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Meeting

Managing Alaska's Information Resources

A Proposed Statewide Policy

Interim Joint Committee on Telecommunications
Senator Fred Zharoff & Representative H.A. 'Red' Boucher
Co-Chairs

House Special Committee on Telecommunications
Representative H.A. 'Red' Boucher, Chair
Representative David Thompson, Vice-Chair

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MANAGING ALASKA'S INFORMATION RESOURCES

A PROPOSED STATEWIDE POLICY

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within the Office of the Governor. This authority should have the responsibility to:

(1) Determine what information the State has, where the information is located, and who needs the information;

(2) Coordinate distribution systems and the sharing of information resources;

(3) Assist and educate state agencies in the use of information technology and systems analysis;

(4) Establish evaluation criteria for state-funded programs that use information technology;

(5) Obtain economical information technology equipment and services by working with the private sector;

(6) Administer information technology procurement and contracting services over the amount of $25,000;

(7) Coordinate the accessing of information by the public;

(8) Address issues which affect the availability and affordability of the distribution systems;

(9) Develop interactive telecommunications.

The Committees believe that this type of coordinating authority, with the active support of the Office of the Governor, would best serve the needs of Alaskans.

INTRODUCTION

Information is increasingly seen as a resource not unlike gas or oil or fish or minerals. Indeed, many of the most successful corporations in America see information as a strategic asset and they value and protect it accordingly. There is also recognition among some state governments that the delivery of social services, the protection of natural resources and much more depend on how information resources are managed. Information is perhaps the state's most valuable strategic resource because it makes possible the identification, counting and management of all other resources.

Until recently, Alaska could count itself among a handful of states which not only identified the strategic importance of telecommunication systems, but invested huge sums of money to build public networks that were without equal. Now this distinction and the benefits derived from it are in serious jeopardy. Far from some maverick corporate raider or thief in the night taking control of its strategic information assets, Alaska may be in the process of unwittingly squandering them.

Here is a partial list of cuts made during the 1986 legislative session: Substantial cuts were suffered by the audioconferencing systems operated by the University and Department of Education, resulting in a reduction of the usage of those services (1); the Learn Alaska Instructional Television

Network was eliminated; funding was reduced for the State Film Library, making it much more difficult for teachers to acquire films and videos for classroom instruction; funds for certain kinds of computing were cut while others were spared or increased, but no rational pattern for these actions could be determined; the means to produce television programs about Alaska were substantially reduced; funds to train people to use information technologies were reduced.

The Department of Natural Resources's information management and analysis group -- the people who massage a vast sea of numbers and facts so they make sense to a decision maker -- has been cut during the last two years from a staff of 12 to 5.

These budget cuts and those threatened this coming year pose a clear and immediate danger to the operation of Alaska's state-supported information networks. These cuts are being made without full consideration of their consequences in the short or long run. This is happening because of the absence of a statewide telecommunication and information policy. In the absence of any guiding policy, it is difficult to contemplate an alternative to the present state of drift and dismemberment.

The purpose of creating such a policy for the State of Alaska is to provide for the management of the State's information and information technologies in a comprehensive and

coordinated manner. Such a policy will assist the State in making decisions and in serving the people. Furthermore, this policy will help plan for Alaska's future.

Before creating the policy, the following were ascertained as goals:

(1) to determine information needs;

(2) to have information available to decision-makers and coordinate the sharing of information within government;

(3) to evaluate the State's information programs;

(4) to manage information technology cost and use;

(5) to facilitate the delivering of information to the public; and

(6) to have the communications network accessible by and affordable to the public.

The creation of an IRM policy arose from the perception of the Committees that there was little accountability for the money spent on information technology and how that information technology was being used. The Committees also perceived that

opportunities existed for managing information to better enable state government to perform its duties and to increase accessibility of information in general.

Although the terminology used throughout this policy proposal might be familiar, the most important words are defined here to assure a common understanding:

-- Information technology: hardware and software supporting communications, data processing, and information analysis

-- Teleommunications: transmission of information via voice, data, and video through mechanical media

-- Data processing: automated generation, collection, storage, manipulation and retrieval of data

-- Information resource management: the use of information technology to deliver information in the desired manner to those who need it

In preparing this policy, the Committees contacted other states such as South Carolina, Delaware, New Jersey, Colorado and California that appear to be IRM forerunners. On-going liaison with IRM leaders in South Carolina and Delaware indicates the clear cut need for the State of Alaska to aggressively enter the area of information resource management. As a result of

implementing IRM programs, these states are experiencing reduced and controlled communication costs and better use of their information resources.

The following policy proposal addresses the need to manage and coordinate the use of the State's information resources and recommends the creation of an Alaska Telecommunications Information Agency within the Office of the Governor. It also addresses the accessing and delivering of information and the remaining need to resolve some critical regulatory issues.

HOW WE GOT WHERE WE ARE

The present need for a comprehensive State information policy is perhaps part of a pattern which has featured great peaks and valleys in the quantity and quality of government involvement in information issues. Generally speaking, progress, at least as defined by the creation of systems, has been greatest when interest and involvement from the governor and the legislature were highest. When interest and involvement were low, development of systems tended to mark time or regress.

State government involvement in the development of delivery systems can be divided roughly into three stages: the early or startup stage (1971-1975), the middle or operational stage (1976-1981) and the advanced stage or applications stage (1982-1986). It is this last and most critical stage when government attention has been weakest. Years of reduced attention coupled with the present budget crisis have put the systems at risk. User needs have been largely ignored. The state is in danger of slipping to a level of development better suited to the 1970's than the 1990's and beyond. The national and international trend is to build up, not tear down; to recognize and further exploit the value of technology, not ignore it. Indeed, as Alaska looks to the Pacific Rim in search of markets for its resources, the reliance on information systems is likely to be greater than ever.

As a result of government involvement, the state had in 1986 extensive voice, data, and video information delivery systems extending not only to state offices but to the entire state populace. These networks were built out of the need for the people of a state of great expanse and cultural diversity to communicate. Indications are, however, that in the process of constructing these various networks, network application and evaluation were not given sufficient resources. Furthermore, emphasis has been on the information technology, and not on information itself as a resource.

The State's information delivery systems include:

(1) One main computer network which is operated and maintained by DOA. Currently, all of the other departments', the University's and the legislature's computer networks connect to some extent with DOA's with the exception of Department of Labor's. (Labor is planning to connect with DOA by the end of 1986.) Viewing the State's main network as a three-lane highway, each agency uses at least one lane of that highway. Because of the interconnection, an employee in the Department of Fish and Game is able to access both legislative and university information. Each of these entities also has its own separate electronic mail system.

(2) A statewide television network which reaches approximately 240 rural communities, plus a television microwave system on the Kenai Peninsula. Four public television stations and fifteen radio stations also receive state funding.

(3) Two main audioconferencing systems -- the Legislative Teleconference Network which reaches about 70 sites, and the statewide Learn Alaska audioconferencing system. Of course, all State agencies are connected via the privately owned telephone system.

After instructional and public television, audioconferencing and computing appeared in force, legislative and executive branch interest in communications declined. By 1981, telecommunication planning responsibility had been moved out of the Office of the Governor to the Department of Administration. This change, brought about by Governor Hammond in Executive Order 50, has directly affected telecommunication policy and its implementation.

The powers and duties of the four DOA divisions responsible for the State's information delivery systems are broad and extensive. Two divisions, Telecommunication Services and Telecommunication Operations, are required to do everything from planning, designing, constructing, managing and operating all telecommunications systems owned by the State to developing a plan for "integrated instructional telecommunications services

for all residents of the state". (2) Two other divisions, Data Network Services and Data Resources Management, have the same planning, designing, constructing, managing and operating duties as they relate to data processing. These divisions basically manage the technology for conveying information.

The interests and needs of the public were better served when the responsibility for telecommunication policy was situated in the Office of the Governor. Of course, no policy regardless of its scope and wisdom will produce the desired results unless the governor and legislature are involved in its formation, implementation, and evaluation.

THE PRIVATE SECTOR AS A MODEL FOR INFORMATION NETWORKING

Treating information as a resource with value has become popular in the private sector because of its potential for increasing productivity, product support, and profitability. There are several reasons for this. First, many of the costs of doing business -- materials, labor, energy -- have increased dramatically over the past few decades. On the other hand, the cost of information storage and processing has decreased 10,000-fold since 1956. Use of information systems has made it possible for private industry to make better use of the more expensive resources. Private industry has been able, for example, to reduce inventories and at the same time improve services and increase profitability. Improved record keeping provides businesses with information about how rapidly stocks of different goods are being depleted and alerts them when it is necessary to reorder -- computers can even place the orders. Businesses such as national car rental companies are able to use computer simulations to decide how many cars should be placed in their lots in various cities at different times of year.

Second, business is discovering that an added benefit of advances in information technology is increased employee creativity. More hours are shifted from mundane tasks to problem solving, as powerful analytic tools are placed at workers'

fingertips. And, third, new information technologies can facilitate smarter, better communications. This in turn improves decision making.

The ultimate objective of all this is to improve performance. This is best accomplished by shifting from managing computers to managing information resources. When a system provides information to be used in the decision making process it is a true information system. A true information system is not aimed at processing data. That is only one of the functions. A true information system contains information, not data;(3) the content of what the system produces is not pages of facts and figures, but conveys a message to the decision maker. The paramount objective must be viewed in terms of the ability of information systems to support the improved performance of people in organizations.(4) This is why some experts have urged that information networks should be focused on the decision process.

The results of not having a true information system has become apparent in the Department of Transportation's current problems with its financial accounting records. The Department knows it has an accounting problem, but does not know how much money is involved and its current accounting system cannot tell them.

The key to improved information management and realization of tangible benefits is to develop a multi-level plan that is woven into the operating fabric of each department. Studies of the introduction of innovations to the workplace have shown that the necessary changes will not occur in the absence of full involvement by management. If the changes are not seen by staff as a priority, the strategy will most likely fail through active and passive resistance.(5) Recent studies of the development of information resource systems conducted at the Massachusetts Institute of Technology have shown that while the gains from such systems are impressive, they also generate fear and anxiety on the part of the organization's staff. Staff involvement in the planning process has been effective in overcoming resistance. However, the innovations may die later if support from top management is not clear and sustained.

These principles that are being used in the private sector can also be utilized within Alaska state government. The people involved in state telecommunication planning must involve the users whether they are individuals or departments. Furthermore, budget support for such planning must come from the Governor and the legislature and it must be developed among users through a sustained program aimed at gaining general support and involvement.

CREATING AN ALASKA TELECOMMUNICATIONS INFORMATION AGENCY

Consistently throughout the process of gathering information for this report telecommunication professionals and users have indicated the need for a policy for telecommunications and information in the state. Views on who should have that responsibility have differed. Give the Department of Administration more power, create a new agency, create an advisory body were some of the suggestions.

A Delphi survey of telecommunication professionals was conducted by the Journalism and Public Communications Department at the University of Alaska-Anchorage. After analyzing the survey results and the responses given to the Committees on their draft information resource management plan, the Committees recommend the following:

Create an Alaska Telecommunications Information Agency within the Office of the Governor whose responsibilities include but are not limited to the following:

(1) Determine what information the State has, where the information is located, and who needs the information;

(2) Coordinate distribution systems and the sharing of information resources;

(3) Assist and educate state agencies in the use of information technology and systems analysis;

(4) Establish evaluation criteria for state-funded programs that use information technology;

(5) Obtain economical information technology equipment and services by working with the private sector;

(6) Administer information technology procurement and contracting services over the amount of $25,000;

(7) Coordinate the accessing of information by the public;

(8) Address issues which affect the availability and affordability of the distribution systems;

(9) Develop interactive telecommunications.

Putting an agency within the Office of the Governor will give it a position of authority and the ability to enforce effective state policy. A legislative audit report on the Department of Administration Information Resource and Communications Management, Data Processing Management and General Controls at the Anchorage and Juneau Service Centers (02-1261-86-R) stated that while the Department of Administration

has the authority to operate and manage the communications and data processing activities of the state, it has no method to enforce the guidelines, procedures and standards. One department enforcing policy on other departments is nearly impossible, and refusing services is not practical.

A letter to Representative H.A. "Red" Boucher from DOA dated October 24, 1986, concurs with this statement. It is difficult for one department "to implement far reaching policies without being suspect of serving its own needs." While state agencies are cooperative, they "do have an understandable reluctance to subordinate their requirements to another department."

As a separate agency within the Office of the Governor, ATIA will be able to interact equally with all the other departments and organizations. It would assume responsibility for making policy decisions on the most general level and would work with these agencies in helping them to achieve their policy goals through the rationalization of their telecommunication systems. No longer would people responsible for the physical operation of the hardware also be required to make the policy decisions.

Of course this structure will not succeed without the active support of the Governor and the legislature. As shown before, Alaska has made the most progress in telecommunications when the government has taken an active interest in it. People's attitudes about networking and sharing of information will also

have to change.. Incentives and disincentives in connection with budgets will be needed to encourage departments to participate. The ATIA also will have to work cooperatively with the other agencies rather than become a dictator of how information is to be managed and distributed.

The work of the ATIA should be reviewed by the legislature two years after its creation and it should be open to reviews thereafter. This will ensure that the approach and the responsibilities of ATIA are meeting the needs of the users.

JOB DESCRIPTION OF ATIA MANAGER

One of the questions asked in the Delphi survey conducted by the Journalism Department of the University of Alaska-Anchorage was to describe the job of a telecommunications manager. According to survey respondents, the telecommunications manager would not be an engineer, but would have the ability to work with technicians. The manager would have majored in telecommunication planning, with a minor in electrical engineering, one Delphi participant said. "At least a master's degree in management or an appropriate social science is required as is fluency in at least Asian language," said another.

The manager should have experience in communications, technology, contracts, law, budgeting, quality control and personnel management, a participant said. "He would have administrative experience," said another. "Knowledge of networking . . . systems is especially relevant," said still another, who also insisted that the manager be able to perform "cost/benefit analysis of networking functions."

What would the manager do? Principally that person would be a coordinator. The person would coordinate the delivery systems plus activities between the public and private sector. The manager would be chairperson of a committee of telecommunication users representing various agencies.

The Delphi participants expect telecommunication to make government more efficient; they expect it to give the citizen a readier access to a variety of services and information sources. But this requires a manager to oversee the orderly transformation of the governmental communication system and the development of new communication utilities within the community at large.

The participants made surprisingly few references to specific technologies. Their view of the future appears to be based on assumptions that existing but not yet widely used communication technologies will become institutionalized in the future. The manager, as described, is a key figure in that institutionalization process.

From these responses, it is clear that an ATIA manager needs to be administratively oriented, possess an understanding of communication technologies and the ability to work with technicians, and also have a vision of how technologies can be used to meet the communication and information needs of Alaskans.

Furthermore, user groups already exist in Alaska state government for providing input into the ATIA and working with the telecommunications manager. The Information Systems Committee (ISC) is comprised of representatives from each of the departments plus the University and OMB. With some guidance and

incentives this group can be a positive contribution to the State's telecommunication/information policy making process.

COORDINATING A STATE INFORMATION NETWORK

Response to the UAA Delphi survey indicates that access to information through the use of communication technology is desired by users. The ability to dial into a state system for direct access to permanent fund and longevity bonus questions, to access central information, and to have forms, applications, and records available electronically were all listed as ways communications could serve both the public and state decision-makers.

A coordinated information delivery network was also supported by most people responding to a draft information resource management proposal written by the House Special Committee on Telecommunications. Indexes to information and linked electronic mail systems to ease communications within and among departments are just two suggestions for making information more accessible.

For state government to operate effectively, information in the appropriate form must be easily accessible by decision-makers. Principal obstacles in decision-making are not having the information, not knowing about available information, and not having it in a format that is readily usable. To help overcome these obstacles, the Committee recommends that the State begin to index and network its information.

First of all, an inventory of all the State's databases should be taken and unnecessary duplication eliminated. Then a central index listing the databases should be created. This index would not only list the databases but also identify the database's location, if the database is public, and in what form (floppy, tape, hard copy, etc.) it is available. The index should be in both electronic and paper form and be available to the public at appropriate locations such as libraries and legislative affairs offices throughout the state.

The concept of a central index is already being implemented by the Committee on Natural Resources Information Management (CONRIM). CONRIM, consisting of federal, state and local agencies involved in Alaskan natural resources, is building a Directory of Directories which lists collections and bibliographies of data. The State could benefit by coordinating its information activities with those of CONRIM. By doing so, the State would increase its access to expert personnel and to information.

The central index is a first step in making information more accessible by making it easier to find. The next step would be the networking of the various information delivery systems. For example, the electronic mail systems of the legislature, the university and the administration are not connected. Thus, the

three entities cannot communicate with each other through this efficient and economical medium. The technology to connect the three is present; the policy decision to do so is missing.

Networking the information systems such as the electronic mail systems would make information more accessible. A goal of information policy should be to make it possible for the public and for managers within government to easily gain access from their homes, offices, or public places to the great array of information that government generates. This information, while located in various places, should be accessible through a single, easy to use information retrieval system.

For example, a person wants to establish and develop a mining prospect. The first stop might be at the Division of Land and Water Management's Public Information Office on the 10th floor of the Frontier Building (in Anchorage) to get land ownership and status. Then a second stop at the 13th floor is needed to determine if state mining claims are currently active in the area. This now involves two divisions: Mining and Geology and Land and Water Management. Third, a trip to the Mining Information Office (in Fairbanks) to examine the mine files is prudent. The serious developer would then have to research the geology, water quality, and environmental conditions of that area. For this, many trips to libraries or other information centers such as the U.S. Geological Survey (USGS being back in Anchorage again) would be needed. Then several

land management agencies would have to be visited to find out which has special permit requirements and if any laws or special stipulations would apply.

This process could take several days, but if the information was networked and accessible from throughout the state, the time would be reduced considerably. A DNR employee used to take two days to do a land appraisal; using DNR's Land Administration System, the Department's online computer system, it took 30 minutes. This type of networking should be encouraged and implemented on a statewide level.

The creation of an index or the networking of information delivery systems does not require the centralization of hardware or the elimination of individual agency activities. The Committee recognizes the individual needs, expertise and creativity in each of the organizations and wishes to foster and coordinate that energy. While standards and policy need to be set, flexibility within those standards and policies is also required to provide for and integrate new technology and new applications.

MAINTAINING THE CONNECTIVITY OF THE NETWORKS

Now that the network hardware has been installed, one continual concern of the State, and a responsibility of the Telecommunications Information Agency, should be the affordability or "connectivity" of the information delivery systems. Due to the massive changes occurring in the nation-wide telephone industry, the following have been shown to be of greatest importance to the State:

(1) Competition -- both interstate and in-state

(2) Regulation of phone companies

(3) Arbitrage and equal access

(4) Rate integration

(5) The need for a State position on lifeline rates and universal service

The resolution of these issues will affect the cost-effectiveness of the State's information delivery systems. Reduced service or increased rates will impact departments' budgets as allocations are increased to cover phone charges or are shifted towards travel and personnel as service is reduced.

The State needs to actively participate in regulatory proceedings at state and local levels that affect the viability of the networks. It is already doing so at the federal level. The future of the telephone industry in Alaska will affect not only the phone network but also the State's two audioconferencing systems and its computer system. Other telecommunication activities also will be affected to the extent that they use the telephone network.

Significant costs are associated with the telephone system. For instance, now that it is a competitor, AT&T no longer wants to support the high-costs of Alaska's phone system. In past years, this support has reached as much as $158 million. If this support is reduced or eliminated as AT&T has requested, phone service in Alaska would be cut severely unless rates were raised or the State was willing to pay the tab.

The State itself also spends substantial amounts of money for voice and data lines. In FY85, the State spent over $10 million in long distance charges, $8.75 million of which was for intrastate service. For long-haul data circuits, the State spends approximately $1.32 million per year. If the State operated its own voice and/or data network, the State could save substantial amounts of money, a potential $2 million annually, according to some preliminary analysis done by the Division of Telecommunication Services.

However, since the State is such a large user of phone services, not using message toll service may be detrimental to the public network. The revenues Alascom receives from the State for intrastate services are 29% of Alascom's total operating intrastate message toll service revenues. (FY85 state costs for intrastate service = $8.75 million; 1985 Alascom operating revenues for intrastate service = $29,670,148.) If the State no longer pays the entire $8.75 million into the public network, then the phone companies will have to recover their costs from a smaller ratebase. This will raise rates for those remaining on the network.

The savings realized by having a state-owned network must be balanced with the social cost to the public network. Furthermore, the savings accrued by the state-owned network would be somewhat offset by extra management activities such as maintenance, accounting, and billing.

In view of this and the remaining uncertainty as to the future structure of Alaska's communications market, it might be wise for the State to not build its own network at this time. A regulatory decision on the telephone market structure could significantly change the cost equation. The State should work with the private industry to reduce costs. Also the State should look towards bidding for competitive services while keeping in mind the social costs.

NEED FOR PROGRAM EVALUATION AND SYSTEMS ANALYSIS

One of the main activities of the ATIA needs to be an on-going assessment of information needs and how well the State's current programs and systems are meeting those needs. A common criticism of communication services in Alaska is a lack of needs assessment. Who wants and needs information and telecommunication services, and why? When put in place, do the services fill the intended need? Early demonstrations of State-provided telecommunication services were often demonstrations of technology rather than demonstrations of meeting a communication or information need.

A partial result of this lack is the reduction or even elimination of some key information delivery systems in the state. Of course budget cuts have played their part, but those cuts are often happening without the benefit of evaluating all the systems and their usefulness first.

For example, during the 1985 legislative session, the legislature and the governor approved the use of teleconferencing for conducting public hearings and meetings. Governor Sheffield in his transmittal letter to Speaker of the House Ben Grussendorf wrote, "The availability of new communications technology combined with our declining revenues make passage of this important measure [HB 140] a timely step towards economical

efficient expansion of public access to the administrative process." However, the FY86 legislative budget for line charges was reduced by $200,000 (41%), and staff was cut 43%.

In FY87, the legislature eliminated the Learn Alaska instructional television network and Governor Cowper's transition team has recommended that the "Rural Alaska Television Network be eliminated" in FY88. The Learn Alaska decision was made based on the belief that rural citizens prefer entertainment television over instructional television. There was no information or consideration as to whether instructional television was fulfilling a vital communication/information need or had the potential to fulfill that need.

A survey conducted of rural school principals by the Interim Joint Committee on Telecommunications shows that instructional television is indeed needed and wanted by rural teachers. Seventy-three percent of the respondents felt that the reduction of instructional television has had an adverse affect on rural Alaskans. Principals of small schools, in particular, felt that their programs had been hurt by the loss. Only 47% of all respondents (but 60% of the small school principals) felt that Learn Alaska should be reinstated in its past form. Rather than direct daytime broadcasts, teachers would prefer tapefeeds so that programs can be used when appropriate in the school curriculum rather than shaping the curriculum around the time when the program was to be aired. (Again, principals of small

schools felt somewhat differently in that more wanted direct broadcast of programs.) Also numerous complaints from the communities have been voiced. If this data had been sought out and acted upon, the sudden reduction of instructional television in the bush might have never occurred.

Another survey conducted by the UAA Journalism Department indicates that there is widespread dissatisfaction among rural people with RATNET programming available. However, television is the preferred medium for receiving information about Alaska and state government. This again points to need for evaluation of information needs and what the best method is of meeting those needs. In some instances, telecommunications might not be the appropriate or most desired method for delivering information. More people chose newspaper as the preferred medium for receiving information on the Berger report. Feedback on a regular basis from the users is critical for determining this.

Also VCR's are becoming very prevalent in the bush and 94% of the survey respondents said VCR tapes could be rented in their village. Cable television services are also becoming increasingly available in rural areas. As the private sector begins to enter these markets, the State needs to re-evaluate its role in providing the same service.

CASE STUDY #1 -- DEPARTMENT OF EDUCATION

The Department of Education (DOE) with hundreds of employees, the largest budget in state government, and statewide responsibilities for educating young Alaskans has recently assigned a senior administrator to assess the need for an information resource management plan. The interest in developing a plan comes mostly from the belief that a systematic approach to managing information can make Department operations more efficient in the face of declining state revenues.

According to the results of an internal needs assessment, DOE's most critical information needs are: (6)

(1) for information about program quality especially as it is affected by and relates to the revenue issue,

(2) for improved accuracy and quality of information at a time when conflicting or erroneous data can be especially embarrassing and damaging to public education, and

(3) for simulating the "what ifs" when alternative strategies for resource allocations are proposed both externally and internally.

DOE believes that the financial problems facing the educational system demand smart decision making. These decisions need to be based on the best possible information. At the moment, though, there is concern that the Department lacks the ability to obtain this kind of information.

According to the Department's data management administrator, the Department has a considerable investment in the hardware and software of information technology. However, few data bases are installed on the systems available. Many data reports -- even those related to major functions such as formula funding for schools -- are still laboriously hand calculated. Data bases remain disjointed and separate and cannot easily be integrated with one another. There is little capability to access or analyze data needed by one unit but collected by another unit. In fact, no one has a comprehensive picture of all the data collected by the Department. (7)

DOE is in the process of identifying the most valuable kinds of information and what to do with it. This is the key step in developing an information plan. One weakness is the lack of a statewide assessment program for judging the quality of educational services. No means exist to assess data collected by school districts through their own testing programs. External financial controls and the data to back them up are weak. Department data bases for students cannot at the moment be tied

together. As a result, no one knows whether DOE might be paying five times for the same special education student or whether money spent on bi-cultural education has had the desired affect.

Despite this perceived need for an information resource plan, DOE seems unsure whether to proceed with its development because of the uncertainty of policy and budget support.

CASE STUDY #2 -- DEPARTMENT OF NATURAL RESOURCES

The Department of Natural Resources began developing a long-range information resource plan in 1983. The plan is one of two approved by Governor Sheffield. This plan will assist in setting budget priorities for FY88, and will set directions for Department action through 1990.

