Policy Framework for Native American Telecommunications

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The federal government does not have an overall policy framework or strategy for Native American telecommunications. Continuation of the policy status quo is likely to compromise the ability of Native Americans to realize the potential of telecommunications to enhance Native cultures, communities, and self-governance. The most highly leveraged options include those that strengthen telecommunications expertise and planning at both the tribal/village/community and intertribal/national levels. Also, the high cost of rural telecommunications, combined with the weak economies in many rural Native areas, means that coordinated, integrated approaches to telecommunications infrastructure development are essential. This includes options to aggregate both supply and demand in order to bring costs down and achieve economies of scale and scope. On the demand side, community communication centers and networks warrant serious consideration. On the supply side, encouraging the formation of Native-owned and -operated telecommunications companies; an upgrade of service by, and/or partnerships with, existing private telecommunications companies; and shared use of federal telecommunications systems can help.

Telecommunications could be specifically addressed in proposals to: 1) consolidate federal programs such as block grants to the states and tribes; 2) reorganize federal agencies serving Native Americans; and 3) implement electronic delivery of services to and by Native governments and individual Native Americans. Information about federal telecommunications programs and activities could be shared and accessed electronically by Native leaders, activists, planners, and technology experts via the Internet and other computer networks. This could help Native groups

become more active participants in developing policies on telecommunications, universal access, privacy, intellectual and cultural property rights, and other issues of concern to many Americans, including Native Americans. Future applications and policymaking would benefit from significant, continuing research and program evaluation on many of the topics discussed in this report—the first by the federal government on Native American telecommunications.

The federal agencies with major responsibility for telecommunications policy, such as the Federal Communications Commission (FCC) and National Telecommunications and Information Administration (NTIA), have not applied Indian law to telecommunications policy. The federal agencies with lead responsibility for Native programs, such as the Bureau of Indian Affairs (BIA), Indian Health Service (IHS), and Administration for Native Americans (ANA), do not have a Native American telecommunications policy. These agencies do support some noteworthy telecommunications projects that benefit Native Americans.

A Native American telecommunications policy framework could, for example, affirm that telecommunications is essential to ensuring Native well-being and survival, and could include telecommunications infrastructure as part of a modern "information age" interpretation of the federal responsibility for Native well-being. The policy could afford flexibility to individual tribes, villages, and communities, recognizing that they will have differing levels of interest and capability in assuming telecommunications responsibilities. The policy could encourage Native governments and service providers that wish to assume self-direction and control of telecommunications in Native areas to do so. Agency-specific policies could address a wide range of programs that affect the viability of tribal/village/community telecommunications activities and enterprises. These programs include, for example: 1) Rural Utilities Service loans; 2) universal service funds; 3) FCC frequency spectrum allocations; 4) NTIA grants; 5) BIA educational technology and geographic information systems support; and 6) IHS telemedicine and health information systems support. The policy could establish new mechanisms for interagency, tribal-federal, and tribal-state collaboration and coordination. For example, the joint federal-state board on the universal service fund could be expanded to include tribal representation. Key policy elements could be included in statutory guidance, such as amendments to existing Native American and telecommunications laws, or a separate "Native American Telecommunications Act" or the equivalent.

NEED FOR A POLICY FRAMEWORK

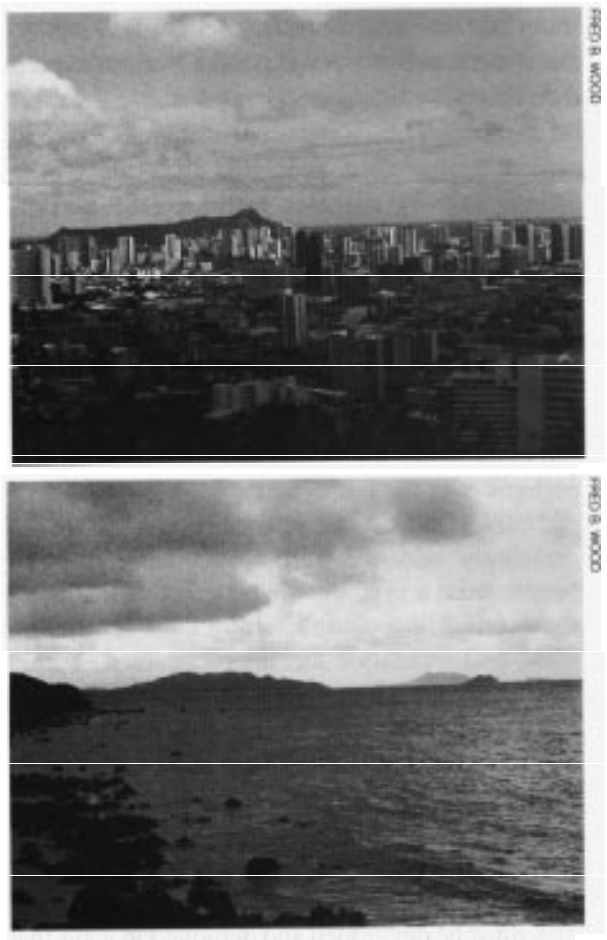
A threshold policy question in any Office of Technology Assessment (OTA) study is whether policy actions beyond continuation of the status quo (usually not entirely static, however) warrant serious consideration.

