband Communications Experiments." IEEE Transactions on Communications, Jan. 1975. p. 27.

6. In its discussion of "cons" to the systems demonstration approach, OTA recognizes this argument. p. IV-95.

7. Bortz, Paul I., Robert C. Sponberg, and Fred P. Venditti. Broadband Communications in Rural Areas: Final Report (Nov. 1973) and Broadband Communications in Rural Areas: National Cost Estimate and Case Studies (May 1974), Denver Research Institute, University of Denver.

8. The projected OTP research budgets for 1977 & 1978 anticipate the allocation of up to 30 person months each year for rural telecommunications research. This includes contributions by the Policy Research Division of the Office of Telecommunications, Department of Commerce.

9. Kay, Peg. Social Services and Cable T.V. Cable Television Information Center. NSF/RA-760161. July 1976.

10. Yin, Robert K., et al. A Review of Case Studies of Technological Innovations in State and Local Services. Washington: The Rand Corporation, R-1870-NSF, Feb. 1976.

11. This project builds on previous work done by Maxine Rockoff (op. cit., p. 23), the Cable Television Information Center (Local Government Uses of Cable Television. CTIC. pp. 60-64) and on research in progress by the Program Evaluation Group of the Urban Institute.