The goals of the plan, as they relate to information management, include the following:

--improve the availability of information required by the public,

--collect and compile objective and reliable natural resource data,

--develop and implement capabilities to solve resource analysis issues,

--provide for public participation in natural resource planning and decision making, and

--make decisions through balanced and objective planning.(8)

The plan continues for some 300 pages, describing in detail the dozens of strategic objectives, budget impacts, status updates, needs and implementation action. It is a massive, thoughtful, forward-looking document. It has all the important endorsements of upper management. It translates the expansive spirit of Executive Order 50 and subsequent legislation directing state agencies to join the information age into a detailed road map plotting how DNR can get there and stay there. It does almost everything except implement itself. That, however, will require cooperation of several variables which are now very much in question: sustained funding and policy support from the governor and legislature.

DNR appears to be at an important crossroads in the development of its information management capabilities. Several issues loom large in the minds of the department's information planners. First, user demand for relevant, accurate, timely and comprehensible information is currently estimated to far exceed the capability to respond. Second, there is a need for divisions to acquire "information manager" positions to assist in feasibility studies, technical liaison and determining general information needs. Third, there is presently no accessible data base that provides an accurate, up-to-date inventory of the state's natural resources. Fourth, much data exists that has not been processed into a form that people can understand. And

fifth, there is a belief that the State has spent millions of dollars on information which is either not used or to which access is restricted due to lack of staff.

These stumbling blocks have occurred precisely at the time when the State needs to package its valuable information to take advantage of new opportunities. Take the area of trade and economic development as an example. State and local agencies, both public and private, have shown interest in promoting enterprise with foreign investors, but lack the necessary information to make investment decisions. Similarly, foreign investors are looking to explore the possibility of investing in Alaska, but lack critical resource information.

The Department of Natural Resources believes that with the collection of some new data, but mostly the packaging or perhaps repackaging of existing data, information needed to make these important resource and investment decision can be made available to the public and to state decision-makers. DNR proposes to network its data bases as well as those of other government agencies such as United States Geological Survey and Bureau of Land Management. Its plan claims that the expertise exists in-house, and the cost would be about $250,000. The payback, DNR claims, would be in the form of better decisions by management and the legislature. Improved service to the public, whose

members would save time and money by accessing a system that for the first time would provide the equivalent of one-stop shopping, would also result.

The Department of Natural Resources, then, is at a crossroads. It has an extensive information resources management plan and the considerable expertise to put it into action. Its management structure is highly supportive and has insured that every division within the Department operates within established procedures. Training is a high priority. A desirable balance appears to exist between centralized computer system applications and decentralized, user-controlled applications. DNR seems to have an information system that exists not to process data, but to provide information to be used for making decisions.

SUMMARY

Resource management is really information management. Unfortunately, the management track record of Alaska's state agencies is mixed. Generally speaking, Alaska is well behind the private sector in the use of information networking techniques, and far from those front-running state governments who have already perceived the need for an information resources plan.

Alaska, though, has the expertise and the technology to use its information to benefit the governor, the legislature, departmental decision-makers and the general public. Models exist in this state and in the private sector which have proved that a comprehensive and coordinated information resource policy can lead to productivity gains and better decisions.

A Telecommunications Information Agency could also through its actions contribute to improvements in social services such as education.

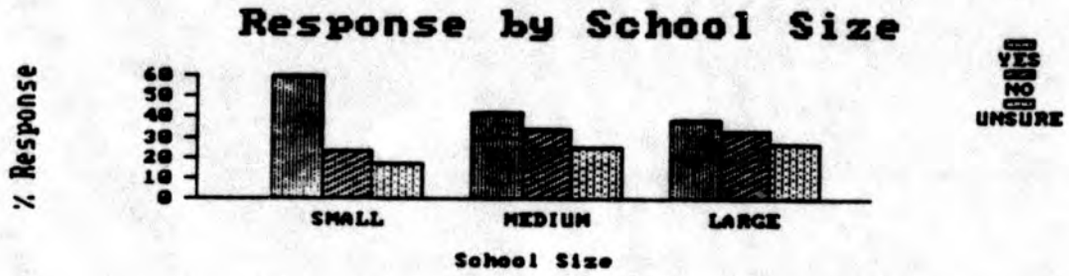
Without the recognition that the State's communication and information management systems may be part of the solution instead of part of the problem, state government may continue to quietly dismantle these systems. The individual bursts of zeal by some departments will not create the future that many people think is within reach. Without policy and budget support,

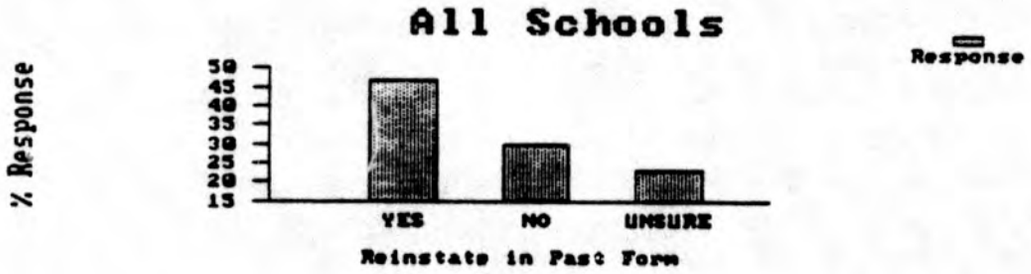
elements of the system will continue to disappear, leaving behind only a tantalizing glimpse of what was possible.

CHARTS, GRAPHS AND TABLES

Should Learn Alaska Be Reinstated In Its Past Form?

	SCHOOL SIZE		
	SMALL	MEDIUM	LARGE
YES	60.00%	42.00%	39.00%
NO	23.00%	34.00%	33.00%
UNSURE	17.00%	25.00%	27.00%
# of schools	52	65	33

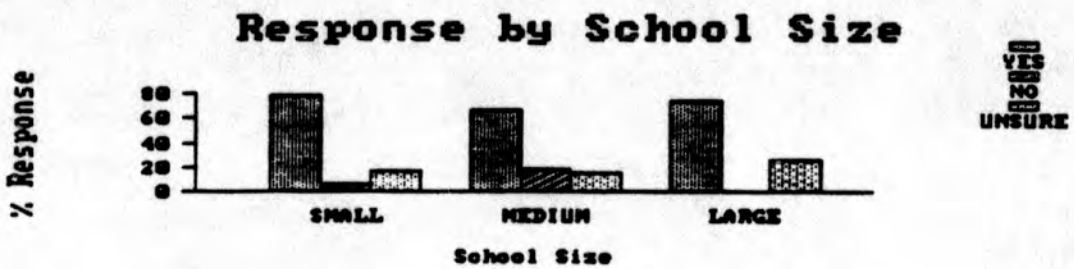


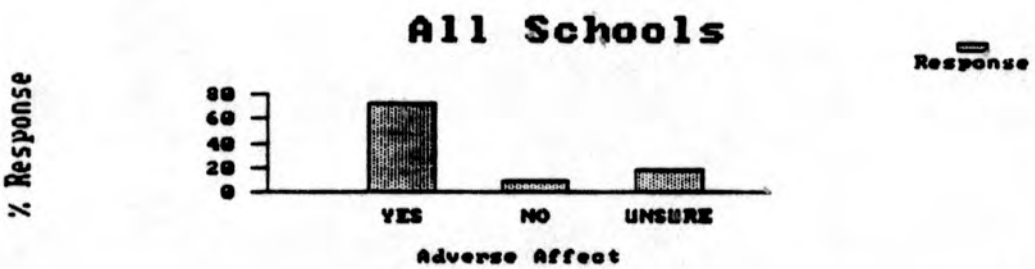


While a majority of the respondents felt that the reduction of ITV was adversely affecting Alaskans, only 47% overall (60% though of the small schools) wanted Learn Alaska reinstated in its past form. This indicates that the structure and/or content of Learn Alaska was not generally meeting its users' communication and information needs.

Has the Reduction of ITV Had an Adverse Affect on Rural Alaskans?

	SCHOOL SIZE		
	SMALL	MEDIUM	LARGE
YES	79.00%	67.00%	75.00%
NO	5.00%	18.00%	.00%
UNSURE	16.00%	15.00%	25.00%
# of schools	62	79	40

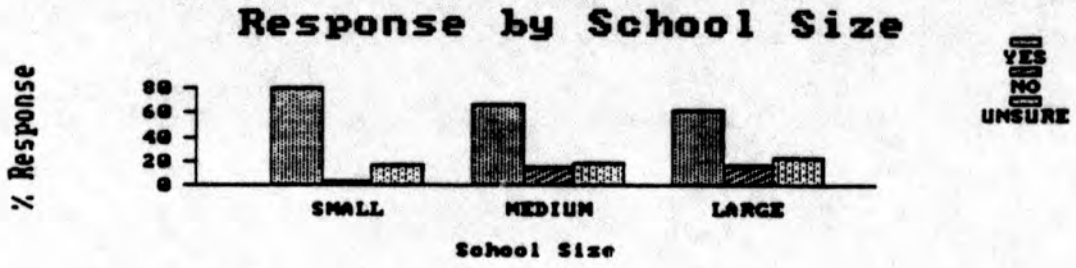


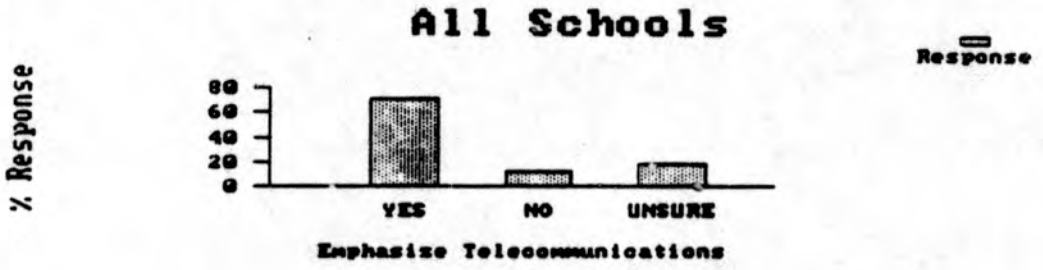


A clear majority of the respondents felt that the reduction of educational programs caused by the elimination of the ITV portion of Learn Alaska has had a adverse affect on rural Alaskans. Small schools in particular felt this way.

Should State Emphasize Telecommunications to Assist Schools?

	SCHOOL SIZE		
	SMALL	MEDIUM	LARGE
YES	80.00%	67.00%	62.00%
NO	3.00%	15.00%	16.00%
UNSURE	16.00%	18.00%	22.00%
# of schools	61	79	37





A majority of the principals felt that given declining revenues which are resulting in fewer educational resources, the State should renew an emphasis on telecommunications as one means of assisting schools. This is especially true in the smaller schools. As with the other survey questions, most of the principals not responding yes were unsure rather than negative towards the idea.

Table I

How Learned About Berger Commission Report by Medium

	Rural Alaskans	Anchorage residents
Television	69%	44%
Radio	69	52
Newspaper	69	78
Magazine	26	15
Book	17	7
Friends	60	26
Number of respondents	35	27

One hundred rural residents and one hundred Anchorage residents were selected by a random sampling method and interviewed by phone in early November 1986. Thirty-five of the rural residents and 27 of the Anchorage residents had heard of the report. The above table indicates all the ways in which those respondents learned of the report.

Table II

How Would Prefer to Receive Such Information

	Rural Alaskans	Anchorage residents
Television	25%	32%
Radio	16	10
Newspaper	42	42
Magazine	3	5
Friends	2	3
Book	11	7
Number of respondents	91	99

Answers for rural Alaskans total less than 100 percent because of rounding error.

Table III

Preferred Medium for Information About State Government

	Rural Alaskans	Anchorage residents
Television	31%	28%
Radio	22	16
Newspaper	26	43
Mail	11	7
VCR	1	1
Friends	1	5
Number of respondents	100	100

Table IV

Preferred Medium for Programs About Alaska and Alaskans

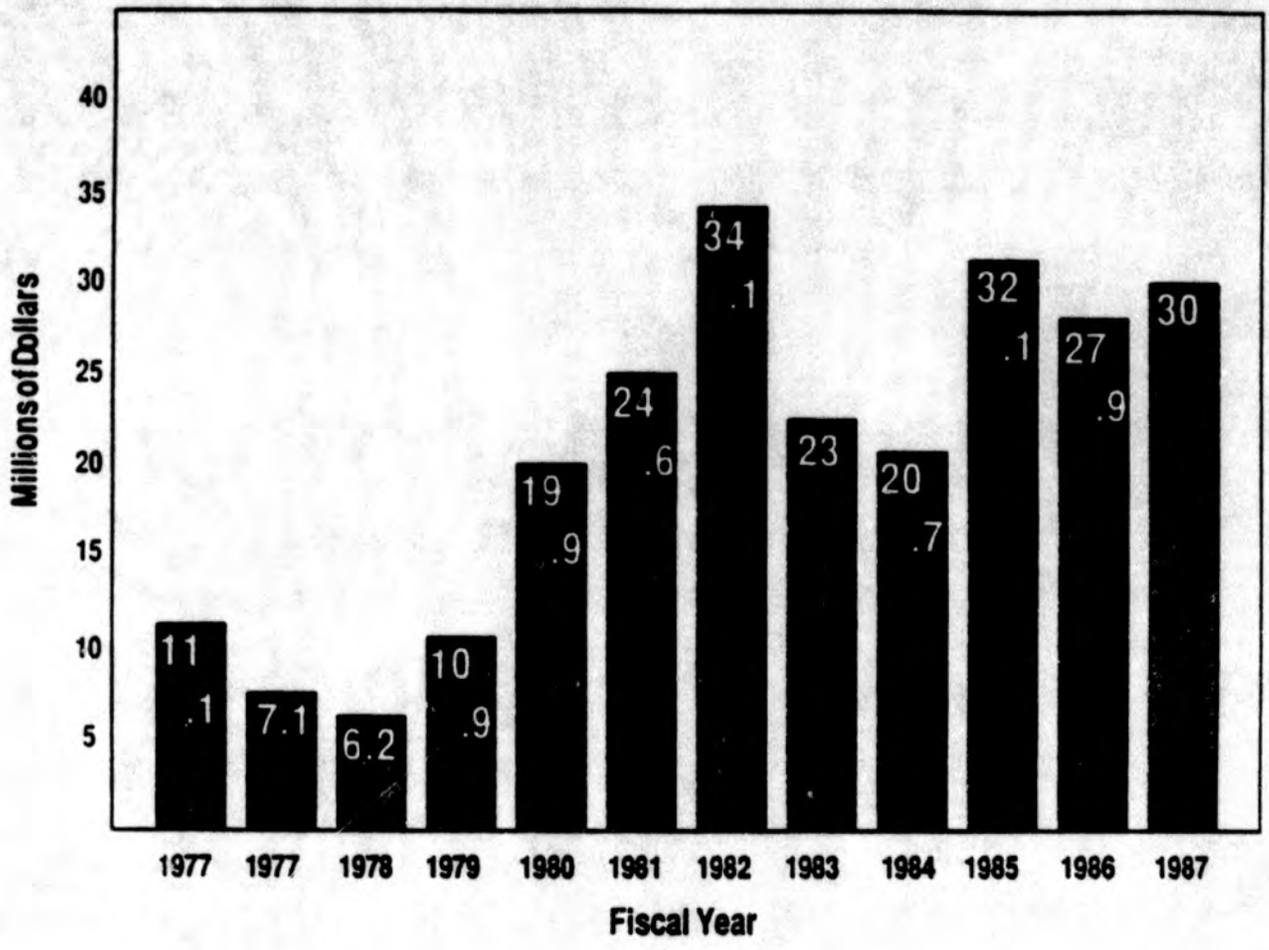
	Rural Alaskans	Anchorage residents
TV	74%	78%
VCR	9	7
Radio	17	15
Number of respondents	99	100

Alaskan Telecommunication History

1900	Congress appropriates money for Washington/Alaska military cable and telegraph system (WAMCATS).
1935	WAMCATS is renamed Alaska Communications System.
1962	First public radio station is established in Fairbanks (KUAC).
1969	Alaskans watch Neil Armstrong walk on the moon; it is the first live satellite TV broadcast.
1970	Alaska Educational Broadcasting Commission is established.
1971	Alascom buys White Alice System from the military; Governor Egan creates Office of Telecommunications Policy and places it within his office; experiments begin in delivering health and education services to rural Alaska via satellite.
1972	Telephone rate integration.
1973	Regular telephone and television services via satellite begin.
1974	New director of telecommunications appointed; dissatisfaction with Alascom service prompts state to consider the creation of a state-owned system of satellite earth stations.
1975	State buys 100 satellite earth stations; ATS-6 satellite continues the process of refining the delivery of health and education services to rural Alaska; following extensive negotiations, Alascom agrees to operate and maintain satellite earth stations; State House passes resolution expressing the importance of communications planning and policy for "the welfare of the state and its citizens."
1976	Alaska Public Broadcasting Commission is created.
1977	Rural Alaska Television project begins.

1978	Responsibility for telecommunication planning is moved out of the Governor's office; Legislative Teleconference Network is created to increase public participation in government; TV coverage of the Legislature begins.
1979	Governor's Office of Telecommunications Policy disbanded; Department of Transportation assumes telecommunication support function but lacks policy making responsibility.
1980	Department of Administration assumes telecommunication responsibilities; Learn Alaska Network begins statewide educational TV and audioconferencing service.
1981	Governor Hammond signs Executive Order 50, urging development of basic and advanced telecommunication services; telecommunication services are consolidated under the Department of Administration.
1982	GCI enters interstate market.
1984	Breakup of AT&T; a study commissioned by Senator Sackett recommends further study of telecommunication in Alaska; Deputy Commissioner for Telecommunication is fired by Governor Sheffield, and position is left unfilled.
1985	A study commissioned by Senator Sackett urges the creation of a multi-million dollar educational computer network; House Special Committee on Telecommunication submits its first report calling for a comprehensive overhaul of state telecommunication policy; end-user telephone access charges begin; AT&T files to end Alaska telephone subsidy; citing the availability of new communication technologies and the need to reduce government spending, Governor Sheffield declares his support for continued funding of the Legislative Teleconferencing Network; the FY '86 budget for the network is reduced by almost half.
1986	The price of oil falls to $10 a barrel; Learn Alaska's educational TV service is eliminated; there is controversy over state subsidized entertainment TV but the rural TV channel survives; funding for many state telecommunication activities is reduced; GCI files for permission to enter intrastate market.
1987	

Telecommunications Appropriations
1975-1986



Does not include spending for computing by individual agencies. This statistic is not collected.

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2. AS 44.21.315, pp.76,77.

3. Dickson, G.W., "Management Information Decision Systems," p.113, Business Horizons, Indiana University, December 1968.

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   Rogers, Everett, New Information Technologies, Oxford Press, New York, 1986. See chapter on "Diffusion of Innovations."

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7. Bramble, William, "Information Resource Management: What Is It? What Good Is It To A Department Of Education? How Can It Be Done?," November 11, 1986, p.5.

8. Ibid, p.5.

Talking to Each Other, Talking to Machines

Alaska's Telecommunication Future

A report to
The Joint Committee on Telecommunications

of the
Alaska State Legislature

January 1987

Written by

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Prologue

Approximately five years from now high volumes of digitized information will begin traveling between the United States and the Orient at speeds approaching that of light over a submarine fiber optic cable which will follow the coastline of Alaska.

That cable illustrates one of the themes of the following report: telecommunication technology is highly volatile -- so volatile that policy makers can hardly hope to keep up with it, much less make policy decisions that anticipate the direction of its growth. It also demonstrates that Alaska is well positioned geographically to step into the Information Age, located as it is halfway between Silicon Valley and Japan, a nation that has chosen to build its 21st century economy on information.

This report has three additional themes. One is that Alaska has few outside referents as it attempts to set telecommunication policy. It is part of the United States and yet it is apart from the United States. In many respects -- its economics, its cultural diversity, even its size -- it resembles other countries more closely than it does other states. Yet its telecommunication policy makers must be mindful of First Amendment law, rulings of the Federal Communications Commission, and antitrust law. This limits the utility for Alaska of other nations' solutions to telecommunication problems.

The third theme is that the geographic isolation of many of the state's residents creates a major dilemma for policy makers in an era of deregulation and declining revenues. Not everyone in Alaska can be served by telecommunication unless the state takes an active role in the process. It was not economic for a village of 25 to pay the costs of the satellite dish linking it with the outside world. It is no more economic for that village to pay the production costs for the information exchanged between it and the outside world (this problem is very like that of Third World nations that can not afford to develop their own video production facilities and resent importing productions from Europe and the United States). Should the state provide more support? Less? Could it be more effective if it intervened in other ways?

The fourth and final theme is that information is a resource, susceptible to good or bad management just as are other resources. Information created within state government and used by state government should be subjected to resource management policies. Such policies have been developed within

private industry and have been adopted in other state governments. Issues that have arisen with identification of information as a resource have tended to revolve around the question of the extent to which control of this resource should be centralized. This report takes a somewhat different tack, suggesting that what is important is that management of information be coordinated.

Although these themes are developed in the sections that follow, this is essentially a report about what Alaskans think. It is based on interviews gathered from throughout the state: from rural and Anchorage residents; from participants in the AFN convention in October; from University of Alaska, Anchorage, students; and from Native high school students. It also reports the judgments of telecommunication experts who were asked to visualize Alaska's telecommunication network as it may appear at the beginning of the next century.

We, the authors of this report, being human, have our own views of what might be best for Alaska. These views have undoubtedly influenced our interpretation of the facts we have gathered. But our intent has not been to put our own opinions forward. Our main objective in this report is a basic one in the Information Age: We simply want to throw more information as fuel into the policy debate in the hopes that the resulting telecommunication and information management policies will be better forged.

We are Larry Pearson and Douglas Barry, assistant professors, and Sylvia Broady, professor and chair, of the Department of Journalism and Public Communications at the University of Alaska, Anchorage. Others who have contributed to this project include Richard Taylor, assistant professor of journalism and public communications; Chris Herberger, legislative assistant to State Rep. H.A. "Red" Boucher; John A. Kruse, professor of public administration in the Institute for Social and Economic Research of the University of Alaska; and Ronald Langley, director of the University of Alaska, Anchorage, Office of Information Technology. This project was funded by the Joint Interim Committee on Telecommunications of the Alaska State Legislature.

-- Jan. 13, 1987

Alaskan Telecommunication History

1900	Congress appropriates money for Washington/Alaska military cable and telegraph system (WAMCATS).
1935	WAMCATS is renamed Alaska Communications System.
1962	First public radio station is established in Fairbanks (KUAC).
1969	Alaskans watch Neil Armstrong walk on the moon; it is the first live satellite TV broadcast in Alaska.
1970	Alaska Educational Broadcasting Commission is established.
1971	Alascom buys White Alice System from the military; Governor Egan creates Office of Telecommunications Policy and places it within his office; experiments begin in delivering health and education services to rural Alaska via satellite.
1972	Interstate telephone rates are adjusted to bring costs of calls from Alaskan in line with rates for calls over similar distances in the lower 48.
1973	Regular telephone and television services via satellite begin.
1974	New director of telecommunications appointed; dissatisfaction with Alascom service prompts state to consider the creation of a state-owned system of satellite earth stations.
1975	State buys 100 satellite earth stations; ATS-6 satellite continues the process of refining the delivery of health and education services to rural Alaska; following extensive negotiations, Alascom agrees to operate and maintain satellite earth stations; State House passes resolution expressing the importance of communications planning and policy for "the welfare of the state and its citizens."
1976	Alaska Public Broadcasting Commission is created.
1977	Rural Alaska Television project (RATNET) begins.

1978	Responsibility for telecommunication planning is moved out of the Governor's office to the Department of Administration; Legislative Teleconference Network is created to increase public participation in government; TV coverage of the Legislature begins.
1979	Governor's Office of Telecommunications Policy disbanded; Department of Transportation assumes telecommunication support function but lacks policy making responsibility.
1980	Department of Administration assumes telecommunication responsibilities; Learn Alaska Network begins statewide educational TV and audioconferencing service.
1981	Governor Hammond signs Executive Order 50, urging development of basic and advanced telecommunication services; telecommunication services are consolidated under the Department of Administration.
1982	GCI enters interstate market.
1984	Breakup of AT&T; a study commissioned by Senator Sackett recommends further study of telecommunication in Alaska; Deputy Commissioner for Telecommunication is fired by Governor Sheffield, and position is left unfilled.
1985	A study commissioned by Senator Sackett urges the creation of a multi-million dollar educational computer network; House Special Committee on Telecommunication submits its first report calling for a comprehensive overhaul of state telecommunication policy; end-user telephone access charges begin; AT&T files to end Alaska telephone subsidy; citing the availability of new communication technologies and the need to reduce government spending, Governor Sheffield declares his support for continued funding of the Legislative Teleconferencing Network; the FY '86 budget for the network is reduced by almost half.
1986	The price of oil falls to $10 a barrel; Learn Alaska's educational TV service is eliminated; there is controversy over state subsidized entertainment TV but the rural TV channel survives; funding for many state telecommunication activities is reduced; GCI files for permission to enter intrastate market.
1987	

Chapter One

Telecommunication and Information Management: How Did We Get Here?

Where Are We Today?

In Kodiak, a fisherman picks up a phone to call a processor in Seattle for the latest price his product will fetch in a Tokyo fish market.

In Juneau, an administrator with the Department of Education uses a computer mail system to send time sensitive information to rural school superintendents.

In the village of Alukunuk, a health aide uses a special telephone line to consult Alaska Native Health Service doctors in Anchorage about the condition of a patient. The telephone link combined with good training has reduced the costs of medical care and helped save lives.

In Anchorage, a senior manager in the Department of Natural Resources uses computer databases to help officials of the Kenai Borough prepare to do business with an Asian company interested in Alaska's coal.

In Mentasta Lake, high school students watch a state-funded television series on Alaska's ecosystems, then talk directly to subject experts over the state's audioconferencing system.

Every day, in hundreds of ways, telecommunications meet human needs and stitch an enormous land mass together through networks composed of telephones, audio conferencing facilities, computers, and satellite radio and television links. The exact value of social and economic activity aided by telecommunication is unknown. It is hard to put a dollar figure on a decision assisted by computers, or an idea sparked by a telephone call or an instructional television program. But common sense and a considerable body of research[1] suggest the overall value of telecommunication is considerable.

Information is increasingly seen as a resource not unlike gas or oil or fish or minerals. Moreover, there is a generally accepted belief that information

and the technologies used to gather, store, retrieve and make use of it will play an even more vital role in the future.[2]

Indeed, many of the most successful corporations in America see information as a strategic asset and they value and protect it accordingly. There is also recognition among some state governments that the delivery of services, the protection of natural resources, the creation of telecommunication networks that assist the conduct of public and private business, and much more, all depend on how information resources are managed.

Until recently, Alaska could count itself among a handful of states which not only identified the strategic importance of telecommunication, but invested huge sums of money to build public networks that were without equal. Now this distinction and the benefits derived from it are in serious jeopardy. Alaska may be in the process of unwittingly squandering its strategic information assets.

Here is a partial list of cuts made during the 1986 legislative session:

The Legislative Teleconferencing Network was cut by almost half even after then-Governor Bill Sheffield asked state agencies to make greater use of the system to save travel costs;

Substantial cuts were suffered by the audioconferencing systems operated by the University and Department of Education, resulting in a reduction of the usage of those services[3];

The Learn Alaska Instructional Television Network was eliminated;

Funding was reduced for the State Film Library, making it much more difficult for teachers to acquire films and videos for classroom instruction;

Funding for certain kinds of computing was cut while other kinds were spared or increased, but no rational pattern for these actions could be determined;

The means to produce television programs about Alaska were substantially reduced;

Funding for the training of people to use telecommunication technologies was reduced;

In some state departments workers who monitored the information fed into computer systems were lost.

These budget cuts and those threatened in the coming year pose a clear

and immediate danger to the operation of Alaska's state-supported telecommunication networks. These cuts are being made without full consideration of their consequences in the short or long run. This is happening because of the absence of a statewide telecommunication and information policy. In the absence of any comprehensive policy, it is difficult to contemplate an alternative to the present state of drift and dismemberment.

How We Got Where We Are

The present state of affairs is perhaps part of a pattern which has featured great peaks and valleys in the quantity and quality of government involvement in the development of telecommunication in Alaska. Generally speaking, progress, at least as defined by the creation of systems, has been greatest when interest and involvement from the governor and Legislature were highest. When interest and involvement were low, development of systems tended to mark time or regress.

State government involvement in the development of delivery systems can be divided roughly into three stages: the early or startup stage (1971-'75), the middle or operational stage (1976-'81), and the advanced or applications stage (1982-'86). It is this last stage when government attention has been weakest. Years of reduced attention coupled with the present budget crisis have put the systems at risk, largely ignored user needs, and threaten to return the state to a level of development better suited to the 1960s than the 1990s and beyond.

Meanwhile, the national and international trend is to build up, not tear down; to recognize and further exploit the value of telecommunication, not ignore it. Indeed, as Alaska looks to the Pacific Rim in search of markets, the reliance on telecommunication is likely to be greater than ever.

As of January 1987 the state's electronic information delivery systems include:

1. A statewide television network which reaches approximately 240 rural communities, plus a television microwave system on the Kenai Peninsula. A cable television channel in Anchorage, operated by the University of Alaska. Four public television stations and 15 radio stations also receive state funding.

2. Two main audioconferencing systems -- the Legislative Teleconference Network which reaches about 70 sites, and the statewide Learn Alaska audioconferencing system, which serves primarily school districts and university users. Of course, all state agencies and most businesses and private households are connected via the privately owned telephone system.

3. One main computer network which is operated and maintained by the Department of Administration (DOA). Currently, all of the other departments', the University's and the Legislature's computer networks connect with DOA's to some extent with the exception of the Department of Labor's. (Labor is planning to connect with DOA soon.) Many state agencies also have their own electronic mail systems.

The Startup Stage (1971-1975)

State government involvement in telecommunication can be traced from the early 1970s. The settlement of Alaska Native land claims, oil exploration and construction of the pipeline brought a rapid influx of people and money, requiring corresponding growth in business and government activities. These and other events stimulated a major increase in demand for improved telecommunication services, largely in the form of better telephone connections. Increased demand focused attention on the inadequacies of the military communication system which, after meeting military needs, had attempted to serve the needs of the civilian population since the 1930s.

The need for reliable, up-to-date telecommunication networks for the exchange of timely information became even more vital for responsive decision-making, for the efficient delivery of goods and services throughout Alaska, and for the effective operation of government. According to Professor William Melody, who directed The Alaska Communication Research Project in 1978:

> The costs of inefficiency in the Alaska telecommunications system were compounded many times. The effects rippled throughout the state, limiting economic, political and social development. Telecommunication inefficiency provided a major barrier to the integration of Alaska into the United States.[4]

A larger problem was the integration of cities, towns and villages into Alaska. Aside from mail service and a network in the rural areas maintained by small aircraft, it was difficult for Alaskans to communicate among themselves. Major gaps in information and understanding existed between regions.

Recognition of these problems served to increase calls for major improvements in telecommunication services both within Alaska and to and from the lower 48 states. As personal and commercial communication requirements grew, the military system proved unable to meet the demands. The inferior quality of the service, the failure to extend the system to remote areas, the lack of sufficient capacity, and the high cost of the service provided major barriers to the development of telecommunication in Alaska.

Besides the need for improved telephone service, there was also a belief that a state that received its television programming often more than three weeks after the rest of the country, and where national and international television news could be frustrated if the videotapes missed their plane in Seattle, was not very well positioned to leap into the Information Age.

Rapid changes in the structure of Alaska telecommunications took place in the early 1970s. These changes were partly the result of market forces fueled by the construction of the oil pipeline. But not all telecommunication problems were solved by the interplay of market forces. Indeed, such forces, especially as they operate in areas that are economically underdeveloped, are often an inadequate stimulus for providing innovation or equity of access to telecommunication technology and services. State policy makers in 1971 understood what officials in other states are just beginning to comprehend: The public sector needs to be active and creative in fostering private sector initiatives in the development of telecommunication systems that serve important economic and social purposes.[5]

Historically, throughout most of the country, governments and businesses have relied on the local phone company to do telecommunication planning for them. Just as private firms have begun to do their own planning (indeed, the threat of private companies bypassing public networks has prodded phone companies into providing better services), states are realizing that they must take on this task as well. While it is true that states have built up considerable expertise in data processing and information systems, an equivalent organizational capacity has yet to be developed in the area of state telecommunication management.[6]

This was not the case in Alaska, at least with regard to the development of systems planning expertise. Paralleling the purchase of portions of the military's system by RCA Alascom was the extension of state regulation over intrastate telephone activities by the Alaska Public Utilities Commission. An office of telecommunication -- one of the few such entities in the nation at the time -- was created in the office of the governor to address long-range policy planning issues affecting the state. These ranged from extension of telecommunication services by satellite to remote areas, to the development of new technologies that would be adaptable to Alaska's harsh environment, to the advocacy of the state's interests in policy matters before the Federal Communications Commission and other federal agencies.

In addition, the Alaska Legislature took a special interest in telecommunication matters. But the primary emphasis of all this attention was on technical development and the creation and operation of systems based on hardware. Little effort, outside some attention paid to the delivery of health and education services in the early 1970s, was devoted to developing ways to apply the technologies.



Active governmental leadership at this time in planning the public telecommunication networks led to a number of important results. In 1974, the administration of Governor Jay Hammond took office and the director of the Alaska Educational Broadcasting Commission, who had been active in the early satellite experiments, became the new governor's director of telecommunications. A core group of government technicians with experience in the then-new satellite earth station technology now had access to the governor and the Legislature.[7] This opportunity to place telecommunication high on the government agenda lasted several years, then went away.[8]

By the end of 1974 there was considerable dissatisfaction among many rural Alaskans about the rate at which Alascom was providing telephone service to the 142 locations required by the state in the agreement which allowed Alascom to be purchased from the military.[9] Acting in accordance with the wishes of the Legislature, Governor Hammond appointed a task force to study the problem. The task force recommended the state develop its own system of small earth stations to serve these rural communities. The Legislature appropriated $5 million to purchase 100 such stations. Following extensive negotiations, Alascom agreed to maintain them. Rural telecommunication had begun the shift to a largely satellite based system, and at least a portion of this vast area now had telephone service. It could be argued that the development of telecommunication in all its forms, particularly in rural Alaska, has played an important role in enabling Native people to participate more actively in the state's development. Indeed, research conducted in provinces of rural Canada indicates that the introduction of telephones helped create communities of interest wherein, for example, leaders can plan, discuss priorities and coordinate strategies.[10] Other research has found that the introduction of a new communication technology has increased the amount of overall communication activity and created a demand for more communication technologies.[11]

It should be noted that even when access to telecommunication is relatively widespread, communication alone will not necessarily create economic development; other factors must be present. According to Robert Hornik: "Communication technology works best as a complement -- to a commitment to social change, to changing resources, to good instructional design, to other channels of communication, and to detailed knowledge about its users."[12] Also needed as complements to communication are other infrastructures, including transportation, effective organizations, expertise, and delivery of social services.

The Operational Stage (1976-1981)

The operational stage involved the continued development of the state's telecommunication networks and direct involvement in policy and implementation by the governor and the Legislature. Among the important

events of this period were the rise of publically funded television networks and the consolidation of responsibility for many telecommunication activities under the Department of Administration.

In 1976 the Legislature appropriated funds for a satellite "demonstration" project, which used one of Alascom's satellite transponders for the distribution of mostly live commercial television to the state's urban areas. By appropriating an additional $1.5 million for small earth stations, the Legislature extended the project to many rural areas of the state. This service, now in its 10th year, is known as the Rural Alaska Television Network (RATNET).

Within a very brief time, the government had organized and generously provided for the distribution of live television throughout the state. Two organizations were created: RATNET and the Alaska Public Broadcasting Commission (APBC). The role of APBC was to distribute funds appropriated by the Legislature to public television and radio stations in several Alaskan communities. RATNET distributed mostly entertainment programming provided by Anchorage affiliates of the major networks. Programs were selected by a board composed of rural residents.

While these additions to the public telecommunication system were generally applauded, it appears that little attention was paid at the time to a formal assessment of specific public needs regarding programming content. Legislative decision-making seemed to be guided by good will, perceived constituent enthusiasm, a desire to work towards a particular kind of information equity between urban and rural Alaska, and a wish to tap technology for the purpose of linking Alaska with the lower 48 states through the images of mostly commercial television.

As long as budgets were fat there was apparently little need to ask if these networks were providing what people needed or wanted, or whether they could cooperate more closely to provide better, more cost-effective service. Needs existed for regional and culturally relevant programming, especially in such areas as health care, business management, resource development, land planning, adult education, school and university curriculum support, and environmental protection, but few advocates emerged in favor of producing Alaska programming that had been identified as needed.[13] This is ironic given the role that at least the concept of educational applications played in the very early days of the satellite television experiments.

Alaska was interested then in building systems. How these systems would proceed to identify and serve important human needs was discussed occasionally, but never came close to achieving the interest and support accorded the systems themselves. Alaska is not alone in this regard. All over the world people are grappling with problems created when technology, not user needs, is in the driver's seat.[14]

Meanwhile, frequent official statements about the value of telecommunication to social, economic and political development continued to be matched by government action. In 1977 the Legislative Teleconferencing Network was created. Legislators could now converse with their constituents and conduct hearings over long distances. It was hoped that public participation in government would increase while travel time and expense declined.

Eight years later, with state revenues in sharp decline, there was renewed hope that audioconferencing technology would help decrease the cost of government and increase public access to government. During the 1985 legislative session, the Legislature and the governor approved the use of teleconferencing for conducting public hearings and meetings. Governor Bill Sheffield in his transmittal letter to Speaker of the House Ben Grussendorf wrote, "The availability of new communications technology combined with our declining revenues make passage of this important measure [HB 140] a timely step towards economical, efficient expansion of public access to the administrative process." However, the FY '86 legislative budget for line charges was reduced by $200,000 (41 percent), and staff was cut 43 percent.

These seemingly contradictory actions may appear inevitable if not understandable given the state's current gloomy economic situation. Yet what has occurred is also suggestive of a pattern whereby enthusiasm for hardware purchases exceeds enthusiasm for spending money to effectively operate the systems. To date there has been no evaluation of how well the audioconferencing system has worked. However, in the Department of Administration's view, the audioconferencing network has saved government departments substantial sums in travel expenses.[15]

The Legislature in 1979 requested that the Department of Education and the University assess the need for a statewide educational television system. The recommendation to the Legislature was for a single TV channel and an audioconferencing network to serve all schools, university campuses and many rural and urban communities. A second educational channel would be added if needed. The advanced stage of telecommunication in Alaska had begun.

The Advanced Stage (1982-1986)

During this stage the systems planned in the earlier stage came into existence. Instructional television, audioconferencing and computing established themselves. Legislative and executive branch interest peaked and then declined.

Adding instructional television and audioconferencing to the state's telecommunication crown was highlighted by an executive order from

Governor Hammond. The document comes as close as anything written before or after to a manifesto on the subject of telecommunication:

> As governor, I find that adequate telecommunications facilities and services available at reasonable and affordable rates are essential to the conduct of government, commerce, and private life . . . the future development of the state's public and private sectors will depend greatly on the innovative use of new telecommunications services and techniques now becoming available. It is in the interest of all people for the state to facilitate the development of both basic and advanced telecommunications services and facilities to be available to all citizens for their individual and mutual benefit . . .

Two years before this was written, the Governor's Office of Telecommunications was abruptly eliminated. The reasons behind closing the office are unclear, though reports suggest that the office ran afoul of several prominent legislators who were pursuing a different telecommunications agenda.[16] A key support agency in the formulation of public policy vanished without extensive public discourse.

In his 1978 report to the state, Professor Melody observed:

> Policy making is an ongoing process involving continuing advocacy of different interests and negotiation among competitive interests. Alaska is unique among states in establishing a governor's office of telecommunications to act as a catalyst for policy planning and an advocate for the interest of the public of Alaska. But Alaska's telecommunication problems continue to be unique.[17]

There has been much speculation as to whether closing the office was wise given the accomplishments that occurred when telecommunication policy planning and advocacy were in close proximity to the governor. According to Professor Melody:

> . . . GOT [Governor's Office of Telecommunications] has been involved as an advocate of the state's interests and has influenced the course of developments in significant and observable ways. Continuation of this public advocacy is essential if the multitude of continuing policy decisions and negotiations at the federal and state level on such matters as revenue settlements, satellite policy, rate integration, rural development, etc. is to reflect the interests of the state. Experience has shown that Alaska is not likely to get its rights in telecommunications policy matters. But there will be opportunities for the state to insist on receiving them.[18]

One question is whether Alaska, in its dealings with powerful interest groups such as private telecommunications companies, has operated on a level playing field since the Governor's Office of Telecommunications was disbanded in 1978.

Some of the functions of the office were revived and expanded in 1981, and placed under the Department of Administration (DOA). But the personalities had changed along with the boxes on the organizational chart. Both variables affect policy and its implementation.

The "powers and duties" of the new telecommunications divisions were cited in Executive Order 50 and in the Alaska Administrative Code.[19] They include: advise the governor and Legislature; coordinate, manage and supervise all state programs in telecommunications; provide technical and consulting services to all state agencies; prepare a statewide telecommunications development plan; promote governmental coordination and unity, and much more. In addition, the budgets of RATNET and the APBC were moved under DOA.

Governor Hammond and the legislative leadership of the day handed DOA and the incoming governor an extraordinarily full plate. For example, the Division of Telecommunications Services and the Division of Telecommunications Systems (later renamed Operations) were required to do everything from planning, designing, constructing, managing and operating all telecommunication systems owned by the state to developing a plan for "integrated instructional telecommunications services for all residents of the state."[20] For good measure, the law directed every state agency authorized to develop its own internal communication system to "coordinate its design, development, management and operation" with the Division of Telecommunications Operations.[21]

Executive Order 50 alone requires DOA to prepare annually at least six major reports for the governor and Legislature. To accomplish these tasks, plus all the other duties indicated in the legislation, would require a sizable staff with a wide range of expertise that agency funding has so far not permitted. Further, it is questionable whether divisions which place an emphasis on data processing functions and telephone hardware procurement and maintainance can also deal effectively with television distribution questions or social policy goal-setting. A mixed mandate, no real power to force compliance from other agencies, changing technology, selective compliance with statutes, and lack of attention to non-hardware needs have recently been cited by some commentators as reasons to revise Executive Order 50 and the thinking on which it was based.[22]

Clearly, no policy regardless of its scope and wisdom will produce the desired results unless the governor and Legislature are involved in its formulation and implementation. This means that there must be policy continuity from one administration and from one legislative body to another, and that policy must be continuously monitored and modified to fit changing technologies and human needs. The lack of continuity during this critical third stage of telecommunication development helped insure that the telecommunication system, which is much more than the sum of its parts,

would not be effectively represented when it came time to slash the budget.

Lack of continuity and the hard realities of a precipitous slide in state revenues during 1986 help explain the decision by the Legislature to dismantle the Learn Alaska instructional television network, following slightly more than four years of operation. The demise of the network can be seen as a direct result of policy failure. Though Executive Order 50 states the need for identifying long-range goals and objectives in educational and instructional telecommunication, for developing "consistent public policy," and for holding public hearings as part of the planning process, there is no evidence in the record that any of these tasks either directly addressed the role of Learn Alaska or were referred to in making budgetary decisions. Further, there is evidence of considerable inter-agency rivalry and lack of cooperation during all four years of the network's existence, which played a role in frustrating the intent of Executive Order 50 pertaining to instructional telecommunication.[23]

Another policy problem which has negatively affected the ability to make fully informed decisions about the performance and relative usefulness of Learn Alaska, as well as other components of the telecommunications system, is the lack of reliable research data. Objective information about user needs and preferences and how they are being met is critical to providing quality service and justifying the continuation of that service. Yet little of this information was available during the brief debate over the network's budget. Arguments against continued funding of the network essentially focused on whether entertainment television, whose distribution in rural areas is also subsidized by the state, was more popular than educational television. When the criterion is popularity, education will always lose.

What is ironic about Learn Alaska is that its managers -- the University of Alaska and the Department of Education -- appear to have focused much more attention on developing and managing systems than attending to how the systems could be used for education. Normal institutional constraints such as insufficient financial resources or divergent administrative styles or philosophies cannot account for this lopsided emphasis. For example, throughout the entire history of the development and operation of Learn Alaska there has not been one major research work published by the University, or apparently anyone else, on the non-technological, user-centered aspects of network operations.[24] What has been published tends to be of a glowingly descriptive nature, most often written by an impressed visitor from the lower 48 states or abroad. Typical of these accounts are recent articles in the *International Political Science Review* and *Development Communication Report*.[25] Although millions of dollars were spent developing and delivering education material by satellite, and despite all the international interest, little is known about the effectiveness of Learn Alaska.

There has been little serious, informed public discussion regarding the wisdom of state subsidized television production or distribution of any kind. Those few in government who have shown an interest in this issue have taken the position that television, other than for the purposes of providing entertainment for rural audiences and Public Broadcasting programs for mostly urban audiences, should not be a funding priority. Their view has been that it is not a proper area for public policy. This runs counter to widely held beliefs that television is a powerful social and cultural force, and that its educational applications and social implications are too important to be left entirely in the hands of the private sector. Some scholars, for example, claim that we are in the midst of a learning revolution in which visual electronic media are playing a key role by offering, especially to students, an unintended curriculum.[26] They claim that primary students beyond the third grade and secondary students receive more than 50 percent of their information from television, compared with 10 percent from print.[27] The implication is that public institutions, especially schools, have failed to address the changing concept of literacy and the supposed effects of learning that takes place via electronic media.

Current law specifically bars the state from making specific program decisions. However, the state is not barred from making broad decisions that have an impact on content. And it has made such decisions in the past. The state need not be oblivious to the debate over effects, applications and the role of government. Research, including what little has been done in Alaska,[28] suggests that television, particularly its social effects and educational applications, is an appropriate area for public policy attention.

In the absence of such attention, Alaska has lost a world class educational television network, the production of Alaska-specific educational programming is down by an estimated 98 percent,[29] Alaska-specific public television production is down by an estimated 25 percent,[30] and the Alaska Film and Tape Library which helps distribute educational and Alaska-specific programs may disappear in the next fiscal year.[31] In addition, a transition team report to Governor Steve Cowper has recommended the elimination of RATNET.

One of the reasons given for the elimination of the Learn Alaska Network was that the Film and Tape Library could take up the slack by making and distributing duplicate copies of instructional television programs whose rights were purchased by the Department of Education. When the network ceased operation in July 1986, tape requests from schools and school districts more than doubled. During FY 1986, when Learn Alaska was operating, the library received 11,000 tape requests. During the first part of FY 1987 -- the library stopped filling requests in October 1986 because of budget cutbacks -- more than 22,000 requests had been received. A film and tape librarian estimated that requests would have exceeded 30,000 if the tape duplication service had continued through the end of the year. She said, "Learn Alaska created a taste for instructional television that has

increased every year."[32] If the Tape and Film Library is cut out of the FY 1988 budget (the Juneau branch of the library was closed last year and the Anchorage branch lost three staff members), the only way for schools to receive programs would be to purchase rights individually from program producers and distributors.

It would be unfair to conclude that the operators of Alaska's telecommunication systems have learned nothing about the applications of technologies. Take the University as an example. Between March and May 1986, at the time when the value of Learn Alaska's television service was being questioned by one or two key rural legislators, all University of Alaska units were surveyed from an office within the University as to their present and anticipated instructional and administrative uses of voice, data and video communication.[33] The survey concluded that need for and interest in use of telecommunication were strong but a number of problems had to be solved before more benefits could be achieved. The survey made a number of recommendations: encourage cooperation and coordination in the development and use of telecommunication; expand student and faculty training; field-test telecommunication technologies; remove institutional barriers to effective use of telecommunication; and explore ways to more effectively integrate voice, data and video communication.[34]

These recommendations suggest, among other things, the difficulty of implementing policy with a strong applications, end-user focus in one large state institution without strong support from top administrators. A statewide telecommunication policy must include a system of incentives and disincentives -- most likely budgetary -- to insure compliance. Nevertheless, the recommendations generated from within the University mark an important departure from earlier, hardware oriented approaches to telecommunication. However, substantial reductions in the University budget, which occurred after this survey was conducted, will probably insure that few if any of these recommendations are followed. Telecommunication, unless specifically protected by an enforceable policy, will continue to suffer major cuts.

What is referred to in this chapter as Alaska's third stage of telecommunication development has produced considerable growth in the use of computers to support government operations in a wide range of areas. However, despite some notable exceptions which are described elsewhere in this report, computer use also suffers from the lack of continuing, comprehensive policy direction.

Like most states, the Alaska state government has developed a reasonably efficient computerized data processing system. However, state agencies here and in the lower 48 states have not as yet made extensive use of information management systems. Information resource management (IRM) has become popular in the private sector because of its perceived potential for increasing productivity, product support and profitability.

information is treated as a strategic asset. Since much of what the state does involves information, the application of information resource management to the public sector could result in substantial benefits. A handful of states have taken the first steps in this direction: drawing up a statewide telecommunication policy and creating a policy planning and implementation entity, with information resource management as its centerpiece.

More efficient government, however, has not been the only motivation for those few states that have attempted to formulate a comprehensive telecommunication policy. It has been suggested that telephone deregulation and divestiture have imposed new demands on state governments for policy-making and management. Before deregulation, federal and state governments traditionally followed a policy of "co-regulation," characterized by a high degree of commonality in federal and state goals. According to Professor Eli Noam: "As the 1970s unfolded . . . the divergence in goals between the federal and state governments became pronounced. The federal redistributory or equity goal became secondary to a pursuit of economic efficiency through reliance on a change in markets and competition."[35]

Through the political process, state governments remain committed to the traditional goals of keeping residential telephone rates low, providing universal service in outlying areas, and maintaining the public telecommunication networks. A few states have recognized the need to craft policy that ensures universal service while simultaneously providing business and government users the benefits of technological innovation and competitive pricing.

Colorado, for example, developed a plan calling for the construction of a government communication network.[36] Using primarily microwave technology, the system is capable of low-cost voice and data transmissions among state offices. The state government found that it could better serve the public interest by bypassing the Mountain Bell system for some of its telecommunication needs. Despite concerns about potential damage to the public telecommunication system if the state went its own way, so far there has been no evidence of serious problems. Colorado's strategy aims to insure the continuation of reasonably priced telephone service to rural areas, make government communications more efficient, and preserve the public telephone network.

New Jersey and Delaware, on the other hand, have attempted to find out where information held by state departments is located, what information is needed, and how much is spent on gathering and processing information.[37] The belief here is that it is not possible to effectively manage what cannot be accurately counted. Less emphasis is placed on state-owned communication networks. Delaware's information management plan also addresses the telecommunication needs of state educational institutions.

According to its plan, South Carolina has developed an information resource management strategy for several reasons: to better serve the public, to reduce the annual rate of increase in government operating costs, and to improve the productivity of the state government workforce.[38] In essence, South Carolina has provided a model for systematically examining the movement and management of information within state government. In addition, it has focused a cautious eye on the possible effects of deregulation and divestiture. According to its telecommunication plan, "The deregulation of the communications industry has created a situation where many large organizations, such as international corporations and other state governments, have found it cost effective to develop their own telecommunications management capability."[39]

Most of the state information resource management plans, including one proposed for Alaska,[40] address at least some of the following goals:

1. To determine information needs;
2. To make information available to decision-makers and coordinate the sharing of information within government;
3. To evaluate the state's information programs;
4. To manage information technology cost and use;
5. To facilitate the delivery of information to the public;
6. To make the communication networks accessible by and affordable to the public.

An example of an Alaskan project that met two of the above goals -- determining information needs and facilitating the delivery of information to the public -- is one undertaken by the Cooperative Extension Service on Kodiak Island. The Cooperative Extension Service with assistance from the Department of Community and Regional Affairs has developed a pilot program to introduce microcomputers to small Native villages on Kodiak Island. The program is in response to a needs assessment which found that village corporate and government entities require timely information on subjects such as land use planning, environmental conservation and state regulations. A preliminary evaluation by the Cooperative Extension Service indicates that the efficiency of village business and government has improved as a result of the computers and associated training schemes.[41]

Extension agents and village officials now envision computer links to state agencies and to other villages around the state, creating new communities of interest and making possible the exchange of technical information. It is hoped that these applications will improve the

management of rural resources, help develop technical expertise within villages, and contribute to economic development. The problem is that there are currently no funds to test the usefulness of these ideas. A single state or federal agency working in isolation may not be able to do what is necessary. A state telecommunication policy could address situations such as this.

Most states have treated telecommunication issues as technical issues, best left to engineers, professional regulators and, periodically, special interests both in and out of government. Elected officials have relied on public service commissions to protect consumers and respond to industry. This narrow telecommunication agenda is now obsolete, in the view of several states. The central issue on their new telecommunication policy agenda is not: How should it work? but: What should it deliver?

Some Lessons From History

1. Information and telecommunication systems are strategic assets that require ongoing public policy attention. The rate of technological and economic change necessitate a creative, responsive approach to policy-making and implementation.

2. Information and telecommunication assets will be squandered, with negative social and economic consequences, in the absence of comprehensive, enforceable policy.

3. Attempts at making information and telecommunication policy have been most successful when interest from the governor and Legislature was highest.

4. Information and telecommunication policy is much more than building and maintaining systems. Policy should include: assessment of user needs; provision of user training and education in the operation of information technology; improvement of public access to information; provision of evaluation criteria for state-funded programs using information technology; and stimulation of the development of new telecommunication applications.

5. Policy planning and implementation should involve all levels of government.

6. The need to improve the quality and usefulness of information should be viewed separately from information technology.

7. Information management techniques and technology can improve government efficiency and public services.

Footnotes

[1]See, for example, Tom Forester, ed., *The Information Technology Revolution*, Cambridge: MIT Press, 1985, and Leonard Lewin, ed., *Telecommunications in the U.S.: Trends and Policies*, New York: Artech, 1981.

[2]See, for example, Hiroshi Inose and John Pierce, *Information Technology and Civilization*, New York: W.H. Freeman and Co., 1984.

[3]Interviews with Michael Woodhead, utilization specialist, Learn Alaska Audioconferencing Network, November 1986; Dr. William Bramble, Alaska Department of Education, November 1986. Both estimated that use was down at least 30 percent from the previous year.

[4]William Melody, *Telecommunications in Alaska: Economics and Public Policy,"* report to the State Legislature, April 1978.

[5]Mitchell L. Moss, "A New Agenda for Telecommunications Policy," in *New York Affairs*, September 1986.

[6]Ibid.

[7]Walter B. Parker,"The Alaskan Satellite Experience: Lessons for the Developing World," paper presented at the Conference on New Directions in Satellite Communications: Challenges for North and South, University of Texas, Austin, October 1984.

[8]Ibid.

[9]Ibid.

[10]Heather Hudson, "Community Communications and Development: A Canadian Case Study," unpublished doctoral dissertation, Stanford University, 1974.

[11]Harvey Leibenstein, *General X-Efficiency Theory and Economic Development*, New York: Oxford University Press, 1978, pp. 37-38.

[12]Robert Hornik, "Communications as Complement in Development," *Journal of Communication*, Spring 1980.

[13]Parker, op cit.

[14]See, for example, Jeremy Tunstall, *The Media Are American*, New York: Columbia University Press, 1978. Also see Vincent Mosco, *Pushbutton Fantasies*, New Jersey: Ablex, 1982.

[15]Department of Administration, *Annual Report on Teleconferencing to Governor Bill Sheffield*, May 1985.

[16]Interviews with Bill McCaughan, former director, Learn Alaska Network, and Walter Parker, telecommunication consultant, November 1986.

[17]Melody, op cit.

[18]Ibid.

[19]Alaska Administrative Code, pps. 62-79.

[20]Ibid., p. 74.

[21]Ibid., p. 75.

[22]Larry Pearson, Doug Barry and Chris Herberger, "Managing Alaska's Information Resources: A proposed Statewide Policy," report to the Interim Joint Committee on Telecommunications of the State Legislature, January 1987.

[23]Interviews with Bill McCaughan, former director of the Learn Alaska Network, and Dr. William Bramble, former administrator of Learn Alaska. Details of a conflict between the two operators of the system -- the University of Alaska and the Department of Education -- were reported on the "Capitol '86" television program of May 9, 1986.

[24]Richard Taylor, "A Crisis in Alaska Television Programming," unpublished manuscript, January 1987. Professor Taylor analyzed more than 150 articles and government documents for his study.

[25]Heather Hudson, "New Communications Technologies: Policy Issues for the Developing World," in *International Political Science Review*. Beverly Hills: Sage, 1986, and C. Green, "Instruction by Audio Conference: An Alaskan Example," *Development Communication Report*, 48, 1985, pp. 1,6.

[26]Mary Alice White, "Technologies for the Curriculum: Or a Curriculum for the Technologies?" paper presented at the National Educational Technology Leadership Conference, Portland, Ore., 1986. See also "Information Technology and Its Impact on American Education," Office of Technology Assessment, U.S. Congress, 1982.

[27]Ibid.

[28]Norma Forbes, Clark Ashworth, Walter Lonner and Danuta Kasprzyk, "Social and Cognitive Effects of the Introduction of Television on Rural Alaska Native Children," final report to Alaska Council on Science and Technology, University of Alaska Center for Cross-Cultural Studies, 1984.

[29]Taylor, op cit.

[30]Ibid.

[31]Interview with Mary Jennings, librarian, Alaska Film Library, January 1987.

[32]Ibid.

[33]"An Assessment of Present Use and Future Needs: Electronic Voice, Data, and Video Communication," University of Alaska, September 1986.

[34]Ibid.

[35]Eli Noam, "Federal and State Roles in Telecommunications: The Effects of Deregulation," *The Vanderbilt Law Review*, 36(4), 1983.

[36]*Long-Range Telecommunications Plan for the State of Colorado*, 1985.

[37]*Delaware State Telecommunication Plan*, May 1985; New Jersey, *Office of Telecommunication and Information Systems*, September 1985.

[38]*South Carolina State Plan on Technology*, October 1983.

[39]Ibid.

[40]"Managing Alaska's Information Resources," report to the Interim Joint Committee on Telecommunications.

[41]"Apples in the Bush," Cooperative Extension Service, Local Government Project Report, Anchorage, 1986

Introduction to the Research Chapters

The next four chapters contain the principal research findings of this report. A variety of techniques were used to gather information that it is hoped will help answer questions in several areas of information and telecommunication policy making.

First, information resource management is examined in Chapter Two. The major promise of information management for Alaska is that it can smooth the internal workings of state agencies. It also promises to improve the interactions between the government and the private sector. The major question that must be addressed by those in government as they weigh commitment to information resource management is its costs versus its benefits. Chapter Two contains case studies of two government departments that have taken steps to introduce information management practices. It also reports the views of a number of people with knowledge and interest in the subject. The chapter doesn't conclusively answer the question of costs vs. benefits of information management systems for state government -- probably nothing less than experience can do that. But the case studies suggest that the benefits will far outweigh the costs.

Chapters Three and Four provide information about quite different aspects of telecommunication -- and as they relate to quite different users. The subject of these chapters is telecommunication media. And the users of interest are rural and urban Alaskans. Two hundred Alaskans were selected using a random sampling technique and interviewed in November 1986. They were asked questions about their use of the telephone, the computer, television, radio and VCRs. Half of those interviewed were Anchorage residents, half lived in rural areas. The chapters report a number of differences in telecommunications use and interest between the urban and rural groups. The chapters provide information about users that addresses such policy issues as the elasticity of demand for long-distance phone service, the demand for instructional programming and programming about Alaska and Alaskans, and the demand for audioconferencing. We believe the findings are a good indicator of how the populations we drew the samples from use telecommunication. The findings fall short, of course, of providing the answers for another kind of cost/benefit analysis: Are the costs of

adjustments in telecommunications services to meet the wishes of Alaskans outweighed by the social benefits?

Most of the issues addressed in the earlier three chapters are encountered again in Chapter Five. That chapter critically examines both information management and telecommunication services. The critical appraisal is provided by a number of Alaskans with special knowledge of the subject. This chapter is the report of another kind of survey. The participants were invited to brainstorm about how information might be managed and telecommunications might be used in Alaska 15 years from now. The participants have sketched in some detail the telecommunication environment of 2001. It is hoped that their picture of the future can help in the identification of policy issues to be addressed in the present.

The research chapters were intended to provide information in three areas in which the authors felt such information was scarce. The chapters do not provide a comprehensive overview of telecommunication and information policy issues. And they don't answer all the questions in those areas they do address. But they do provide some information that wasn't available before. They should make it possible for us to move on to more sophisticated questions.

Chapter Two

Information Resource Management

Where We Are Now

Every year the Alaska state government spends tens of millions of dollars to collect and store information. Government is an information organization. Indeed, it is estimated that more than half of all state workers are information workers.[1] Information -- passed around by word of mouth, paper, computer and other means -- is perhaps the state's most valuable strategic resource because it makes possible the identification, counting and management of all other resources. Resource management is information management.

It has been argued that no other activity offers such concentrated room for improvement as information collection and analysis, and yet it is only recently that formal procedures have started to appear in state government.[2] But lessons available from the private sector may have been learned too late. Today the state's information resource -- the ability to gather, store, retrieve, interpret, communicate and make use of information for the benefit of all Alaskans -- is in trouble.

The source of trouble is twofold. The process of managing the state's information resources has suffered substantial harm during the past five years from lack of policy direction from the governor's office or the Legislature. While laws have been passed extolling the importance of information to economic and social development, and stipulating ways to coordinate and improve its use, the practical effects of this legislation have been limited.

The second source of trouble is the current economic situation. Budget cuts during the past 18 months have adversely affected the state government's ability to gather and analyze information. This is ironic since solutions to the state's economic problems require the best possible information. And it runs counter to the example offered by private industry. When faced with financial difficulties, organizations in the private sector must act quickly to improve their information capabilities in order to survive.[3]

One example of harm that may occur if the present state of drift and dismemberment continues is the Department of Natural Resources (DNR).

During the past few years, DNR has spent about $8 million to collect information. It directly accesses more than $16 million worth of information collected by other state agencies.[4] This information enables DNR to carry out responsibilities which include obtaining title to millions of acres of lands acquired under the Statehood Act, and planning for and managing timber, grazing and agricultural lands, wildlife habitat, recreational resources, oil, and gas and coal, plus other leasable minerals.

The DNR's information management and analysis group -- the people who massage a myriad numbers and facts so they make sense to decision makers -- has been cut during the last two years from a staff of 12 to 5. In addition, 2 to 3 more staff members may lose their jobs at the end of the fiscal year.[5] According to one DNR section chief:

> This service is in deep trouble. While other groups were getting across-the-board cuts, we received . . . much deeper cuts. Monies that we had put in reserve and earmarked for future data collection and analysis were taken to make up for shortfalls elsewhere. We cannot maintain a system for the effective and rapid analysis and retrieval of information until people recognize that we ultimately provide the least expensive way of getting resource data into the hands of potential users and investors.[6]

DNR was chosen for this study because of the role it plays in the state's economic development, and because it is one of two state departments that have information resource management plans approved by former Governor Bill Sheffield. DNR is considered to be quite advanced in both the technology and techniques used to gather, process and analyze information for decision making. The Department has also participated in efforts by state and federal agencies to create electronic networks to share information and avoid costly duplication.[7] Much of what has been accomplished is now at risk.

Other state agencies are acting to improve management of information. The Department of Fish and Game has an approved information resource management plan and the Department of Administration has a plan in draft form. The Information Systems Committee (ISC) was created in 1983 by a governor's policy statement to assist with the planning and coordination of information systems in state government. Another group, the Information Resource Management Expenditure Approval Committee (IRMEAC), reviews proposed software and hardware purchases for all 15 state departments. The purpose of the reviews is to promote compatibility among information systems. IRMEAC was created by statute and placed within the Department of Administration, which has the authority to manage data processing and telecommunication for the state.

It has been suggested that attempts at planning have often become mired in the inability to get the majority of the state's 15 departments to participate, much less agree to cooperate. The problem, according to one

source, is that planning groups lack the clout to compel departments to comply with their recommendations.[8] The solution, according to another source, is to give a centralized telecommunications and information planning entity more power than the organizations it is designed to provide policy direction for.[9]

Considerable doubt exists as to whether the efforts so far come anywhere near what is needed. One problem is that requests for information far outstrip the ability of many departments to meet them. Another is that while the necessary information may exist within an agency, it is often not in a form that can be used by managers, the general public or the Legislature. Information managers in the Department of Natural Resources estimated that the state has spent millions of dollars on information which is either not used or to which access is restricted due to a shortage of staff.[10]

Easy access to reasonably priced, accurate information helps societies to adjust quickly and respond effectively to new problems and opportunities.[11] The field of information economics suggests that as the cost of searching for information falls, the amount of search that is privately and socially useful increases.[12] In other words, the information that more efficient management produces can aid decision-makers in both the private and public sectors.

But interviews with state agency personnel and a review of pertinent correspondence to Rep. H.A. "Red" Boucher point to a number of problem areas in Alaska. Needed databases do not exist, and some of the databases that do exist are disjointed. A central resource agency with the necessary tools to provide technical and planning support to all state agencies exists only on paper. Proper training for support staff and management is not available in proportion to the need. Purchases of incompatible software and hardware have frustrated some efforts to create new networks. There is currently no policy to help identify what information resources are most important nor how they should be further developed to the state's best advantage.

The present budget situation and government transition have made things worse. Planning groups are simply waiting. Many senior managers do not consider better information management as a key to agency survival, budget cutters appear unaware of the strategic value of information, equipment upgrades and proposals for new services have been put on hold, and, most disturbingly, key technical and planning personnel and even some administrators who have tried in the past to protect them are losing their jobs. All this is happening as newspaper headlines such as "State Agency's Financial Records a Mess" point to failures to manage state information resources.[13]

Of course it can be argued that hard choices must be made soon about what government can and cannot afford to do. It has been charged that information management can become a bottomless pit into which state agencies and their budgets are lured by hardware vendors and starry-eyed computer programmers and information analysts. Those who hold such

beliefs point at suggestions by representatives of some state agencie
support for information management activities should be increase
reduced. What then is the value of information resource managemen
where should one look for guidance on what -- if anything -- should b
to encourage its development in Alaska?

To help answer this question, the next sections look at the evolut
information resource management in the private sector, suggest th
concept has applications for government use, and present two case s
where information management techniques are used in Alaska
government departments.

What the Private Sector Has Done

Information resource management (IRM) has become popular i
private sector because of its perceived potential for increasing produc
product support and profitability.

Many of the costs of doing business -- materials, labor, energy --
increased dramatically over the past few decades. On the other han
cost of information storage and processing has decreased 10,000-fold
1956. Information systems have made it possible for private indus
more efficiently use the more expensive resources. It has been a
reduce inventories and at the same time improve services and inc
profitability. Improved record keeping provides businesses with inform
about how rapidly stocks of different goods are being depleted and
them when it is necessary to reorder -- computers can even plac
orders. Businesses such as national car rental companies are able t
computer simulations to decide how many cars should be placed in the
in various cities at different times of year.

Business is discovering that an added benefit of advances in inform
technology is increased employee creativity. More hours are shifted
mundane tasks to problem solving, as powerful analytic tools are pla
workers' fingertips. And new information technologies can fac
smarter, better communications. This in turn improves decision makin

Evidence of the growing importance of IRM (also widely know
management information systems, MIS) within corporations can be fou
the increasing investments in hardware, software, and support staff, ch
in methods of product development, marketing, research, delive
products and services, and in changes in the techniques used to m
internal operations. The American Express Company, for example,
about five percent of its $8.1 billion in revenue in 1985 on inform
processing.[14] It has been estimated that data processing expenditur
large companies were growing at an annual rate of about 30 percent
late 1970s.[15] More recently emphasis has been placed on the manag
of these databases to support decision making. One management mo

use by the private sector is a steering committee composed of senior management. The committee provides direction in formulating information management strategy and revises priorities to meet changes in the business environment. Another relatively new creation is the chief information officer (CIO), who increasingly manages the day-to-day information activities within corporations.

The ultimate objective of all these things is to improve performance. This is best accomplished by shifting from managing computers to managing information resources. When a system provides information to be used in the decision making process it is a true information system. A true information system contains information, not data.[16] The system produces for each decision maker just those facts and figures that are needed to aid his or her decision making. The paramount objective of information systems must be to support the improved performance of people in organizations.[17] This is why some experts have urged that IRM should focus on the decision process. Procedures and new user applications should be developed and organized in ways that help make decisions.[18]

According to Richard Nolan, the key to successful information management is to develop a multi-level plan that is woven into the operating fabric of each department.[19] It may be advisable, for example, to bring information resource functions -- data processing, research, acounting and finance, analysis, quality control -- under a single reporting authority with close ties to top management. Individual units still carry out their distinct information resource duties under the supervision of line management, but their activities are structured in such a way as to be responsive to the specific needs of top management. Most importantly, decisions must be made on what IRM will be -- its priorities and purposes; when, where and whom it will serve.

If management makes these decisions about what IRM will be without benefit of agreed-on strategy and planning, the decisions are likely to be wrong. If they should happen to be right, the rationale won't be understood by the users. In either case, if the users don't understand the strategic directions of information resource management, they won't provide cooperation and support.[20] Strong support from all levels of management is essential if a sound strategy is to be developed and implemented. Studies of the introduction of innovations to the workplace have shown that the necessary changes will not occur in the absence of full involvement by management. If the changes are not seen by staff as a priority, the strategy will most likely fail through active and passive resistance.[21] Recent studies of the development of information resource systems conducted at the Massachusetts Institute of Technology have shown that while the gains from such systems are impressive, they also generate fear and anxiety on the part of the organization's staff. Staff involvement in the planning process has been effective in overcoming resistance. However, the innovations may die later if support from top management is not clear and sustained.[22]

All this assumes that top management believes strongly in the potential

benefits of IRM. This support must take the form of additional investments in the information and telecommunication budget category. Expenditures for private sector IRM have grown because of increased information seeking and processing activities necessitated by changes in the marketplace. A large share of the increased spending has been for software and hardware and the staff to run it. These expenditures are now recognized as an essential cost of doing business. While the practice of *satisficing*,[23] or not examining all possible alternatives and searching for the optimum one, has been the standard practice of governments, the private sector must compete and innovate or perish. But satisficing is no longer acceptable for many state governments. Changes in federal revenue sharing and economic dislocations have focused the attention of many state governments on the bottom line. Nowhere is this more true than in Alaska.

Two Case Studies

This section looks at two Alaska state government departments which have taken different approaches to managing their information resources. The Department of Natural Resources was selected for study because of its rather substantial experience with developing information management systems. The Department of Education (DOE) was selected because of its relatively recent interest in developing these systems. DNR is moving into a stage which emphasizes more advanced applications of information management techniques, while DOE is in the process of designing its systems.

Department of Natural Resources

DNR began developing a long-range information resource plan in 1983. The plan is one of two approved by Governor Sheffield. This plan will assist in setting budget priorities for fiscal year 1988, and will set directions for department action through 1990. In addition, the plan will be reviewed and updated annually.

The goals of the plan, as they relate to information management, include: improve the availability of information required by the public; collect and compile objective and reliable natural resource data; develop and implement capabilities to solve resource analysis issues; provide for public participation in natural resources planning and decision making; make decisions through balanced and objective planning.[24]

The plan was developed with the following assumptions in mind:

Expanding pressures and increasing competition for use of DNR-managed resources will continue, requiring more informed decision making and increasing public accountability; improved data and information will be required to support decisions and monitor resource management activities; the basic organization, roles and responsibilities

of the various units within DNR will continue to be dynamic; the trend to manage information, technology and change with more of a department-wide perspective to achieve economies of scale and cost effective results will continue; use of new and changing technologies will aid in solving DNR's management challenges; and funds for operational programs and new projects will become increasingly difficult to obtain.[25]

The plan continues for some 300 pages, describing in detail the dozens of strategic objectives, budget impacts, status updates, needs and implementation action. It has the all-important endorsement of upper management. It translates the expansive spirit of Executive Order 50 and subsequent legislation directing state agencies to join the Information Age into a detailed road map plotting how DNR can get there and stay there. It does almost everything except implement itself. That, however, will require sustained funding and policy support from the governor and the Legislature.

In addition to its information resource management plan, DNR has been active in creating natural resources databases, developing new applications for technology, and creating user networks. DNR is a major participant in the state/federal interagency Committee on Natural Resources Information Management (CONRIM) and recently helped organize the Northern Information Networking Conference (NINC), which focused on the belief that better information collection, analysis and exchange will lead to better decision-making and better use and conservation of Alaska's resources.

Despite these efforts, DNR appears to be at an important crossroads in the development of its information management capabilities. Several issues loom large in the minds of the department's information planners. First, user demand for information is currently estimated to far exceed the capability to respond. Second, the planners believe the department needs "information manager" positions within divisions to assist in feasibility studies, technical liaison and general information needs. Third, there is currently no database that provides an accurate, up-to-date inventory of the state's natural resources. The program that was collecting information for possible use in creating this database was cut by 80 percent in 1986. Fourth, much data exists that has not been put in a form that people can understand. And fifth, there is a belief that the state has spent millions of dollars on information which is either not used or to which access is restricted due to lack of staff.

Another related concern is that recent and projected staff layoffs include people whose responsibilities include maintaining quality control over information that is collected and entered into computer storage systems. The collection and storage of inaccurate data may lead to inaccurate decisions.

All this is seen as making it difficult for the state to take advantage of new opportunities. Take the area of trade and economic development as an example. State and local agencies, both public and private, have shown

interest in promoting enterprises with foreign investors, but lack the necessary information to make investment decisions. Similarly, foreign investors are looking to explore the possibility of investing in Alaska, but lack critical resource information.

Lack of information creates significant obstacles to economic development. On the other hand, knowing what resources exist and where allows the entrepreneur to accurately study the environment of a proposed development site and accurately calculate costs. Matching this information with regulatory requirements is critical to assessing development opportunities. Additional questions that need quick answers involve land ownership, available infrastructure, transportation, environmental quality and a host of permit issues.

Say, for example, a borough government is interested in developing local coal deposits with a foreign investor. A situation like this involving Kenai exists now. The borough needs a blueprint detailing what steps to follow in dealing with the resource issues, taking into account all social, legal and environmental conditions. The borough will need information on soils, vegetation, slopes, elevation, wetlands, ownership, airports, roads, energy sources, fish and wildlife uses, and perhaps air and water quality. An analysis is needed which will present investors and legislators with a list of development strategies. Most of the work can be done now by DNR using existing data and technology. But, because of staff cutbacks, only one such request can be handled at a time even though the number of requests continues to increase.

Another example of the capabilities and limitations of existing information systems involves the development of hardwood forests in the Susitna basin. Recent concern has focused on wood fiber fuel for power. A request was made for about 3,000 acres per year for 15 years. Additional and competing requests have recently been made by another customer interested in power generation and a customer wishing to export logs to Japan. Using mapped and automated data, the DNR will network with other agencies to analyze the demand for hardwood forest products within the basin.

DNR and the Center for International Business, University of Alaska, Anchorage, have identified three critical elements for someone wishing to become involved in international trade and investment in Alaska. The elements are a directory of Alaskan firms interested in international trade, a directory and catalog of information about Alaska resources, and an international trade profile. The directory of Alaskan firms would be relatively simple to create. It could be compiled by using the existing Alaska Trade Directory, making some minor additions, and automating and linking with the other two elements of the package.[26] A directory and catalog of natural resources would require a substantial amount of work. Much information already exists in DNR's databases, but some analytical and statistical products and adequate user access would need to be developed.

The required facilities and expertise already exist within the department, but apparently the manpower does not. The trade profile would access current statistics and historical records of the federal import and export sources. Portions of this element would consist of a series of reports relating commodities, countries, export locations, dates, quantities, consumption patterns, prices and exchange rates.

What is being proposed by DNR includes some collection of new data, but it is mostly the packaging or perhaps repackaging of existing information. Private industry places a major emphasis on this activity in order to provide clients with new value-added services. Recently, several big publishing concerns have tapped a rich source of new profits by gathering and packaging financial information for sale to investment bankers, brokerage houses, and the financial media.[27] This segment of the information industry is estimated to be growing at the rate of 20 percent per year.[28] Airlines and insurance companies are other examples of industries in which the repackaging of information has led to major changes.

To insure that information needed to make sound decisions is available, DNR proposes to link together its databases as well as those of other government agencies. Its networking plan claims that the expertise exists in-house and that the cost would be about $250,000. The payback, DNR claims, would be in the form of better decisions by management and the Legislature, and improved service to the public, whose members would save time and money by accessing a system that for the first time would provide the equivalent of one-stop shopping.

Networking is especially popular in the private sector, as companies struggle to connect incompatible hardware systems and experiment with new software that shows patterns and relationships among databases. Creating a super network can be costly, and as always special attention needs to be paid to data security and individual privacy. However, proponents claim that there is substantial payback in the form of the multiple use possibilities, the creation of customized information packages, reductions in duplication, and cost savings on future automation. DNR offers to transfer the networking technology to any state agencies and provide all necessary training.

If the network was funded, who would use it? Getting people to use information technology has been a major challenge for private industry. And there are those in Alaska who claim there is little of use now on the state's computer networks. Good systems design and extensive training are seen as ways to boost utilization and, later, productivity. DNR claims high use of its present system. The key, managers feel, is a facility called a learning center. The three-person training staff assists all divisions within the Department in meeting the goals of the information plan. In addition DNR's trainers have recently done work for the Governor's Office, Department of Fish and Game, and the Department of Administration. One of the trainers noted that layoffs due to budget cuts have increased the demand for computer training and

information systems planning, as managers scramble to find ways of maintaining productivity.[29] DNR managers argue that technology and its applications must be aggressively marketed within the Department. The belief is that once an employee is sold on what the technology can do for the individual, acceptance occurs and resistance is almost never a problem. One rule of thumb, however, seems to be that it costs far more to make a piece of technology useful than it costs to buy it.

DNR, then, is at a crossroads. It has an extensive information resource management plan and the considerable expertise to put it into action. Its management is highly supportive and has insured that every division within the department operates within established procedures. Training is a high priority. A desirable balance appears to exist between centralized system computer applications and decentralized, user-controlled applications. DNR seems to have an information system that exists not to process data, but to provide information to be used for making decisions. Finally, efforts are underway to effectively interconnect and, it is hoped, to integrate small systems within the department and larger systems beyond.

But the fate of this component of the department that exists to help those in government make better decisions about Alaska's resources now hangs on the decisions of others.

Department of Education

DOE, with hundreds of employees, the largest budget in state government, and statewide responsibilities for educating young Alaskans, has recently assigned a senior administrator to assess the need for an information resource management plan.

The interest in developing a plan comes partly from the quiet prodding of the Information Systems Committee, but mostly from the belief that a systematic approach to managing information can make department operations more efficient in the face of declining state revenues.

According to the results of an internal needs assessment, DOE's most critical information resource needs are for:

1. Information about program quality, especially as it is affected by and relates to the revenue issue.

2. Improved accuracy and quality of information at a time when conflicting or erroneous data can be especially embarrassing and damaging to public education.

3. Ability to simulate the "what ifs" when alternative strategies for resource allocations are proposed.[30]

DOE believes that the financial problems facing the state and the

educational system demand sma[illegible]ecision making. These decisions need to be based on the best possible [illegible]rmation. But at the moment there is concern that the department lacks the ability to obtain this kind of information. Several problem areas are being studied. One is the need to improve staff productivity and the ability to creatively respond to problems. According to the administrator for data management:

> While the department has a considerable investment in the hardware and software of information technology, few databases are installed on the systems we have available. Many data reports -- even those related to major functions such as formula funding for schools -- are still laboriously hand calculated. Databases remain disjointed and separate and cannot easily be integrated with one another. There is little capability to access or analyze data needed by one unit but collected by another unit. In fact, at present no one has a comprehensive picture of all the data collected by the department.[31]

Data and information "glut" is common to most government departments. DOE manages better than most because of good basic computing and word processing capabilities, an electronic mail system, and a staff that is receptive to use of technology. Missing is the capacity for staff members to analyze information using relational databases. One example cited is that federal program staff (large federal grants are passed on to school districts but administered by DOE) should have updated automated program information at their fingertips. District financial information should be available to DOE management as well as district administrators, and program quality data should be available in such a way that it can be easily analyzed against budget data.

DOE is now identifying the most valuable kinds of information and what to do with them. This is the key step in developing an information resource management plan. One weakness is the lack of a statewide assessment program for judging the quality of educational services.

No means exist to assess data collected by school districts through their own testing programs. External financial controls and the data to back them up are weak. Department databases for students cannot at the moment be tied together. As a result, no one knows whether DOE might be paying five times for the same special education student or whether money spent on bi-cultural education has had the desired effect.

Other problem areas include problems in reporting information to federal agencies and the need for special studies, simulations and evaluations. One example of the need for vastly improved decision making abilities concerns the formula funding issue, or the process through which school districts receive state funds. The issue is controversial. A number of conflicting suggestions for revising the formula have been made. According to Dr. William Bramble, administrator for data management, there are several major concerns associated with the inability to organize internal

communications:

> One is efficiency. We collect the same data multiple times. Secondly, our ability to make good informed decisions is hampered. And I think, thirdly, we're embarrassed in reporting to outside agencies and the Legislature poor information. One section reports one set of information and another section reports something else. And they don't match. And this creates a real problem, when you have a real tight budget situation.[32]

Dr. Bramble also sees possible benefits from better information management systems:

> One is to increase the efficiency of the process. Secondly, we can simulate the different proposals and models that could be applied, and provide accurate information to the people who will make the decision, not in this department, but in the Legislature, so at least they'll know the effect of competing, or conflicting or just different demands and proposals.[33]

Dr. Bramble has urged DOE to draft an information resource management plan as soon as possible, arguing that delay will lessen the chances of confronting problems that are sure to lie ahead. He recommended that statistical services, data processing, and the data management and assessment staff be moved under a single umbrella. Unless the plan gains the full support of top management, Dr. Bramble said, "It will not be perceived as a priority, management and staff will neither participate nor cooperate in its development, and through active and passive staff resistance it is doomed to failure."[34]

So DOE also has reached a crossroads, a turning point -- unsure whether to proceed with the development of an information resource management plan. Reluctance to act decisively is largely attributed to uncertainties over future budget and institutional priorities. Dr. Bramble and others suggested that data managers and planners are not favorite items to fund:

> All this stuff has to be coordinated by someone or it won't work. The data has to be massaged into a format that's usable to other departments and divisions, and finally it ought to be useful to the public. That takes a lot of coordination and communication. People are the key -- knowledgeable, experienced people. Well managed people. The very things we ought to be putting our bucks into, we aren't.[35]

Summary

Resource management is really information management. Unfortunately, the management track record of Alaska's state agencies is mixed. Generally speaking, Alaska is well behind the private sector in the use of information resource management, and it is far from those state governments that have already perceived the need for an information resource management plan.

Telecommunication technologies and information systems appear to have the capacity to help Alaska through this period of change and uncertainty. It is technically possible to get many of Alaska's information systems to talk to each other. It has been suggested that such linkups would be beneficial to state workers at many levels: to departmental decision makers, to the governor and Legislature, to members of the business community, and to the general public.

Some state agencies have learned the folly of investing in hardware without equal and preferably much greater investments in training the people who will operate the machines. Models exist in this state which have proved reasonably successful in realizing productivity gains and insuring that workers participate fully in experiments with new information systems.

But little bursts of entrepreneurial zeal will not create the future that many respondents to Delphi Survey questions about information resource management (see Chapter Five) thought was within reach. The problem is that for the past 18 months the Alaska state government has quietly gone about dismantling a world class telecommunication system and a nascent information management system. The fear is that in the absence of public debate, let alone any recognition that telecommunication and information management systems may be part of the solution to our problems, elements of the system will continue to disappear, leaving behind only a tantalizing glimpse of what was possible.

Footnotes

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[27]N.R. Kleinfield, "Turning McGraw-Hill Upside Down," *New York Times*, Dec. 11, 1985, E-1.

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[34]Ibid.

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Chapter Three

Anchorage Residents and Telecommunication

Telecommunication problems?

Anchorage residents appear to take telecommunication for granted. And why not? They have four commercial VHF TV stations, two UHF TV stations, cable TV, public TV, public radio, several commercial radio stations, and dozens of stores selling and renting VCR cassettes. There are public and private audioconferencing networks, and two telephone companies that are competing for Anchorage residents' long-distance business. The print media contribute two daily newspapers, the Tundra Times and several locally produced magazines.

No, unlike people living in some areas in rural Alaska, Anchorage residents have no difficulty in getting a wide variety of information and in making connections via telephone or computer networks with distant places.

But there are telecommunication problems in Anchorage. Respondents in a phone survey conducted in the first half of November 1986 had a number of complaints and suggestions for improvements. They didn't complain about an absence of some types of services, they complained primarily about absences or weaknesses in some areas of television content. Their concerns, although they may seem relatively minor in comparison with those of rural residents, are important. They offer us a look at the future. As media become more accessible in other parts of the state it may be expected that Alaskans in other areas will come to share the concerns that Anchorage residents have now.

Now, a closer look at the media habits, the likes and dislikes of Anchorage residents.

Who Are They?

Between Nov. 1 and Nov. 16 interviewers at the University of Alaska, Anchorage, talked by phone with 100 Anchorage residents chosen in a way that gave every household with a telephone a roughly equal chance of being selected.[1] The typical respondent was white, lived in a household of two or

three people, had lived in the city seven or eight years, and was 36 years old.

Eighty-five of the respondents were white, six were Native, three were black, three were Hispanic, three were other races including Asian and Pacific islander. Men and women were about equally well represented in the sample (51 men, 49 women).

Only three percent of the respondents had lived in Anchorage all their lives; 28 percent had lived there more than 10 years. Only nine of the respondents were 50 or older; the oldest was 68. This profile is in conformance with other demographic data, including census data, about the Anchorage population.

Almost all respondents worked. Just three respondents identified themselves as homemakers, two said they were retired, three were students, and one was unemployed. Occupations ranged from the familiar -- waitress, chef, banker, mechanic, nurse, bartender, sculptor -- to the arcane -- non-profit membership recruiter, fire protection engineer, computer systems engineer, contract specialist, pbx supervisor. Several of the respondents were in the military.

Fewer than half of the respondents (47 percent) belonged to any community organizations. Of those who belonged to organizations, 62 percent belonged to more than one.

Their profile suggests the Anchorage residents are a somewhat more homogeneous group than the rural Alaskans described in the next chapter. There is also a hint -- though the difference as indicated by organizational memberships is slight -- that Anchorage residents are less involved in the life of their community.

How Do They Use The Print and Broadcast Media?

The typical Anchorage respondent had listened to the radio 2.8 hours the previous day and had watched television for 2.4 hours. He or she subscribed to one of the Anchorage dailies. The typical respondent also had a VCR and about 20 tapes.

This profile distinguishes the Anchorage resident from other urban Americans in two respects: the Anchorage resident is more likely to subscribe to a newspaper and to own a VCR than is the resident of another city.

Of course, there were some exceptions to this composite profile. Twenty-one percent of the respondents had listened to no radio the previous day, while six percent had listened to it for 10 hours or more. Seventeen percent had listened to no television; six percent had listened to it 6 hours or more.

Eighty-nine percent subscribed to one of the newspapers -- a newspaper readership in Anchorage is unusually high for American cities. Ten percent of the respondents subscribed to a newspaper from another city.

Sixty-nine percent of the respondents said they had VCRs. This finding is supported by other research. The VCR industry found that about 40 percent of American households have VCRs, with penetration topping 50 percent in cities including Las Vegas, Baltimore and Sacramento. The industry research shows VCR penetration is highest in Anchorage, with 61 percent of the households having VCRs.[2].

What did the Anchorage respondents think of what they had watched and heard on the broadcast media?

Despite the number of commercial channels, many of the Anchorage respondents singled out public television and radio as being important: "Really enjoy public TV and radio," "would give public radio more support; don't cut it out," "do away with commercial programming and get more PBS," "public radio is an excellent source of information and entertainment," "public TV and radio programming is excellent and want more funding available so they don't have to grub for money."

They had some complaints and these tended to focus on news personalities and their approaches: "The people who are doing the news are not real good," "I guess I'd like to see a greater emphasis on positive and not negative bombardment of fear producing news items," "not enough detail in the TV news," "TV news stinks," "love Larry Makinson." At least some of the comments of this type may reflect the sophistication of Anchorage residents who have come to Anchorage from much bigger cities in the Lower 48 with comparably bigger TV news operations.

Several Anchorage respondents also had complaints about the election campaign that ended during the survey period. In this, they differed markedly from rural respondents who were interviewed at the same time (see Chapter Four) but who much more infrequently offered comments about the campaign. Typical comments were: "Disillusioned with elections on media," "disappointing to hear about the 'mud slinging,'" "disgusted with all the 'mud slinging' in campaigns," "I get tired of hearing and seeing the ads." These comments, negative though they are, are of interest because they confirm that Anchorage residents did have access to the broadcast media and were paying some attention to them. At least some of the comments reflect what was being said in campaign advertising and in news reports at the time.

Several of the Anchorage respondents were content with the media: "Doing good job on coverage," "[the media] appears fairly well balanced," "there is enough variety in Anchorage to pick and choose; I am quite satisfied," "media is great."

And some had suggestions: "Thought the Barrow TV program was

interesting and want to see more of it on Channel 7 [the PBS channel]," "education needs to be emphasized," "would like to see Legislature on TV; maybe committee meetings on bills that are controversial," "enjoy watching legislative sessions on TV," "because the Legislature is far away and isolated, we need the procedures on TV," "the Legislature should subsidize public radio more."

Anchorage residents were asked if they had watched several programs of the sort that might be broadcast by a state-supported channel such as Learn Alaska. Viewership of one of these programs -- the one-hour program describing the archaeological dig into a prehistoric home in Barrow -- was fairly high, even by the standards of commercial television. Forty-one percent of the Anchorage residents said they had watched the program.

Programs dealing with Native issues had lower viewership in Anchorage. More than a third (35 percent) of the respondents had watched the Native Youth Olympics, which had been held in Anchorage last spring. Only six percent had seen any coverage of the Inupiat Circumpolar Conference last August on television (46 percent were unaware of the conference). Twenty-two percent of those who hadn't watched said they would have watched if more coverage had been available.

Seventy-three percent of the Anchorage respondents were unaware of the Berger Commission report about Alaska natives that was released in late 1985. Those who were aware of the report were most likely to have obtained information about it from the newspapers (see Table I in the next chapter).

This suggests that there is an audience in Anchorage for programming dealing with Native issues. However, this audience is small -- no more than 25 to 35 percent of the audience for all programming in Anchorage.

The audience for more general programming about Alaska and Alaskans is much larger. Fifty-two percent of the Anchorage respondents said they would like to see more programs about Alaska and Alaskans. Some programming of this type -- such as the Iditarod sled dog race -- has been taken on by commercial stations. Other programs such as the Barrow TV program might deliver large enough audiences to make them an attractive investment for commercial TV -- but the Barrow TV program, in fact, was broadcast on public television.

Programming about Natives and Native issues clearly will require support from such sources as state government or Native foundations if it is to appear at all.[3] Other types of programming about Alaska lie in a gray area. Some programs in this second category may appear on commercial television; but commercial television stations in Alaska appear to be in no position at this time to take on the task of producing programs about Alaska and Alaskans on a large scale. If the desire for more programming is to be satisfied, the state probably will have to provide support in some form.[4]

Thus, just as the government has stepped in at the federal level through use of antitrust laws and FCC regulations to break up media monopolies and assure content diversity, the state government is in a position where by its actions it can increase the diversity of the broadcast media's content or, by inaction, decrease it.

How Do They Use the Telephone?

As anyone who has tried to make a long-distance call from Anchorage on Christmas Day or Mother's Day knows, Anchorage residents make a lot of long-distance calls. Answers by the Anchorage respondents indicate just how many calls are made.

Eighty-seven percent of the Anchorage respondents had made long-distance phone calls in the previous two weeks, and the average number of calls per respondent was 7.5. Ninety-seven percent of those who had made long-distance calls had placed at least one out-of-state call. The average number of out-of-state calls was 6.7.

The large majority (64 percent) said most of their long-distance calls were to relatives, with business calls a distant second (14 percent). Friends came third (8 percent). The remaining 14 percent of the respondents said their calls were about equally divided between two or more of these categories.

This suggests that the number of long-distance calls made is fairly insensitive to changes in the costs of long-distance phone calls. This was borne out by two follow-up questions, one of which found that 36 percent of the respondents would make about the same number of calls even if the long-distance rates were halved. The other found that 40 percent would make about the same number of calls even if the costs were doubled.

Of those who said they would make many more (31 percent of the respondents) or a few more (33 percent) calls if phone rates were cut in half, 50 percent said these additional calls would be mostly to relatives.

Telephone use by Anchorage residents, as indicated by this survey, is quite different from that of rural residents. The responses suggest (1) that Anchorage residents are more concerned about interstate rates and (2) that increases or decreases in long-distance rates would have less impact on the amount of phone use in Anchorage than in rural areas. From the viewpoint of phone companies, this suggests that revenue could be increased by raising long-distance rates for Anchorage residents. To the extent that this reduced phone calls, the social cost would be high: A rate increase would reduce communication among relatives in lower income families.

Twenty percent of the Anchorage residents had participated in audioconferences during the previous year. This is roughly equal to use of

audioconferencing by rural respondents (19 percent). Sixteen of the 20 audioconference users had participated in eight or fewer. Three of the remaining four had participated in 50 or more. Three of the respondents in their end-of-the-interview comments spoke favorably of audioconferencing. One of them said there should be more audioconferences.

It had been anticipated that use of audioconferencing would be somewhat lower in Anchorage than in rural areas. That may indeed be the case. Because of sampling error associated with surveys of this size, it is possible that use of audioconferencing in Anchorage could be as low as 12 percent or as high as 28 percent. Assuming, however, that the survey findings are closer than that to actual use of audioconferencing, what's the explanation? One possible explanation is that use of state audioconferencing networks is lower in Anchorage and that use of private networks in business activities is higher. Whether this explanation is true or not, it is evident that a significant minority of Anchorage residents maintain links with people in other places by audioconferencing.

Computers in Telecommunication

Public computer networks such as the University of Alaska network, business networks, and private networks such as CompuServe and The Source provide an alternative to the U.S. mail or phone calls for exchange of messages. But are they a viable alternative?

Are Alaskans becoming familiar with computers? Are they taking advantage of the messaging capabilities of computers? The answer to the first question is yes. Most of the people surveyed in Anchorage and in rural Alaska had used computers. Not many, however, had used computers in telecommunication. Use of computers for telecommunication was comparable to use of audioconferencing.

Three-fourths of the Anchorage respondents had used computers. Patterns of use of Anchorage and rural respondents are contrasted in Table 1. While a smaller proportion (60 percent) of rural residents had used computers, use patterns within both groups were similar. The largest difference was in the percentage who had used computers for school work. This difference may be explained by the fact that the rural sample was slightly older (average age of 40, compared with average age of 36 for Anchorage respondents) and that younger people are more likely to use computers.

Use of computers by young people, as shown in columns three and four of Table 1, provides some dramatic contrasts with computer use by samples of general populations. The young people surveyed were 56 University of Alaska, Anchorage, students in a freshman level class and 21 Native high school students from rural Alaska who were in Anchorage for a conference. Both student groups were surveyed in early November.

Table I

Ways Alaskans Have Used Computers

Types of use	Anchorage residents	Rural Alaskans	UAA students	Rural, Native, H.S. students
For school work	49%	43%	73%	81%
Playing games	73	70	75	95
Word processing	77	77	71	62
For an employer	81	83	60	5
Electronic mail	19	17	15	0
Programming	39	38	55	57
Number of respondents	75	60	55	21

Anchorage and rural samples were selected using a random sampling method. The student samples were not randomly selected.

Only respondents who said they had used computers are represented in this table.

The most striking difference between the student groups and the samples drawn from more general populations is that nearly all the students had used computers. All the rural Native students had, as had all but one of the urban college students. The students, as might be expected, were more likely to have used computers in school work and less likely to have used them on the job. They were also more likely to have used computers in programming. In most other respects they resembled the other samples. The one additional difference of interest is that none of the rural students had used computers for electronic mail.

These findings suggest that use of the public and private electronic mail systems available in Alaska is low. They also suggest that one way of encouraging greater use of electronic mail would be by developing instructional uses of electronic mail. Such uses are described in some of the responses to the Delphi Survey in Chapter Five.

Conclusion

Telecommunication use patterns of the Anchorage residents, and the concerns they expressed, suggest several telecommunication policy issues:

1. Television content is less varied than many Anchorage residents would like it to be. There is a large audience for programming about Alaska and Alaskans. It is questionable that much programming of this type will be provided in the absence of state support.

2. The audience of Anchorage residents for programming about Natives and Native issues appears to be too small to be attractive to commercial broadcasters. Programming of this type is likely to appear only if it receives support from such sources as state government and Native foundations.

3. Public radio and TV are important to Anchorage residents, some of whom would like to see state support increased.

4. Anchorage residents make many long-distance calls, and they make them mostly to relatives. Many of these calls are interstate calls. Increases in phone charges would make more costly a type of communication the respondents regard as essential. Such increases would have the negative effects of weakening links within poorer families or lowering the standards of living of those families as they economize in other ways to meet the increased costs.

5. Audioconferencing appears to be as important to Anchorage residents as to rural residents.

6. Most Anchorage residents have used computers, but most computer users have not used them for telecommunications. State intervention -- perhaps in the form of instruction involving electronic mail -- may be needed if this form of communication is to grow.

Appendix

At the close of all interviews, the respondents were asked if they had any comments that the interviewer could pass along to legislators. This is what the respondents said:

I've participated in many teleconferences in the last year and am highly supportive of these. Would likewise give public radio more support. Don't cut it out.

Disgusted with all the "mud slinging" in campaigns.

Hope they keep up the good work. Get the information out to the public

but fast enough so that there is not a rush at the end of a session to get everything done. Getting bills passed etc. is of much more importance.

Thought the Barrow TV program ["The People of Ukpiagvik"] was interesting and want to see more of it on Channel 7.

Really enjoy public TV and radio.

Like things capsulated so you can spend a small amount of time to get to the core of what's being presented.

Hope they keep on with teleconferences. It helps us in Kenai.
-- *Kenai resident who was visiting daughter in Anchorage*

Best interest to publish *real* announcements, real issues pro and con so I can make a decision. Give real facts, not blow smoke.

Doing good job on coverage.

Disillusioned with elections on media. Issues weren't addressed and only voted because felt obligated to fulfill my constitutional rights. In the future want no more dirty politics on TV.

Legislature goes too long.

Probably TV is best form of media. Has to be straightforward. More factual, less bias.

Do away with commercial programming and get more PBS. Education needs to be emphasized. Available programming should have less explicit violence and sex (but casual nudity is okay!). Keep the sports.

There is a national liberal bias and I do not see that here. It [the media] appears fairly well balanced. Impressed that the newspapers here also seem for the most part non-partisan.

Wish they were more outspoken on almost everything and honest.

Newspapers are most accurate. Would like to see them expanded and less television coverage.

There is enough variety in Anchorage to pick and choose. I am quite satisfied.

I guess I'd like to see a greater emphasis on positive and not negative bombardment of fear-producing news items. Need more human interest and upbeat news items.

The quality of TV coverage is real sorry. It is a joke. The people who are

doing the news are not real good. They don't put too much into it.

Need more articles printed in the paper about local and statewide events.

Think that it would be a good idea to put a lid on expenditures of candidates' re-election campaigns. It seems that it's gotten out of hand. Maybe we wouldn't have so much "mud slinging" if a limit was put on spending. I get tired of hearing and seeing the ads. Some of the money spent could be put into the state government instead.

More current and important events. Need more prime time TV instead of only at odd hours.

Media is number one for information. Media is great.

Should have more talk shows with call in to senator and discuss issues.

Not enough detail in the TV news. There's more detail in newspapers. Maybe a CNN channel.

Nice if you could hold candidates to the truth instead of rhetoric and attacks on each other.

Would like to see Legislature on TV. Maybe committee meetings on bills that are controversial.

Public radio is excellent source of information and entertainment. TV news stinks!

See more legislative conferences by TV and mail, and explained and clarified. Especially those bills that have additional laws tacked onto them.

Not interested in TV. Legislative process needs to be taught to public.

Enjoy watching legislative sessions on TV.

Irritated at getting advertisements over the telephone.

In regard to newspapers, extreme bias in Times and Daily News. Not a good place for information.

Because the Legislature is so far away and isolated, we need the procedures on TV. If they were more centrally located then the TV coverage could be cut back. We could go sit in on the meetings if they were closer to Anchorage.

I don't like TV. It makes me mad. It is not intelligent, not stimulating. Like books, newspapers.

Commercial TV is so awful that I never watch it. Public TV and radio programming is excellent and I want more funding available so they don't have to grub for money.

Media should quit hiding things. Tell it as it really is.

Due to the fact that it is almost impossible for regular people to watch the legislators in session due to the cost of travelling to Juneau, I would like to see more teleconferences available. Before elections, I would like to see someone publish more factual information about the legislators, i.e. attendance records and real specific voting records on important issues.

I think that the Daily News favors the left. Really surprised that they slanted the election coverage so much toward Cowper, especially with pictures.

The Legislature should subsidize public radio more.

Disappointing to hear about the "mud slinging." It seemed like nobody cared about what they could do, only about how many bad things they could say.

I really stay away from it [the media] as much as possible because of the negativism. Need more positive things.

Enjoy Channel 7 very much. Last year really enjoyed watching the Legislature on TV. Wish they would run them later in the evening. Love Larry Makinson. "Running" was excellent.

More information about both sides of issues. Not slanted.
Think the public radio station in Alaska is excellent.

Wish they would let us know about things before they happen, like do we get a choice about state income tax or do we just get it. We should have more say so in things.

Footnotes

[1]A random sample of 100 Anchorage households was selected, using a computer generated list of phone numbers. The first three digits of the numbers appeared on the list with a frequency corresponding to the size of the exchange; the last four numbers were randomly generated. This made it possible to include households with unlisted numbers in the sample. The interviews were conducted between Nov. 1 and Nov 16. Most calls were made during evenings and on weekends. The probability is 95 percent that the figures given in this chapter and the next are no more than 9 percentage points higher or lower than the true population values. This estimate does not take into account types of error other than sampling error that can enter into survey findings.

[2]David Lachenbruch, "The Makers' Lament: not-So-Fast Forward," *Channels, the Business of Communications, Field Guide '87*, December; 1986, p. 88.

[3]In northern Canada, the Inuit established the Inuit Broadcasting Corporation to produce native-language programs. See "New Communications Technologies: Policy Issues for the Developing World," by Heather Hudson, in *International Political Science Review*, Vol. 7, No. 3, July 1986, p. 342. The Alaska Public Radio Network, using funds from a national grant, has hired an Indian as the anchor of a 15-minute national Native news service that will be based in Alaska. See "Anchorman wants to de-mystify Alaska Native news," by George Bryson, *The Anchorage Daily News We Alaskans* section, K-5, Jan. 4, 1987.

[4]See Bruce M. Owen, Jack H. Beebe and Willard G. Manning Jr., *Television Economics*, Lexington, Mass.: Lexington Books, 1974, esp. p. 151, and Bruce M. Owen, *Economics and Freedom of Expression*, Cambridge, Mass.: Ballinger Publishing Co., 1975, pp. 12-14, for a fuller discussion of television economics and content diversity.

Chapter Four

Rural Alaskans and Telecommunication

Just as rural Alaskans are making do in other ways, they appear to be making do with telecommunication. Some of them are quite content with what they have, some of them are mildly dissatisfied, some are quite vocal in their discontent. They speak with many voices but the flavor of their comments about Alaska's media is quite different from that of Anchorage residents, as will become apparent in the following sections.

Who Did We Talk To?

The 100 people from rural Alaska who talked to us about how they use telecommunication media and how they feel about them included nurses, teachers, fishermen, lawyers, electricians, clerks, secretaries, supervisors, technicians, unemployed workers, construction workers, retired people, homemakers, cooks, a pilot, a handyman, an ore sampler, a pastor, a travel agent, an accountant, a waitress, a bailiff, and a dog catcher.

They ranged in age from 18 to 80. Fifty-four percent of them were women. Nineteen percent had lived in their community all their life; another 34 percent had lived there more than 10 years. More than half (56 percent) were members of community organizations, and most (62 percent) of those who belonged to community organizations belonged to more than one.

Nineteen percent of those interviewed lived alone, but the average family size was between three and four people (3.25).

Seventy-two of them were white; 24 were Natives. One was black, one was Asian, one was a Pacific Islander, and one was noncommittal.

Where Did We Find Them?

The village of Metlakatla lies on Annette Island in the extreme southeast corner of Alaska, a one-hour ferry ride south from Ketchikan. The island is a

federal Indian reservation. Only holders of special permits are allowed to visit it. We interviewed three people there.

We talked to a woman who lives alone and without electricity on an island near Petersburg. She chops her own wood, carries her water and reads by candle light. She told the interviewer she reads a lot and listens to cassettes. She had listened to her battery radio 14 hours the day before.

Also in Southeast, we talked to residents of Wrangell, Craig, Kupreanos and Skagway.

Eleven hundred miles to the west, on an island near the southern end of the Alaskan Peninsula, is Sand Point. A businessman there expressed regret that Learn Alaska programming had been dropped but said he was glad aviation weather had been transferred to Ratnet. We also talked to a fisherman there who said he would like to see the Legislature on TV and to a teacher who said he would rather have Learn Alaska on during the day than soap operas.

Our interviews then took us 800 miles north along Alaska's west coast to King Salmon, Bristol Bay, Dillingham, Bethel, Tununak, St. Marys, Pitkas Point, Emmonak, Nome and Selawik. At Tununak we talked to a teacher who said, "If you had called anyone else in the village, you couldn't have asked your questions unless you spoke the Yupik language." (But we had placed another call in the village and had obtained another interview.)

On the north coast, we talked to eight residents of Barrow, about 350 miles northeast of Selawik. In the interior, we obtained interviews in Bettles, Nenana, Cantwell, Delta Junction, Tok, Glenallen and Copper Center. One of the four people we talked to in Delta Junction had a collection of 1,300 VCR tapes. She said radio and TV reception were so bad her family didn't bother even trying to use them.

Along the southcentral coast of Alaska, we talked to people in Yakutat, Cordova and Valdez. One of the Cordova residents also complained about bad TV reception and another, who has cable TV, complained that "programming is real bad."

A line connecting all these geographical points would be thousands of miles long and would enclose most of Alaska. Deliberately excluded were larger centers such as Sitka, Juneau, Ketchikan and Fairbanks, the Mat-Su Borough and the Kenai Peninsula so that the telecommunications use patterns and the concerns of rural Alaskans could emerge more clearly. Those who were selected were chosen in a random manner intended to give each rural Alaskan household with a telephone an equal chance of being selected in the survey.[1]

Two problems in this survey were language barriers and bad phone connections. A handful of survey attempts were unsuccessful because of

language problems. Bad line connections made a few of the interviews difficult. After completing an interview in Pitkas Point, the interviewer observed: "It sounded like talking on a ham radio."

How Do They Use the Print and Broadcast Media?

A number of the rural Alaskans hadn't used the media at all the previous day. Thirty-five percent of them had not listened to the radio, twenty-two percent of them had not watched television. Fifteen percent of them could not have bought a local newspaper because there was none available. Only 35 percent of those who have a local newspaper subscribe to it.

These figures suggest that use of all the media is lower in rural areas than in Anchorage. But that is deceptive. The survey provides evidence that both broadcast and print communication are important to rural Alaskans. Indeed, comments from those interviewed suggest that feelings about telecommunication run stronger in rural Alaska than in Anchorage.

There are several explanations for the lesser use of the media by rural Alaskans, two of which were offered by the respondents. The explanations they most often advanced were poor -- or non-existent -- reception and limited programming.

The video cassette recorder offers them a way around both of these problems and there was evidence that they were making use of it. Sixty-six percent of the rural respondents said they had VCRs, about the same proportion as those in the Anchorage survey who said they had VCRs (69 percent). Ninety-four percent of the rural respondents said tapes could be rented in their village (10 percent of rural VCR owners had no tapes of their own). The VCR ownership figures are much higher than recent figures for the United States in general (40 percent) and for other countries.[2]

Their use of VCRs to compensate for deficiencies in broadcast communications parallels the way they appear to have compensated for deficiencies in local print media. Thirty-four percent of the rural respondents subscribe to distant newspapers (about the same number as those who subscribe to local newspapers). In contrast, only 10 percent of the respondents in Anchorage, where two local newspapers are available, subscribe to newspapers from other places.

So what do they watch on television and listen to on the radio? In an attempt to develop some estimate of the potential audience for various kinds of Alaska programming, several questions were asked about specific programs broadcast during the previous year.

One of these programs was the one-hour television program describing the archaeological dig at Barrow in which a prehistoric home was excavated. Forty-three percent of the respondents had seen this program. The

program was viewed by about as many Anchorage respondents, 41 percent. These are high viewership figures for any television program, indicating that there is a large audience for such programming.

Other programs appeared to be of more interest to rural residents than to Anchorage residents. Thirty percent of them watched the Inupiat Circumpolar Conference in Kotzebue in August as compared with six percent of Anchorage residents. Of those who didn't watch the conference, 31 percent of rural residents as opposed to 22 percent of Anchorage residents would have watched if more of it had been televised.

Forty-eight percent watched the Native Youth Olympics last spring. Only 35 percent of the Anchorage respondents watched the Youth Olympics, even though they were held in Anchorage.

More rural Alaskans than Anchorage residents were aware of the Berger Commission report about Alaska Natives, 35 percent to 27 percent. The rural Alaskans had learned of the report in somewhat different ways than had Anchorage residents, as Table I on page 56 shows. The rural residents were more likely to use more than one medium and to discuss the report with friends. This suggests that the intensity of their interest was greater than was true of the Anchorage residents. The rural respondents relied on television, radio and newspapers for information while the Anchorage residents relied primarily on newspapers (radio and television were important secondary sources for Anchorage residents).

That these differences are largely due to different levels of interest is born out by the answers to a follow-up question (Table II). The answers to this question show that rural and Anchorage respondents agree on how they would like to receive such information. The respondents were asked: *How would you prefer to get information such as the Berger Commission report?* Respondents could give only one answer to this question (from a list that offered them six media and friends as choices) and this time newspapers emerged as the preferred medium for both groups, with television coming in second and radio third.

It appears that the audience for programs about Natives and Native issues is almost as large among rural Alaskans -- the program about the Native Youth Olympics had the highest viewership of any of the programs the rural Alaskans were asked about -- as is the audience for more general programming about Alaska and Alaskans.

How Do They Use the Telephone?

Respondents also answered a series of questions about their use of the telephone and audioconferencing.

Ninety-five percent of them had made long-distance phone calls in the

Table I

How Alaskans Learned About Berger Commission Report by Medium

	Rural Alaskans	Anchorage residents
Television	69%	44%
Radio	69	52
Newspaper	69	78
Magazine	20	15
Book	17	7
Friends	60	26
Number of respondents	35	27

One hundred rural residents and one hundred Anchorage residents were selected by a random sampling method and interviewed by phone in early November 1986. Thirty-five of the rural residents and 27 of the Anchorage residents had heard of the report. The above table indicates all the ways in which those respondents learned of the report.

Table II

How Alaskans Would Prefer to Receive Such Information

	Rural Alaskans	Anchorage residents
Television	25%	32%
Radio	16	10
Newspaper	42	42
Magazine	3	5
Friends	2	3
Book	11	7
Number of respondents	91	99

Answers for rural Alaskans total less than 100 percent because of rounding error.

previous two weeks (compared with 87 percent of Anchorage respondents). Seventy-eight percent of them had made out-of-state calls. The average number of long-distance calls in the previous two weeks was 10.2. The average number of out-of-state calls was 4.9. (Anchorage residents didn't make as many calls but a higher proportion of their calls was out-of-state calls.)[3]

Forty-five percent of the rural respondents said they most often called relatives, 20 percent said the long-distance calls were most often for business, 14 percent said the calls were most often to friends. The remaining 21 percent of the respondents said they made about the same number of calls in two or more of these categories.

The percentage of calls to relatives is substantially lower than it was for Anchorage residents (64 percent). Even so the largest portion of the calls was in this category for rural as well as for Anchorage residents.

Apparently because the rural residents make fewer calls to relatives than do Anchorage residents their phone use seems to be more sensitive to rate changes. Seventy-three percent said they would make more phone calls if phone rates were cut in half. Most of the additional calls would be about equally divided between friends and relatives (friends 34 percent, relatives 36 percent). Seventy-three percent said they would make fewer calls if the rates were doubled.

The implication is that changes in phone rates would have more effect on the volume of phone calls in rural Alaska than in Anchorage. In both places, however, the social implications are similar. Higher rates mean less communication among relatives. Higher rates would also reduce communication among friends in rural Alaska to a greater extent than appears to be true for Anchorage.

Nineteen of the respondents had participated in audioconferences during the previous year. They participated in from one to 50 audioconferences, with most (11 of the 19) participating in no more than three. The person who used audioconferencing the most was a college instructor in Valdez. The person who used it second most often (25 or more times in the previous year) was an attorney in Bethel. The third most frequent user (15 audioconferences) was a Sand Point resident who served on a state board.

Those who used audioconferencing tended to be those most involved in community activities, as measured by a question asking whether they belonged to any organizations in the community.

Computers in Telecommunication

Sixty percent of the rural respondents said they had used computers. Computer use was related to age and to race. Those who had used

computers were more likely to be young and to be Caucasians. Computers were heavily used for three things: work for an employer (by 83 percent of those who had used computers), word processing (by 77 percent), and game playing (70 percent).

There was moderate use of computers for school work (by 43 percent) and for programming (38 percent).

Use of computers in telecommunications, that is for electronic mail, was low: 17 percent of those who had used computers.

Given that 60 percent of the rural respondents have some familiarity with computers, it would appear that use of computers for electronic mail could easily be increased if electronic mail networks were more readily available. The three principal obstacles to use of electronic mail are costs of hardware (the user must buy a modem and software that allows communication via telephone line), long-distance line charges, and the difficulty of learning how to use electronic mail systems. However, electronic mail could provide a lower cost alternative to voice communication by telephone for some types of information.

None of the respondents, in their comments about telecommunication, made suggestions related to computers or electronic mail.

What Do They Want?

More than half of the rural respondents (57 percent) said the number of TV programs about Alaska and Alaskans is about right. Thirty-four percent said there were not enough such programs; seven percent said there were too many. This is in sharp contrast to the responses of Anchorage residents. Less than half (46 percent) said the amount of Alaska programs is about right; 52 percent said there were not enough.

This is particularly surprising given the lower viewership in Anchorage of the two Alaskan programs about Natives (the ICC conference and the Native Youth Olympics) and the lower awareness in Anchorage of the Berger Commission report. A possible explanation is that interest in Native issues is lower in Anchorage than the rural areas but that interest in more general programming about Alaska is high and is not being satisfied by existing programming.

The level of dissatisfaction with television content apparently would have been lower yet in rural areas if Learn Alaska had still been on the air. A number of the rural respondents, when asked at the end of the interview to say anything they'd like to about telecommunication, volunteered that they missed Learn Alaska. About one-fourth (14) of the 61 people who made comments said they missed Learn Alaska (one respondent said he was glad it was gone). Several others, while not referring to Learn Alaska by name,

Table III

Preferred Medium for Information About State Government

	Rural Alaskans	Anchorage residents
Television	31%	28%
Radio	22	16
Newspaper	26	43
Mail	11	7
VCR	1	1
Friends	1	5
Number of respondents	100	100

talked about types of programming they missed. Several expressed dissatisfaction with Ratnet as the sole television channel.

The respondents were asked several questions about how they would prefer to receive different kinds of material such as information about the state government and programs about Alaska and Alaskans (Tables II, III and IV). The similarities between the rural and Anchorage respondents are in most cases more striking than the differences.

The largest number of respondents in both groups would prefer to receive information such as the Berger Commission report by newspaper. Three-quarters of the respondents in both groups prefer television for programs about Alaska and Alaskans (fewer than 10 percent in both groups prefer VCRs). The proportion of rural residents who would prefer to get information about state government by television is about the same as for Anchorage residents.

The one noteworthy difference between the groups is that Anchorage respondents would prefer to get information about state government from newspapers while rural residents prefer television by a slight margin. This may simply reflect a difference in the way the two groups are used to getting this information. Several of the rural respondents remarked on television coverage of the Legislature in their comments; also, as has been noted, newspapers are not available in all rural communities.

The respondents' answers raise another question: Why, if VCRs are so widespread in rural areas, did so few people indicate a preference for them? Possible explanations are that VCRs are preferred for other types of programming, such as movies, or that VCRs are used as much as they are

Table IV

Preferred Medium for Programs About Alaska and Alaskans

	Rural Alaskans	Anchorage residents
TV	74%	78%
VCR	9	7
Radio	17	15
Number of respondents	99	100

only because TV offerings are considered inadequate. The first explanation seems the more likely because even in Anchorage where more channels are available few respondents said they preferred VCRs for programs about Alaska and Alaskans.

It is important to bear in mind that though the media preferences of rural and urban Alaskans may be similar, the interests of these two populations and the media available to them are quite different. These points are underlined by the comments of rural respondents at the end of this chapter.

Conclusion

Several findings with policy implications emerge from this examination of telecommunications and rural Alaskans:

1. Television and radio are not available to all Alaskans. In some places, neither is available.

2. In some places where television and radio are available, people have no choice of programming.

3. There is widespread dissatisfaction with available programming, though there is disagreement about what the programming should be.

4. VCRs have become a widely available alternative to live television programming. (However, they are not preferred to live television in at least a couple of subject areas.)

5. Computers have not been extensively used for telecommunication even though most rural Alaskans have some familiarity with computers.

6. The telephone is most widely used for communication among relatives and friends. Long-distance phone use by rural Alaskans is more sensitive to changes in phone rates than is true for Anchorage residents.

Appendix I

Now it is time for the respondents to speak for themselves. At the close of each interview, the respondent was asked if he or she had anything to say about the media that could be passed on to legislators. This is what they said:

Need Learn Alaska or have all the tapes available to teachers.
-- *a teacher in Barrow*

Was pleased to see Alaska public network go because could not bear another minute of Native dancing. There was too much emphasis on Native issues. Thoroughly enjoy public radio. Would not mind seeing return of Learn Alaska if programming were more balanced. There are too many newsworthy topics in Alaska to rely so heavily on strictly Native issues. Right now public radio is the only thing that makes living in Glenallen tolerable.
-- *a biologist in Glenallen*

Would like to see the radio station improved. Programming is real bad. Have no local TV -- only cable and one Anchorage station. No statewide channel. Really feel isolated because media exposure is so limited.
-- *a housewife in Cordova*

Listen most to KUAC-FM and TV in Fairbanks and would like to see funding restored to previous levels.
-- *a pipefitter in Delta Junction*

The channel we get . . . Alaska TV reception is rotten.
-- *a plumber in Cordova*

People in rural areas depend more on what they read because television coverage is so limited. Information on VCR cassettes should be increased. TV satellite programming should have more diversity. The loss of Learn Alaska has caused us to watch far less television. Would like programming restored.
-- *a housewife in Yakutat*

Wish that some of the Learn Alaska programs were still on. It would be helpful if the rural satellites would have published schedules available so

would know what is going on in advance instead of finding out about it several days later.

-- *a lawyer in Bethel*

Want to see more movies and programs about Alaska. All we get is a combination on one channel of the three Anchorage networks.

-- *a housewife in Metlakatla*

Please continue what's available.

-- *a tutor in Wrangell*

How much was allocated for the survey? Surveys are not necessary. Telephone and television are only contact with outside and legislators aren't using good common sense about how they use available funds when the answers are already obvious.

-- *a secretary in Barrow*

Want more programs concerning daily life to maintain history for the children. Would also like to see more regarding subsistence.

-- *a cook in St. Marys*

Feel for the most part this state does an excellent job of keeping people abreast of legislative activities. But the statewide channel needs better scheduling and better quality programs. Would like to see more PBS and wildlife programs. Also feel statewide news is unsophisticated and unprofessional. Quality could definitely be improved.

-- *a teacher in Valdez*

Would like to see more news. Sorry to see Learn Alaska off the air.

-- *a college instructor in Valdez*

Bush channel is *very* important to us. Our only source of news and entertainment. We live 15 miles outside Valdez.

-- *an oil worker*

Would like to see the legislators care more about the everyday people, not the money people. Need to feel like my vote means something to politicians.

-- *a laborer in Wrangell*

Appreciate legislative information offices, use legislative information services and would hope Legislature keeps these services available to public.

-- *a lab tech in Glenallen*

Learn Alaska programs were very helpful. Wish they would continue.

-- *a pilot in Petersburg*

Would like to see improvement in quality of Ratnet programming. Enjoy very much local PBS programs.

-- *a secretary in Petersburg*

For bush communities, need to expand number of channels.

-- *a teacher's aide in Barrow*

Don't reduce funding for Ratnet. Miss Learn Alaska programming.

-- *retired in Bethel*

Hope there is no more funding cuts in Ratnet or public radio. Disappointed in cuts made to date.

-- *an equipment operator in Bethel*

Hope economy will improve through legislative action. Media is very good in Nome.

-- *in aviation in Nome*

No confidence in television. Feel that newspaper is more accurate.

-- *pastor in Nenana*

Appreciate honesty in media. Conversely, dislike distortions in media, i.e. campaign ads during elections.

-- *a Wasilla electrician who works in the Bush and was interviewed there*

Would like more satellite radio. Can get KYAK only when weather conditions are right.

-- *a store owner in Skagway*

Disappointed that they took the Learn Alaska station off the air.

-- *a housewife in Yakutat*

Appreciate the TV coverage that the legislature has in Valdez.

-- *a technician in Valdez*

Really like to hear what is going on. Listen to the radio at work and get most of my information this way.

-- *a state office worker in Bethel*

Radio not out here. Really miss public radio. Don't think enough has been done to promote radio in the Bush. Radio is not obtrusive like TV is and radio requires listening and visualization skills which are better for children. TV is a passive participation and is detrimental to children.

-- *a teacher in Tununak*

There is a "Governor's Time" on the satellite station and they should use

that with the university to keep people informed about what is going on. They don't use this half hour two-three times a week very well.

-- *a correctional officer in Nome*

Just keep me informed.

-- *an electrician in Dillingham*

Miss Learn Alaska. Rely on KTOO in Juneau -- wonderful programming -- Nova and National Geographic.

-- *a psychiatric aide in Wrangell*

Enjoy the televised legislative sessions. Feel much more informed.

-- *a lab technician in Valdez*

Only receive state channel and feel there is a pretty good effort made to appeal to all audiences.

-- *a shop owner in Cantwell*

Doing great.

-- *a maintenance worker in Bettles*

Public radio and TV are extremely important to rural areas. Please continue or increase funding.

-- *a lawyer in Bethel*

Want public radio programming in Cordova. Want Learn Alaska! Would like ongoing newsletters on legislative activities both statewide and nationally. Very angry that Learn Alaska was dropped without input from people. Unhappy that no input was requested about longevity program before it was placed on the ballot. Both ballot measures phase it out and that shouldn't be.

-- *a teacher in Cordova*

Need more information about school grants. Need more ways of getting schooling while working.

-- *a clerk in Wrangell*

Would like more information about Alaska and Alaskans.

-- *a domestic cleaner in Kupreanos*

It is important that public radio and TV stations continue to be funded in the small communities.

-- *a cook in Petersburg*

Haven't used audioconferences but they're great because they give the people in rural communities some input.

-- *a teacher in Dillingham*

I like it [the media].

-- *a homemaker in Barrow*

Would be real helpful if Ketchikan paper would print more about our candidates.

-- *a teacher in Metlakatla*

Would like to see the "Capitol '86" program continued on TV. Would like to see Learn Alaska on in the daytime instead of soap operas.

-- *a teacher in Sand Point*

Want to see the number of violent and sexually oriented shows reduced on statewide channel and CNN news put back on.

-- *retired in Nome*

Very happy with the amount of TV stations able to get in Nome.

-- *a supervisor in Nome*

All the media are very important to the North Slope people. Like radio -- keeps informed with what is going on in the world. They also use the radio to find lost people and to get people to the hospital when sick. The TV is also very important because of the instant news they can get.

-- *retired in Barrow*

A lot of times the news media seem to focus on their interpretation of different bills and important issues. It would be really great if pros and cons of bills and major issues were put on VCR cassettes so they could be checked out. Realize that the TV does not have the time to put everything on and this would be a great way to get more information.

-- *an electrician in Valdez*

Like to see Legislature on TV.

-- *a fisherman in Sand Point*

Everything seems okay.

-- *retired in Cordova*

Miss Learn Alaska.

-- *a homemaker in Barrow*

Like the legislative session coverage. The statewide channel has too many soaps and not enough educational, National Geographic and Cousteau specials.

-- *a fisherman in Yakutat*

Very sorry that we lost Learn Alaska programming. Not satisfied with number of educational programs on Ratnet. When Learn Alaska was cut from the budget, we threw away a very economical technology that was being viewed with great interest by other countries in the last two-three

years. Felt Learn Alaska was extensively used and watched throughout rural Alaska.

-- *a store owner in Sand Point*

Sorry to see that Learn Alaska has been dropped. Also, have a forum for people to express their concerns and problems regarding jobs.

-- *unemployed in Copper Center*

I appreciate the pride that is displayed in Alaska on the state channel.

-- *ore sampler in Skagway*

Concern as to why we pay for hours of scheduling. Need cartoons during weekdays. Not providing anything but junk. Need more than just publishing on the screen the scheduling of upcoming TV shows.

-- *a maintenance worker in Valdez*

Real fan of radio. Best means of communication for rural Alaska.

-- *an accountant in Nome*

Frustrated about media presentation. Taken one satellite and now only have Native education and cartoons. Natives are going overtime on that committee. Ratnet committee has only two Caucasians. They have really ruined the TV programming.

-- *retired in Tok*

Nice if more control of TV. When sports come on nothing else is on; need variety and more news. Only get Anchorage-based news. Need to have area news, also Bush news.

-- *a nurse in Dillingham*

Should continue to fund Learn Alaska because it gives an informative and true picture of Alaskan life and the state of Alaska.

-- *an educator-fisherman in Cordova*

Appendix II

During the three days of the Alaska Federation of Natives convention in Anchorage last October, copies of the questionnaire later used in the phone surveys were made available at the information desk in the lobby of the convention center. Only a few completed questionnaires were returned so it was impossible to extract useful data about telecommunications from them. However, some of those who did complete the questionnaire did have comments they wished to be relayed to legislators. These follow:

State television is <u>important</u> to all Alaska.

-- *a retailer in Wrangell*

Cover AFN action, in simplified terms for Alaska Native areas, and

broadcast. Help Tundra Times to make it financially. We believe them.
-- *an Unalaska resident*

I would support and encourage a statewide radio network that would broadcast statewide on a dedicated frequency that would be identical statewide including the Alaskan Highway, which would be manned by all the major radio stations in the state on a 2-hour rotating basis with statewide news and weather on the hour and local news on the half-hour.
-- *an Anchorage/Saxman businessman*

Please cut down on time allotted for sports. We have only a few hours each week and a lot of prime time is given to sports. More Alaska programming, please! No more Alaskan weather for half-hour though. Please do not schedule a movie or miniseries every night during prime time. We need variety and appreciated the half-hour - one-hour shows.
-- *a counselor in Valdez*

Footnotes

[1]The rural phone sample was drawn from a computer generated list of phone numbers. The first three digits were those of phone exchanges; the probability of those exchanges appearing on the list was based on the size of the exchanges. Numbers were randomly generated for the last four digits for most exchanges. For some exchanges, the last four numbers were taken from a local directory on a random basis. This selection technique gave all households in rural Alaska, including those with unlisted numbers, a roughly equal chance of being selected. Because the sample size was fairly small, the sample did not include all rural communities of substantial size. It did, however, include communities from throughout the state. The probability is 95 percent that the figures given in this chapter are no more than 9 percentage points higher or lower than the true population values. This estimate does not take into account types of error other than sampling error that can enter into survey findings.

[2]The figure for VCR ownership in the United States is taken from the Oct. 15, 1986, issue of *Variety*. That issue also provided figures for the percentages of households with VCRs in several other countries: Australia, 50 percent; Japan, 48 percent; Great Britain, 46 percent; West Germany 26 percent. *Channels, the Business of Communications*, in its *Field Guide '87*, published in December 1986, reported that about 40 percent of the households in Canada have VCRs as do 1 percent of the households in Mexico. It estimated there are 795,000 VCRs in India, a nation with 730 million people. These figures underline how different Alaska's VCR use is from that in other places.

[3]Alascom reported handling a total of 35,132,000 intrastate toll calls and 20,000,000 interstate calls in 1984. "Alascom, Inc. Message Toll Fact Sheet" in *Policies in Conflict*, briefing paper on Alaska Telecommunication Issues, Alascom, Inc.

Chapter Five

Alaska's Telecommunication Future

The year is 2001.

Alaska is nearly 50 years old. In many ways it resembles the Alaska of 1987, or of 1955. But it is not the same. For the world is different.

There has been political change, economic change, social change. All of these changes reflect -- as they have affected -- another kind of change: technological change. Technologies that were in their infancy in the 1980s have matured, and new technologies have been introduced.

The citizen of the 1980s wouldn't find Anchorage or Juneau of 2001 so different. Not at first. Soon, however, she would notice on display within the familiar facades some unfamiliar objects. And these evidences of change would extend beyond the surface, beyond such things as the fashionable colors for clothing and styling for automobiles. The changes would encompass, the authors of this study believe, even the way we communicate.

We wish we could know now -- in 1987 -- just what those unfamiliar objects will be. It is that curiosity that led us to invite a number of Alaskans interested in telecommunications to join us in pressing our faces against the window that separates us from the future and in trying to describe what we dimly see beyond.

We believe new ways of communicating will make Alaska seem smaller in the year 2001 than it does in 1986. But how is that going to be done?

About the Delphi Survey

About 30 Alaskans who have been involved in making decisions about telecommunications joined in a Delphi Survey in the fall of 1986 in which they offered their insights about Alaskan telecommunication in the year 2001. They included people within state government and in private industry: legislators, representatives of a consumer group, educators, members of a futurists' society, consultants, journalists, computer experts, telephone company executives. Many of them are well placed to bring about the future they discuss. They will not be identified more exactly because

they were assured anonymity in exchange for their private thoughts.

In mid-October, they were asked six questions, each of which was intended to illuminate a different facet of telecommunications. Their answers were summarized and in late November they were given the summaries -- and an opportunity to modify their answers. In early January, they were then given revised summaries and invited to submit their final comments. The descriptions that follow are the result of that process.

Delphi Surveys, by definition, are time consuming. This one was conducted with unusual speed so that preliminary findings could be made available to the Joint Committee on Telecommunications of the State Legislature before the start of the 1987 legislative session. If more time had been available, some inconsistencies apparent in the answers to the Delphi questions probably would have been resolved through more participation in the later stages of the survey.

We initially invited 120 people -- half of them legislators -- to join in the Delphi Survey. The survey was conducted in a way so that participants could remain anonymous -- even from the researchers -- if they so desired. Most participants, however, identified themselves to the researchers. Only a handful of the legislators accepted the invitation which arrived in the midst of a political campaign. About a third of the remaining invitees -- chosen because of their involvement in telecommunication activities -- did participate.

We were curious about how comfortable people with high interest in telecommunication would be with a relatively new telecommunication technology. Therefore we divided the potential participants into two matched groups. One group was invited to participate by mail; the second group was invited to participate using the University of Alaska's electronic mail system. These participants were given user numbers, and a special bulletin board was set up on the system for them. Seven of those in this second group tried out their Delphi numbers, but only four actually participated in the survey (and two of the four ultimately participated by regular mail). Most of the predictions about the future of telecommunications in Alaska that are presented in this chapter were submitted by U.S. mail. Some reasons for low use of the electronic mail system are discussed at the end of this chapter.

Beyond satisfying our curiosity about the future of telecommunication in Alaska, the survey had two objectives: to promote communication among these people with similar interests but divergent viewpoints and to identify long-range policy concerns in telecommunication. Realization of both objectives, it was hoped, would help bring to reality the information society that now exists only in our optimistic fantasies.

The Institutionalization of Telecommunications in Anchorage

Question: In this, the first year of the new century, you are telecommunications manager for the city of Anchorage. Write your job description, based on your expectations of what telecommunication technologies will be available by then and how they will be used.

Telecommunications manager. Will that be one of those new jobs in the world of the future? Perhaps not. One of the participants questioned the need for such a person, saying:

> Telecommunications services should be so plentiful and pervasive (and simple to use) that there may be no need for a central telecommunications agency for a municipality. The various agencies or divisions within the municipality would order up their own telecommunications assistance in the same way they would deal with office supplies and other types of services. There *might* be a staff level telecommunications advisor or service agent to help the various parts of the municipality make the best and most coordinated telecommunications choices.

Most of the participants, however, accepted the proposition that there would be a telecommunications manager. They succeeded in describing that person, and that job, in some detail.

The telecommunications manager would not be an engineer, the participants said, but would have the ability to work with technicians. The manager would have majored in telecommunication planning, with a minor in electrical engineering, one Delphi participant said. "At least a master's degree in management or an appropriate social science is required as is fluency in at least one Asian language," said another.

The manager should have experience in communications, technology, contracts, law, budgeting, quality control and personnel management, a participant said. "He would have administrative experience," said another. "Knowledge of networking community councils, community schools, social services, health services, and other community support systems is especially relevant," said still another, who also insisted that the manager be able to perform "cost/benefit analysis of networking functions."

What would the manager do? Principally, that person would be a coordinator. He would coordinate the continued upgrading of the system, ensuring "compatibility of all new technologies within a common architecture (i.e., ISDN)."[1] He would coordinate with utilities to assure the provision of communication services to businesses and households. He would sit on a committee of people who manage access to satellite communications; he would be chairperson of a telecommunications users panel composed of representatives of city agencies. He would maintain

professional contact with telecommunications managers of other cities. He would coordinate with the state and federal governments to "ensure that telecommunication development in Alaska encompasses municipal concerns."

Exactly what resources would he manage? There would be videophone, cellular phone and telephone service within the community. The telephone would also incorporate computer capabilities and "voice activated access will be available, but not in common use." There would be data transmission and communications between all office work stations. There would be voice mail, research data bases and computer networks. Means of transmission would include radio wave, cable, microwave and satellite, and the manager would be responsible for transmission security.

The manager would use these resources himself. He would "access data bases and other information useful for planning and activities of state agencies" and would use computer networks to locate items to purchase for the city.

Within city government, the improved communication "has meant a significant increase in the pace of the governmental process." It means that the "focus on decision making has shifted from getting important pieces to the decisions and long-range implications."

For the Anchorage citizen, the expansion of two-way telecommunication capabilities has made possible electronic:

shopping	voting
mail	educational services
medical and social services	security services
libra. r/media services	banking
stock/financial services	conferencing
news/sports/entertainment	census
bulletin board services	language interpreter services
remote work sites	emergency services

The Delphi participants expect telecommunication to make government more efficient; they expect it to give the citizen a readier access to a variety of services and information sources. But this requires a manager to oversee the orderly transformation of the governmental communication system and the development of new communication utilities within the community at large.

The participants made surprisingly few references to specific technologies. Their view of the future appears to be based on assumptions that existing but not yet widely used communication technologies will become institutionalized by 2001. The manager, as described, is a key figure in that institutionalization process.

One participant felt that even this agenda for change was overly

optimistic. "The technology is there but I don't see it being universally popular. Several firms are getting out of Vue-Text and other computer information services because of a lack of interest."[2]

Telecommunications for Keeping in Touch

Question: You have retired to a small village on the northwest coast of Alaska, but you still take an active interest in the outside world. In what ways does telecommunication help you?

The implied question was: Just how remote will the the extreme northwestern tip of the North American continent be 15 years from now?

The answer: Not very remote at all. The descriptions provided of the communication resources available in that remote village of the future make the present-day communication resources of Anchorage -- or even those available in Los Angeles -- sound a bit limited.

"Telecommunications enables me to touch the world," one participant said. "There is essentially no difference from a communications perspective between living in this situation and living in Chicago."

The interactive telecommunication services that were described in answers to the first question were emphasized in responses to this question, with some refinements:

> "Direct satellite audio/data service will allow me to carry a 'cellular phone' whenever I go out to visit my trapline or go to fishing camp."
>
> "Emergency handheld beacons that two way up/down link on emergency channels for Bush travel. Telephones like cellular, only good all over village and on frequently used rivers, ice roads and trails."
>
> "Spotbeam technology is used by some families who live out too far to be part of the local phone system. It connects them to local and long distance networks at little cost and provides more reliable service than the old radio-telephone links."

Other interactive services judged of particular importance to a retired person in a remote location were:

medical services	legal assistance
purchasing	electronic mail
ferry schedules	reference
universal town meeting	governmental information
telecourses	interact with former colleagues

stock/financial services

One participant viewed electronic mail as the principal means of keeping in contact with government agencies, "particularly those providing social services, public assistance, and Social Security benefits." Another anticipated participating in electronic town meetings conducted by state and regional governmental bodies. "Questions would be presented to the audience in a multiple choice format. Responses are entered on home keypads, transmitted and tabulated by computer at the programming source. Results are provided quickly to the audience." [This technique was tested by Warner Amex on cable TV audiences in Columbus, Ohio, beginning in the late 1970s. Warner Amex discontinued its interactive programs in 1984.[3]]

Television programming would be more varied: "as many channels as are available in Anchorage" . . . "programs from other countries" . . . "the local cable franchise . . . delivers me video programs, text and software from state, regional, national and international distributors" [one of the television networks in Britain has been transmitting software via television signal since 1984] . . . "legislative committee meetings and public meetings of agencies are routinely televised" . . . "programming from all over the world, with translations, is available on cable. The state no longer provides an entertainment channel."

The telecommunications mix would include videodiscs: "Videodisc technology is currently in use today. By the turn of the century there will be readily accessible and inexpensive videodisc programs covering virtually every subject. I would expect that 'how to' programs will be extremely popular and I could imagine taking advantage of them."

Radio would remain important: "Radio will still be the primary means of quick breaking news and public affairs information. Traditional broadcast audio will still be prevalent, though improved, via an accepted industry standard for AM stereo, etc. If the village is of sufficient size, a TV cable/fiberoptic system will be available."

Now, let one of the respondents describe how he would keep in touch with the world:

> I would utilize Equatorial A or C earth stations, or similar equipment to access on a continuing basis: . . . a major hospital diagnostic unit and its associated doctors, the best library network in existence at the time (hopefully including the Library of Congress), a major university educational outreach program and my own personal business network. I would install the appropriate earth station to access available television channels (probably about 150 by that time). I would hope that disc technology was at the point where all books were automatically made available in this format and could be downloaded to me from either private or business sources. My private network

would link together current working arrangements with colleagues around the world.

Another participant describes the communication equipment in his home:

> I will have a home telephone/computer linkage/facsimile instrument that connects me anywhere in the world -- both interactive (audio) and print-out capability. I can access central information (news as well as stored information, library type) by screen or print. Video (two-way) will be possible through recent computer coupled screen technology.

One participant envisioned a community communication center, "modeled on centers pioneered by the North Slope Borough in the early '80s. [it] provides teleconferencing, facsimile, electronic mail, computer services, tape feed recordings and other technologies for community use. Also, it's a place where folks get together. Those who don't have technology at home can use the center's facilities."

Talk of so many new communication systems led one participant to say: "Despite all of this telecommunication use, human contact will be just as important as it is today. In fact, it is my feeling that the more we get involved with telecommunication, the more important face-to-face communication will be, and the less we will take it for granted." There was some disagreement about what human contact would be replaced. One participant suggested that politicians would see less of each other face to face; another argued that such contact was more valuable than was face-to-face contact with constituents.

But not all the changes foreseen in telecommunication were "high tech": the retiree in 2001 will have "access to all 800 numbers that are good in contiguous states," one participant predicted.

In summary, the telecommunications environment that the Delphi participants visualized has a very few strong, clear characteristics: It provides much more content variety than is available anywhere today -- more channels, more varied programming; It allows much more interactive telecommunication than is possible today; Finally, it extends telecommunications links into places where they do not reach today such as isolated homes, fishing camps, trails. In this information village the retiree will have small excuse for feeling bored or isolated.

Just one question remains to be answered: Who will pay for it?

Meanwhile, in Juneau

Question: You are the director of a state government agency in Juneau (it's still the capital). In what ways does telecommunication help you?

In this scenario, unlike the first one, the state official is not a manager of telecommunication. Telecommunication is simply one of the tools available. The Delphi participants said they would use it for electronic mail and conferencing, in record keeping, and in managing an electronic office.

Citizens could use electronic mail to contact the agency from throughout the state, as could other agencies. One participant predicted electronic mail "will have replaced hard copy correspondence for all but the most formal contracts and agreements."

The department would use teleconferencing and interactive TV as well as electronic mail for public hearings. Legislative hearings would use "these same technologies, relieving agency personnel from personally testifying when scheduling conflicts occur." Teleconferencing would also be used in dealings with federal agencies, with agencies in other states and with agencies in foreign countries. All this would reduce employee travel and, therefore, "our operational costs." (One participant, however, said that while his staff would travel little, he would spend a quarter to a third of his time travelling to talk face to face with people.)

Conferencing would cost less There would be "two-way video conference facilities cheaper than current $900/hour and available in most all conference rooms and middle management and up offices." Phone costs would fall, according to this participant, because the state would lease transponders for "backbone telecommunications network" including Seattle, Ketchikan, Juneau, Anchorage and Fairbanks. In the third round of the survey, a telephone company executive expressed concern at this last suggestion: "Since the State of Alaska is by far the largest player in the Alaska economy, a decision by the State to become a captive telephone company for its needs would withhold substantial revenues from local companies and require either unacceptable local rate increases or slow down for lack of capital the very modernization process the survey participants predict."[4]

Efficiencies will have been realized in record keeping. "Paper forms and applications will have been replaced by microcomputer originated documents which any citizen can access at any field office of the agency." "Corrections can be made on-line, eliminating the cycle of rejected or postponed action on applications due to incomplete information, etc. State employment registers and employment applications for state jobs will be available through the statewide computer system, eliminating the two-week to one-month delay in getting such information out of the current personnel system." "Important committee hearings will be stored on video disks, accessible by computer for 'instant replay.'"

There would be other efficiencies: "Multiple networks and special program networks within an agency will essentially disappear. Instead, greatest efficiency will be obtained through conforming to an integrated ISDN network."

The office itself is one of those things about the world of 2001 that might look somewhat unfamiliar:

> Electronic work stations and telecommunications have revolutionized the office. We have very few clerical staff and secretaries. Most workers do their own correspondence (via E-mail) and documents. This has resulted in cost savings and revolutionized the sexist, traditional office organization.
>
> We provide faster service and respond to public needs quicker as a result of telecommunications.
>
> Offices are equipped with desktop computer terminals, keyboards, printers, telephones with many special features and other, usual, office accoutrements. Telephones provide features common for many years, plus good quality audio conference and telecopy capabilities.
>
> One special feature that helps in dealing with Alaska's participation in the world marketplace is the ability to compose documents in English, then have them automatically translated in many different languages.
>
> Artificial intelligence is relieving my office of some of the more routine responsibilities.

In the field, "field representatives are able to videotape a problem such as a depreciating structure, complete with a voice report on how to repair it and a computer simulation of what it will entail and look like, with printout copies for the files and the governor."

Telecommunications would be used by the participants themselves in the following ways:

> I would subscribe to those networks which would make available to agency employees the most current . . . information in their needed areas of expertise to the limit the budget would allow.
>
> I am in contact with my colleagues on the national and international scene through telecommunications, and we all share common data bases.
>
> Sitting at my desk in Juneau, I have a running day-to-day check on my budget and daily reports from offices throughout the state.

In some ways the state agency of 2001 sounds very different from state agencies today. However, the description of the state agency of the future points up how dated are some of the telecommunication practices of the state agency of today. For a number of the efficiencies that are forecast have already been realized in the internal communication networks and the electronic offices of private corporations.

Many private corporations have realized another benefit of telecommunication that was largely ignored in this section. They have established management information systems that extract and quickly transmit to top managers information of particular importance in decision making. This issue was discussed at greater length in the chapter on Information Resource Management.

Teleteaching

Question: You teach university level courses to students scattered throughout the state. How do you and your students use telecommunication?

The microcomputer assumes central importance in the responses to this question. In fact, one of the participants complained in the third round of the survey, "This section focuses on technology rather than the overall impact of technology on education." The microcomputer is described as "critical for some courses" by one respondent. Another assures us, "Advancements in computer technology will allow the delivery of an exceptional amount (by today's standards) of computing power to all users of the network." If students don't own computers, they will be able to check them out or go to their community communication centers.

What will the computers do? They will be used for voice and text mail (submitting assignments), electronic office hours and other types of conferencing (with interactive visual images), taking tests, gaining access to large databases, managing highly individualized learning, record keeping by instructors, schematic drawing, and providing expert systems as a substitute for graduate student advisers.

The role of teleconferences, if not central, is nonetheless prominent. It is not central simply because a number of the participants predict that the microcomputer of the future will have videoconferencing capabilities. One of the participants, for example, describes the student's terminal as having "a split screen and two-way voice [so he can] listen, comment, read and take notes."

Those who would use a video- and/or audioconferencing system would use it for discussion of selected topics, for lectures and demonstrations, for bringing in outside experts, linking up with professional conferences, joining round-table discussions with students of other universities. Several of these people would use conferencing in conjunction with other technologies and/or expect technical improvements in conferencing.

More exotic technologies also entered this discussion.

The electronic blackboard is one of them. It "will allow real-time duplication of hand-written materials across the network." The transmission of three-dimensional holographic images via television-like equipment is another. Holography is seen as supporting "visual interchange between the teacher and the students."

One participant would still require students to buy textbooks. Another said he expects print to "remain an integral part of any content delivery system." The opposite position was taken by a participant who said, "There is no hard copy in the entire course, and we do a lot of work through voice mail and voice actuated machines."

Two participants said they would make an effort to visit each student in person and a third said she expected "some form of 'campus' will necessarily remain as the social center of the university."

The overall impact of these technologies, one participant said, will be to "alter human perceptions and consciousness" just as "the introduction of the printing press in Europe and the growth of print literacy replaced an oral learning tradition which was thousands of years old. . . . The very essence of education will change -- including the current focus on low cognitive level content and the bureaucratic structure of our public school system. . . . Our large, institutional high schools will be the first to feel the effects of passive student rebellion, as students reject the current model of impersonal, institutionalized adolescent education."

Participants in the Delphi Survey appear to have put more emphasis on computers in their answers to this question than they did in their answers to other questions. Yet the activities engaged in by students and teachers do not seem so different in kind from those engaged in within government agencies. This raises the question of why experts might be reaching for one solution in one situation, a different solution in another, when the circumstances are similar. Certainly, some of the innovative applications of computers discussed in this section could be translated to the bureaucratic environment.

Private Industry and Telecommunications

Question: You're the manager of a telecommunication empire -- a private business -- based in Anchorage. What sorts of services do you provide? In what ways does the state government affect you? (A point to consider: will you be a content provider, will you be a carrier, or will you combine these functions?)

The central issue of this chapter is the role of the state government in telecommunications 15 years from now. But to understand what that role

might be, it is necessary to have some idea of what telecommunications tasks might be accepted by private industry. The Delphi participants were asked, therefore, what tasks they might take on.

Most of the participants would prefer to be content providers or to provide content and be the carrier. Only three would want to be solely carriers, and only one of these expressed interest in control of the means of transmission. One participant predicted "there will probably be a set of laws clearly separating carriers from content providers."

The content providers would provide information, be massagers of content obtainable from other systems, develop learning programs for clients throughout the world, provide services to schools and governmental bodies. The most exotic of the services envisioned would be for the state Department of Corrections:

> We have developed a whole new field of uses for telecommunication with the advent of micro-transceivers which do not require dishes to communicate via satellite. . . . Many prisoners, who in the past were in prison, costing the state about $35,000 per year, are now "collared" and in society. Their whereabouts and activities are monitored via satellite and computer 24 hours a day. Each prisoner wears a small, non-removable collar which transmits data every 10 seconds. Anti-social behavior is immediately detected and results in pick-up usually within 4 minutes. "Collared" prisoners are productive members of society, cost the state only $7,000 per year each and have a lower rate of anti-social behavior than members of the general population. This is just one of the services we provide for the state.[5]

Three of those who would offer mixed services would offer interactive, videotex-like services in which they would provide a portion of the content and act as a gateway for other information providers. A large videotex system, such as the French government's system, may have 1,500 or more information providers. One of the Delphi participants would provide Alaska-specific databases, the second would contract with small banks and retail stores to provide banking and shopping services. That service would also provide access to libraries throughout the world, would trace family trees, etc. The third would provide experts on technology to private industry and state agencies and would offer an international network for electronic mail, data searches, etc.

One of the common carrier operators would simply rent space on whatever was available: satellites, cable, fiber optic cable, computer linking systems. That person would also own "translating" devices enabling communication between systems with different standards. The second common carrier also would offer a connecting service, permitting communication between networks and media. The third common carrier operator would be a "system integrator. This company would provide

transformation, bandwidth management, voice and data connectivity, and network management."

Some of the services described in earlier sections are seen by the participants as promising ventures for private industry. Two would try to provide services to the educational system; three would try to develop interactive telecommunication services; others would provide the link for incompatible communication systems; still others would provide technical expertise and services to governmental bodies.

However, none would touch teleconferencing; none would provide new phone services to rural areas; none would create content for television; none would provide new television services. Perhaps other people would. It's hard to say. But the Delphi respondents included people who have created content for television, who are involved in the provision of phone services, who are working with teleconferencing. On the face of it, many of these activities seem uneconomic, and therefore unattractive to private industry.

The 15-Year Plan for the State

Question: What could the state government do to help bring about the telecommunication environment you envision?

What follows is the Delphi Survey participants' policy agenda for the state, loosely organized by theme:

1. Provide no-cost local access system to telecommunications statewide.
2. Provide grants for model programs.
3. Sponsor a statewide demonstration project to combine audio/video/computer capabilities for statewide use. (two participants)
4. Develop an attitude of openness to new technologies.
5. Be an example to private entrepreneurs by using the system to significantly improve government operations.
6. Coordinate and manage resource acquisition for all government entities. (two participants)
7. Develop a long range process, starting with a description of expectations at target dates in the future. After separating needs and desires for the new system, write specifications and develop a plan that includes development of specific technology to implement the system.
8. Have just one, long-term body which studies the telecommunications needs and recommends or makes policy.

9. A balanced board of users needs to be established to problem solve.

10. Above all, please no central office of telecommunications . . .[instead] a council of senior private and public persons who met once quarterly. to go over whatever agenda they and the governor agreed on.

11. Strengthen existing enabling legislation to permit the Division of Telecommunication Services in the Department of Administration to assist state agencies to move into a new telecommunications environment.

12. Educate students about the trends in telecommunications.

13. Permit filing of taxes and reports via computer.

14. Provide an information bank; put all state library information in a computer.

15. Develop technical specifications to assure reliable, effective and efficient delivery of services. (two participants)

16. Help create an ISDN environment for all state and public traffic to go over. No more separate networks for separate agencies.

17. Promote and foster research in technical and operations areas.

18. Lead the way in demanding new, more sophisticated and efficient telecommunications systems.

19. Get off the Alascom bandwagon.

20. Avoid getting tied to one vendor a la Alascom.

21. Establish local drop telephone numbers for state agencies to use.

22. Define telecommunications "quality of life" requirements for Alaskans. Determine what services citizens need and want, and what role the state should play in direct or indirect provision of these services.

23. If subsidies are needed, subsidize the users, not the providers.

24. Increase use of telecommunications for citizen access to government and the decision making process.

25. Demand quality from service providers.

26. Enact laws and regulations that promote competition.

27. Deal with security issues in the following areas: a) pirating of fee-for-service channels, b) access to confidential information, c) personal privacy.

Some Conclusions

The Delphi participants are well qualified to speak for themselves. We can not know exactly what lies in our future, but the Delphi participants are better positioned than most to guess.

In some of their guesses they have let their imaginations soar, but much of their speculation is based on their knowledge of telecommunication systems that are technically possible, if not feasible, today. We do not have to wait for new technologies. The technologies are here. Our task is to decide what we need and to choose the technologies best qualified to meet those needs (and to ignore the others). Our situation today is not so unusual as it might seem. The radio was around for more than 20 years before it was discovered that it could be more than a wireless telephone. Almost accidentally, it was discovered in 1920 that it was a good medium for transmitting messages to large numbers of people. The first television set was built in the 1920s; it took 30 more years to become a mass medium.

Just as there are precedents for our situation, there are cautionary tales about those who have failed to exercise foresight. Prominent among these figures is Thomas Watson Sr. of IBM, who turned down the opportunity to manufacture computers after World War II because he didn't think there would be a market for them. As a state we are in a similarly difficult position; no one has gone before us, there is no other place with similar telecommunication needs.

The challenge is well stated by one of the participants: "Must we structure our thinking based on what we already know is possible, or could we rather design a communication support system based on specifications derived from expected human needs in the next century?"

The Delphi participants suggest that telecommunication can save the state money: audio- and videoconferencing can be substituted for travel. Perhaps. Telecommunication can substitute for some travel, but historically business travel has not declined as telecommunication systems got better. Telecommunication can improve communication within government and between government and other entities; this can lead to the making of better decisions. It does not mean those decisions will come more cheaply.

The participants suggest that telecommunication can make state government more efficient. Undoubtedly. But they disagree about the best way to go about it. Give the Department of Administration more power? Create a new agency? Create an advisory body? At least a few of them -- those who think they could make careers 15 years from now of connecting incompatible communication systems -- do not really expect to eventually

see the integration of communication systems.

They foresee social benefits of improved telecommunication systems. These benefits appear to come largely from much greater use of existing and new interactive communication systems. Private industry has been interested in such systems for several years in the Lower 48, but they are still in their infancy and it remains questionable that private industry can support videotex services on the scale envisioned by the Delphi participants. The most successful of the existing videotex services is France's, designed and managed by its national government.[6] If Alaska wants such a service, the state government will undoubtedly have to play a role in its development.

The Delphi survey itself indicates that the age of interactive telecommunication has not arrived in Alaska. Those invited to participate by regular mail wrote enthusiastically about the promise of electronic mail. Those invited to participate by electronic mail largely remained silent. As late as four months after the start of the project, only seven of them had used the electronic mail system. We have only a little information about the reasons but they include the following:

1. Hesitance to use an unfamiliar technology. (Those selected for the electronic survey were provided with instructions; these were more than a page long.) Two participants asked to switch from electronic mail to regular mail because of difficulties in using the system.

2. Long-distance charges. In communities where there is no branch of the University system it is necessary to place a long-distance call to get into the University's computer network.

3. Lack of necessary equipment. Electronic participants needed a computer, a modem and some software to link up to the University system. One participant asked to participate by regular mail because he didn't have a modem.

4. Slowness in updating bulletin board content. Content on the bulletin board was updated about every six weeks. When it was updated, participants were advised of that by electronic mail (after the first updating they were advised via U.S. mail, too). That means they got electronic mail messages infrequently. So usually their searches for new content on the system would have gone unrewarded. Only one participant checked his electronic mail in the the three days following the final updating of the electronic bulletin board.

These then appear to be some of the immediate bars to more widespread use of interactive telecommunication. The apparent solutions are education in the use of interactive telecommunication, simplification of the systems, provision of local access to the systems, and attention to the content of the systems. Private industry in the United States has been working hard since the beginning of the 1980s at the problems of providing simpler, more acceptable systems. If solutions are to be provided in the other areas, they

will be provided by government.

The Delphi participants have told us what interactive telecommunication can do. But it isn't happening yet. How badly do we want what they describe?

Footnotes

[1]ISDN stands for Integrated Services Digital Network. One glossary of technical terms describes it as "an internationally recognized technical framework for future digital telephone, data and perhaps video transmission by wire." *Channels, the Business of Communications,* in its *Field Guide '87,* p. 94.

[2]The returns to date on interactive computer services are mixed. Two of the most technically sophisticated services, Knight-Ridder's Viewtron service in Florida and the Los Angeles Times' Gateway service, shut down in 1986. Some other services have prospered. CompuServe was reported to have 280,000 subscribers in 1986, followed by Dow Jones News Retrieval with 250,000, Western Union's Easylink with 130,000 and The Source with 70,000. See Gary Arlen, "High Rollers With High Hopes," in *Channels, the Business of Communications, Field Guide '87,* December 1986, pp. 86-87. See also "Videotex Exodus Continues," *Presstime,* January 1987, p. 44.

[3]Peter Ainslie, "Dead in the Red: A Billion-Dollar Necrology," in *Channels, the Business of Communications, Field Guide '87,* December 1986, p. 10.

[4]Colorado's experience with a government telecommunication network is briefly summarized on page 18 of this report. The use of private telecommunications by businesses in Alaska is described in "Telecommunications Policy in Alaska," paper prepared by the Alaska Consumer Advocacy Program for the Division of Telecommunications Services, April 23, 1985, pp. 9-11 (see also pp. 24-25). That paper reported that four of nine businesses surveyed in the summer of 1984 were bypassing local and long distance companies for interoffice communication. The issue of economic benefits vs. social costs of a government operated telecommunication system is also raised in "Managing Alaska's Information Resources, A Proposed Statewide Policy," report to the Interim Joint Committee on Telecommunications and the House Special Committee on Telecommunications, by Larry Pearson, Doug Barry and Chris Herberger, Jan. 19, 1987, pp. 27-29.

[5]It "really isn't that exotic," the man who advanced the idea said. "One state is already doing something similar with prisoners wearing a foot bracelet and monitored at home through telephone lines. The technology for collaring already exists."

[6]Two million French households now have Minitel terminals that enable them to communicate with 1,900 information providers on the national videotex system. The system, created by the government's telecommunications authority, was estimated in early 1986 to be handling 15 million calls a month. Thane Peterson, "Why the French Are in Love With Videotex," *Business Week,* Jan. 20, 1986, pp. 84-85, and Arlen, "High Rollers With High Hopes," *Channels,* p. 87. See also Felix Kessler, "France Spends Billions on Goal of Becoming Leader in Technology, Some in Business See Pitfalls But a Concrete Result Is Better Telephone Service, Merits of the Yellow Pages," *Wall Street Journal,* Sept. 14, 1982, p. 18.

Chapter Six

In Conclusion: Remembering What We Want

In our efforts to examine telecommunication issues, we have looked at what has worked -- and hasn't -- in Alaska and elsewhere; we have asked people within government and outside it about their likes, dislikes and expectations; and we have asked experts to tell us what is possible.

Some of the viewpoints we have presented are contradictory. Some of the issues identified could be dealt with in more than one way. So we will not presume to step forward with a single all-encompassing solution. But we will not be so hesitant in identifying those issues that such a solution must address.

First of all, Alaska is like no place else. Our telecommunication policies must take that into account. If they do no more than imitate policies adopted elsewhere, they will fail to address those aspects of Alaska's telecommunication and information environment that are unique.

Alaska is a huge, sparsely populated state -- inhospitable terrain for marketplace forces in the information industry. The telecommunication grid that has been established across the state has required the active involvement of the state government. A recent decline in state support immediately affected that grid. Some kinds of television programming and other telecommunication services suddenly became unavailable in some parts of the state. The loss of these services increases the danger of an information gap developing between rural and urban areas in Alaska. Without state intervention, rural residents could become the information poor while urban residents become the information rich in the Information Age.[1]

The state needs to develop a telecommunication plan. It has to identify telecommunication needs and to come forward with proposals for satisfying them. It should probably make two lists, one of luxuries and one of necessities. It may need to provide subsidies to users or to providers of expensive telecommunication services that are deemed necessary. It may need to promote Alaska as an attractive testing ground for some types of

Footnotes

[1]The problem is discussed by Don A. Dillman, in "The Social Impacts of Information Technologies in Rural North America," *Rural Sociology*, 50(1), 1985, pp. 1-26.

[2]The newspaper industry in several states, for example, fought efforts by AT&T to conduct tests of videotex systems in the early 1980s. Pearson, Larry, "Electronic Publishing: Is Regulation of AT&T in the Public Interest?" paper presented to the Newspaper Qualitative Studies and Advertising divisions of the Association for Education in Journalism and Mass Communication at Boulder Colo., March 13, 1984.

[3]Harlan Cleveland observes that we have not yet got much beyond a "gee whiz" reaction to the technical wizardry of the emerging information society: "The hardware can come up with the *answer* in seconds and communicate it around the world in minutes, but have we asked the right *question?*" In "Information As a Resource," *The Futurist*, December 1982, p. 34.

services that can less easily be tested elsewhere. The lower 48 states, for example, have proved a somewhat hostile environment for the testing of interactive telecommunication services by telephone companies.[2] And it may have to provide some services, such as audioconferencing and computer networks, itself.

The state needs to develop an information plan. We have lots of information. It's as plentiful as grass and about as useful until we find ways of organizing it. We don't need more of it. We don't need to get it faster.[3] (Well, maybe a little more and a little faster.) But we need to find ways to communicate it more easily and we need to find ways of extracting the really important information -- those facts essential to the making of major decisions -- more quickly than is now possible. This is true whether we are managers within state and local governments or in private industry.

The state will need to support its telecommunication and information plans. Information management, in particular, is a fragile concept. It means change, and every organization contains its own inertia. Without a strong show of commitment from the top levels of state government as well as support from lower levels of management, efforts to rationalize the use of information within state government are doomed to failure. Equally important, the workers who will be affected by it should be involved in the change process. They are much more likely to accept the new environment if they regard it as the result of their own efforts.

Once these plans have been developed, they will need to be kept current. This will require continual surveillance of the environment. New needs and new ways of satisfying them will develop. As Alaska grows and its demographics change, the role of the state government in telecommunication will change. The Alaska of 2001 will undoubtedly be different from the Alaska of 1987, but it will take much more than the predictions of a Delphi panel of telecommunication experts to get us from here to there.

DEPARTMENT OF NATURAL RESOURCES

INFORMATION MANAGEMENT SUMMARY

JANUARY 1987

Prepared by: Division of Management
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I. INTRODUCTION

The Department of Natural Resources is responsible for acquiring title to and subsequently planning, managing and allocating natural resource use on lands owned by the State of Alaska, including 104.75 million acres selected under the Statehood Act, some 60 to 70 million acres of offshore lands, and as much as 10 million acres of lands beneath navigable rivers and lakes. The Department's planning and resource management authorities cover timber; materials; grazing lands; agricultural lands; wildlife habitat; recreational resources; sites for residential, commercial and industrial use; transportation and utility rights-of-way; locatable minerals; oil and gas; coal; geothermal resources; and other leasable minerals. In addition, the Department has certain regulatory powers applicable without regard to land ownership: water use allocation statewide; zoning authority in the unorganized borough; wildfire control responsibilities throughout Alaska; and the statewide regulation of logging operations, coal mining, and geothermal resources.

In fiscal year 1979, DNR began a department-wide program to acquire new technologies for use in the management of natural resources information, including land records resource data and related administrative information and data. The goal has been to improve effectiveness and

efficiency in management of natural resources through the use of up to date technology for information management. Many projects have been initiated and completed since that time. Others are ongoing. This report provides a status report on development as well as an overview of information management in the Department of Natural Resources.

II. ORGANIZATION AND OPERATIONS

A. DNR Resource Information Management User Group (RIMUG)

The DNR Resource Information Management User Group (RIMUG) is composed of representatives from each division. The group is chaired by the Deputy Commissioner for Operations. The mission of the group is to coordinate information management activities within the department to provide general oversight and direction to the resources information management program. The future direction of RIMUG is currently under review and recommendations for change are being developed. Changes will be recommended to reflect the shift of department data processing focus from the

development phase to the production phase. The Information Systems Committee (ISC) and the Information Resources Management Expenditure and Approval Committee (IRMEAC), provide oversight functions at the statewide level.

B. Division of Management

The Division of Management, Land Records Information Section (LRIS), has the responsibility for providing support services for automated information management within DNR. These services include technical and user-oriented support for computer systems in the areas of system development, system maintenance, data base administration, computer operations, user training and assistance, user manuals and automated systems feasibility studies. LRIS also maintains land status plats, provides reprographics and micrographics, scientific graphics and mapping, and data base quality assurance support. LRIS also provides DNR's liaison with the Department of Administration Information Resources Management (IRM) divisions and other agencies involved in information networking.

C. The Division of Mining, Geological & Geophysical Survey

The Division of Mining and Geological and Geophysical Surveys (DMGGS) is responsible for natural resource data collection, inventory, assessment and analysis. It is the major user of several Data General minicomputer based systems used to collect, analyze and present natural resource information in a graphic format. DMGGS is also responsible for management of statewide resource mapping efforts.

D. User Divisions

All DNR divisions are users of electronic information management tools in their day to day work including micro and mini computers, mainframe terminals, and word processors.

III. POLICIES AND PROCEDURES

The Department Order 108, executed in March 1985, is the department's general policy statement regarding information management. It is currently being rewritten to reflect changes resulting from the recent elimination

of the Division of Technical Services and the merger of the Divisions of Geological and Geophysical Surveys and Mining.

The Department Order gives guidance for:

1) Uniform operations
2) Rational decision-making
3) Delegation of authority and responsibilities and,
4) Improve correspondence and communication.

Specific standing policies and procedures exist for EDP (Electronic Data Processing) standards, micro computers, word processors and EDP actions.

IV. PLANNING/BUDGETING

A. Long-Range Resource Information Management Plan

DNR's first long-range plan was developed in 1983 and it has been updated each year thereafter. It was issued in September 1986 in a format consistent with ISC guidelines. The scope of the plan includes

projects and activities that are proposed or being conducted at any level within the Department that fall within the following eleven broad information management goals:

1. Establish and maintain an effective communications network linking DNR offices to each other and to the data/information they must access.

2. Provide applications assistance, as appropriate, in solving information management problems so as to assure cost effectiveness and full integration into the daily conduct of business.

3. Develop an accurate and complete cadastral information base for lands and waters within DNR jurisdiction to insure the legality and accuracy of resource management decisions.

4. Provide information to the public to inform them about issues, involve them in decisions, and establish departmental accountability.

5. Provide current, consistent policy direction and procedural information to appropriate DNR managers form the Commissioner's Office.

6. Use new office systems and procedures, compatible within the Department, to provide more efficient administration and management of work.

7. Manage manual and automated data bases as departmental resources to reduce redundancy and improve accuracy and availability of data/information.

8. Develop and use resource data assessment and evaluation techniques to provide standardized, accountable analytical methods for use in decision making.

9. Develop new data processing systems to better manage DNR's growing amount of land status, natural resources, and administrative data and provide increased reporting capabilities.

10. Operate current data processing systems in an efficient, economical manner so as to meet the growing use of their capabilities.

11. Collect data on natural resources to meet resource management and decision making needs, provide consistent, current accurate data for areas of greatest concern and according to standards.

B. Tactical Plans

Based on the strategic long-range plan, those divisions and sections assigned responsibility for projects and programs develop operational and project-oriented workplans for the implementation of their various projects and programs.

C. Budgeting

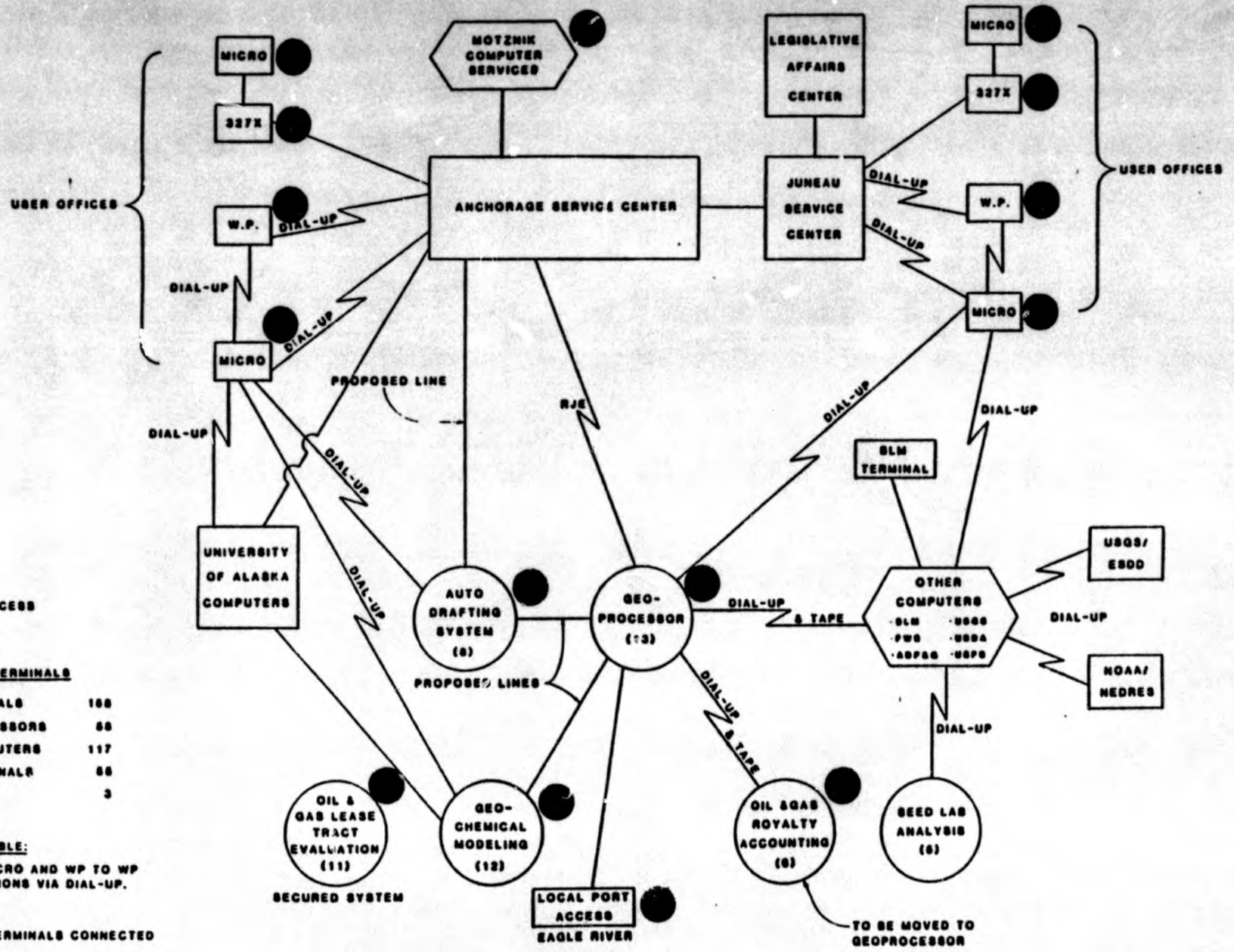
Based on the priorities set through the long-range planning process, DNR establishes budgeting priorities for information management activities. Beginning in FY 88, divisions are responsible for budgeting for any data processing costs which exceed the FY 87 allocation from the Department of Administration. The chargeback issue is discussed later in this paper.

All automated information management projects and capital budget requests are reviewed by the RIMUG.

V. Computer Resources

(See attached overview of computer resource network)

OVERVIEW OF DNR DATA COMMUNICATIONS



NETWORK ACCESS IN 10 CITIES

NUMBER OF TERMINALS

327X TERMINALS	168
WORD PROCESSORS	58
MICRO-COMPUTERS	117
OTHER TERMINALS	66
TTY-TYPE	3

ALSO AVAILABLE:

MICRO TO MICRO AND WP TO WP COMMUNICATIONS VIA DIAL-UP.

(X) No. OF TERMINALS CONNECTED

● Supported by LRIS

A. State Mainframe/Anchorage and Juneau Service Centers

The Department has 330 terminals which access the State's mainframe computers.

1. Statewide administrative systems used by all DNR divisions:

   a. PROFS-(Professional Office System)
   Office automation system featuring low cost instant communication statewide with electronic mail, document preparation, scheduling, reminder and Displaywriter interface capabilities.

   b. AKSAS-(Alaska Statewide Accounting System)
   Designed to incorporate sophisticated file management technology, highly flexible management reporting facilities, on-line entry/inquiry and streamlined procedures to provide minimum processing turn-around time and high-quality timely management and financial information. Summarize as "normal" DNR's access to mainframe.

c. RAMIS II-(Rapid Access Management Information System) Combination data base management system with an easy to use nonprocedural computer language interface for report preparation and records maintenance.

d. ALECSYS-(Alaska Legislative Computer System) Several different systems designed for both legislative service and information.

e. SAS-(Statistical Analysis System)
A statistical analysis system which can analyze data from many sources to produce statistical reports, graphic charts and diagram, and/or plots the data in a specified format.

f. CMS-
An online computer based training system used by the State to train staff in the use of mainframe applications.

g. PHOENIX-
An online operation system used to create and edit programs, process script and SAS files.

h. PACS-(Personnel Accounting and Control System) Uses to maintain budget accounting for all State employee positions.

i. PRAMS-(Personnel Reporting and Management System) Menu driven personnel data reporting system for rapid access to a variety of employee or position information.

j. PROPERTY ACCOUNTING-
Statewide system for the inventory of all State equipment.

k. RLVE-
System for the accounting and management of State employee leave records.

2. DNR Systems

a. Land Administration System (LAS)

LAS is a system of related component parts which together compose the state computerized textual land status records. The completed components are:

1) Case Monitoring - Allows the Department to add, update, delete and display information concerning any DNR casefile.

2) Customer Information - Provides an online customer directory.

3) Printer - Provides the capability of printing off of printers located in DNR rather than on the Service Center printers.

4) Appraisals - Contains data on about 13,000 appraisals providing cross reference and reporting capability.

5) Coal Surface Mining - Stores, retrieves and displays surface mining casefiles and related information.

6) Contracts - Contains all land sale and lease contract information necessary to administer contracts, issue billings etc.

7) Water - Contains water management data pertaining to water rights, water use, dam inventory and well inventory.

8) Revenue and Billing - Performs revenue accounting functions for all revenues generated from the sale or use of natural resources scheduled for completion by January 1, 1987.

b. Status Plat Tracking - Contains a current inventory of status cases not yet noted to the Status Plat maps. Because there is an eight month backlog of status drafting, this file, in conjunction with the latest Status Plat, provides the resource manager with a current picture of State land status.

c. Recorder's Office - Provides an on line index for grantor, grantee and location of recorded documents. Maintained by a private vendor. Used by Division of Management (DOM) and private title companies.

d. Land Lottery - Maintains land and application data on all DNR land lotteries. Used by the Division of Land and Water Management (DLWM).

e. Forest Inventory - Maintains all data related to inventory of the state's forest and timber resources. Used by the Division of Forestry (DOF).

f. Data Processing Service Request (DPSR)
Provides tracking and monitoring information related to data processing service requests.

B. Minicomputers

1. Geoprocessor

The geoprocessor operated by DOM is a Data General MV 8000 minicomputer system primarily devoted to computer mapping, geographic and statistical analysis of natural resource information for planning and resource management purposed. Principal user's are the DMGGS, DLWM, DOF, DOG, the Department of Health and Social Services, the Department of Fish and Game, and the U.S. Fish and Wildlife Service.

2. Automated Drafting System

The Automated Drafting System is a DOM managed DEC-VAX minicomputer utilized for the production of State Status Plat maps on a graphic database system.

3. Oil & Gas Royalty Accounting System

They system accounts for the states royalty oil

derived from oil leases and interfaces with the new Revenue & Billing system for accounting and billing. The system runs on a Data General mini computer operated by DOM. The principal user is DOG.

4. Oil & Gas Lease Track Evaluation System

This system is a Data General based minicomputer system operated by DMGGS for evaluation of seismic and other types of geologic data in the development of oil and gas lease sales. The principal user is DMGGS.

5. Geochemical Modeling System

This Data General based minicomputer system is managed by DMGGS and is located in Fairbanks. This system primarily analyzes geographic data such as aeromagnetic surveys and geochemical data for the determination of mineral zones in the State. The principal user is DMGGS.

6. Seedlab Analysis System

This system is a Hewlett-Packard based minicomputer at the Division of Agriculture's

Plant Material Center in Palmer. This system analyzes seed lab information and facilitates the State's participation in a national agricultural seed lab program.

C. Microcomputers

The Department now owns 158 microcomputers distributed through all divisions. They are used for:

1. Terminal access to the State Service Centers for the use of LAS, PROFS, and other mainframe systems;

2. Administrative functions such as time reporting, fiscal accounting, budgeting, inventory control, and project management;

3. Communications with other computers (i.e., wildfire network, federal and university agricultural data bases); and

4. Records management for small data bases not on or large enough for the State Service Centers, and occasional word processing and local computing support.

VI. STATUS OF DEVELOPMENT

A. LAS

Capital funds have been allocated to convert DNR's active, manual case files to summary form on the automated Land Administrative System (LAS). Of an estimated 140,000 case files, 116,000 have been converted to date. The remainder are expected to be completed by July 1987. One hundred percent conversion accuracy of all active case files is the goal.

B. Revenue & Billing

In 1985 a major development project was started to design and implement a new Revenue and Billing system. This project was contracted with a software development company within the state. The system was implemented in January 1987 and is in the final stage of clean up. The Division of Management has provided project management and technical support during all phases of development.

C. ADS

The ADS system has been fully implemented for Status Plat automation. Currently 585 townships out of 7,000 total have been automated onto the system. These 585 townships represent over 2,500 map documents.

Survey data for all remaining townships is now being automated using DNR staff. At the same time, the basemap information will be automated by contract. Bid proposals are currently being evaluated and a contract should be awarded by March 1. A Cooperative Agreement with the BLM to photo-revise USGS quadrangles using high-altitude infrared photography will provide the hydrographic base source documents for this phase of the work.

Conversion of land activity information remains to be funded.

D. Recorder's Office

During FY 86 the Recorder's Office system was updated and improved to provide on-line access. This system then was installed on a contractor's computer system (Motznik Computer Services) where technical and system access support is provided on a statewide basis through a cooperative agreement with the State of

Alaska and the service contractor. Hookups to some rural offices have been delayed pending a decision on closure of those offices.

VII. CRITICAL ISSUES

A. Funding of Data Processing Costs

1) Operating Costs

The Department has a capital investment in excess of $12 million in data processing hardware and software and data bases. The annual operating cost for contracted maintenance and for staff support is about $1.6 million. Automated processing of information becomes of even greater importance with reduced staff in the divisions to carry out the department's resource management programs. DOA chargeback for mainframe activity is not included in this figure and is discussed separately below.

The budget supporting this function was cut 25% in FY 86 and another 15% in FY 87. We are now at a baseline funding level for the systems we are supporting. Further cuts to this budget will result in shutting down computers and/or systems running on the mainframe.

The issue we face with any additional departmental cuts, therefore, is whether the computers and mainframe systems are sufficiently critical to the operation of this department to maintain current funding levels.

2) CIP - Automated Drafting System

An additional $2.24 million in CIP funds is needed to complete the ADS system within a 3 to 4 year timeframe.

If these monies are not appropriated, the Department will be forced to finish the project "in house" on a time available basis. No estimate is currently available of years required for completion.

B. Chargeback

From FY 80 to FY 83 costs associated with the State mainframe were paid through a chargeback system. The system did not work well. In FY 83 data processing operating budget monies were gathered up from most Department budgets and transferred into the Department of Administration's budget with the instruction to formulate a new chargeback system. FY 87 is the first year of the new system.

The procedure for FY 87 has been for DOA to negotiate resource allocations (not dollar allocations) back to the departments based on actual use during FY 86. Any usage above the allocation will be charged back to the department.

Although we are still negotiating our FY 87 agreement with DOA, we currently project that our additional chargeback cost will be in the neighborhood of $100,000. When the agreement is final and we can be more precise about the projected additional cost, divisions will be asked to encumber operating monies to cover their prorated share of the costs. Since these are unbudgeted costs, divisions may need to make program shifts to cover the expense.