For this study, the answer seems straightforward. Native American telecommunications policy and activities are clearly lagging behind both: 1) other areas of Native American policy (e.g., self-governance, education, social services, and health care); and 2) the telecommunications policy development and initiatives in the majority society. Native American telecommunications activities are increasing, and likely will continue to do so absent any special policy interventions. But the rate of change in the majority society has itself accelerated markedly in recent years, due in part to the current Administration's reinventing government and national information infrastructure ini-

tiatives, and more generally to the continuing transition of the United States into a post-industrial information economy and society.[1]

Absent policy interventions, it is unlikely that - Native Americans will catch up with the majority society with respect to telecommunications, and they may fall further behind. This assumes even greater importance, given the potential benefits of telecommunications that may be deferred, diminished, or foregone under the policy status quo. Even if the more optimistic visions of Native American telecommunications are not realized, achieving just an "average" result is likely to be highly leveraged because Native American telecommunications policy is very incomplete and underdeveloped. Neither the federal government nor the national tribal and Native American leadership has an overall policy strategy or framework for Native American telecommunications.

Native Americans, as a group, are under considerable stress. They have significantly higher rates of unemployment, poverty, high school dropouts, alcoholism, cirrhosis, and suicide compared with national averages. The BIA estimates that unemployment on or near reservations averages about 50 percent (double the 1990 U.S. Census estimate of 25.7 percent using a narrower definition of unemployment).[2] Unemployment on some reservations is as high as 70 to 80 percent. American Indian and Alaska Native high school graduation rates are about 10 percent below the national averages, and college graduation rates are



Top: *Oahu, an island of contrasts. The majority of the island's population live in Honolulu, the state capitol of Hawaii, shown here looking southeast toward Diamond Head and the Pacific Ocean beyond.* ***Bottom:*** *Wide expanses of beaches and mountains reaching the sea are typical of rural Oahu and the neighbor islands where many Native Hawaiians live. View from Makapuu Beach looking northwest toward Waimanalo Bay, Kaiwa Ridge, and Ulupau Crater beyond.*

[1] See Vice President Gore, *Creating a Government That Works Better & Costs Less: Report of the National Performance Review* (Washington, DC: U.S. Government Printing Offlce, Sept. 7, 1993); Information Infrastructure Task Force, "The National Information Infrastructure: Agenda for Action,'' National Telecommunications and Information Administration, Washington, DC, Sept. 15, 1993, and "National Information Infrastructure: Progress Report 1993 -1994," National Telecommunications and Information Administration, Washington, DC, Sept. 13, 1994; Emilio Gonzalez, *Connecting the Nation: Classrooms, Libraries, and Health Care Organizations in the Information Age* (Washington. DC: National Telecommunications and Information Administration, U.S. Department of Commerce, June 1995); and U.S. Congress, Office of Technology Assessment, *Making Government Work: Electronic Delivery of Federal Services,* OTA-TCT-578 (Washington, DC: U.S. Government Printing Office, September 1993).

[2] See Indian and Native American Employment and Planning Coalition, "Will the Real Unemployment Rate in Indian Country Please Stand Up,'' Mar. 1, 1993, and "The Indian Labor Force: A Portrait in Numbers" May 1993. Also see George Russell, *American Indian Digest: Facts About Today's American Indians,* 1995 Edition (Phoenix, AZ: Thunderbird Enterprises, Inc., 1994).

about half the national averages.[3] The IHS reports that American Indians and Alaska Natives experience mortality rates considerably above the rates for the entire U.S. population—tuberculosis (520 percent higher than average), alcoholism (433 percent higher), diabetes mellitus (188 percent higher), accidents (166 percent higher), homicide (71 percent higher), and suicide (54 percent higher).[4] The health conditions of Native Hawaiians are, likewise, considerably worse than those of the general population. This situation is attributed, in part, to serious erosion of Native culture, family and community traditions, and diet and exercise patterns over the last century.

Native leaders and advocacy groups are increasingly addressing the well-being of their people from a systemwide perspective that takes into account how culture, family, community, lifestyle, and workstyle are interconnected. Within this community framework, telecommunications can be an important facilitator and, in some cases, a necessary—although not by itself sufficient—prerequisite for improving the well-being of Native Americans.[5]

Native Americans who research or experiment with telecommunication technologies stress that they must be developed and deployed in ways that enhance Native culture and values.[6] Native Americans historically have struggled to preserve and defend their cultures within the dominant, majority society. In recent decades, the advent of electronic communications—especially TV, film, videos, and popular music—and the new electronic media of computers, software, and satellites present a formidable challenge. Because Native culture has been eroded in the past by the mass media, some Native American leaders are understandably cautious or even resistant to adopting new telecommunication technologies without first gaining confidence that technology applications will be sensitive to and strengthen Native culture. The new media could, indeed, have adverse impacts on Native culture unless Native Americans have a central role in understanding and guiding their use and in developing programming and informational materials.[7]

Telecommunications can play a multifaceted role in improving the overall well-being of Native communities. In the absence of policy interventions, however, much of this potential is likely to be lost or indefinitely deferred. And the opportunity for Native Americans to take control of their telecommunications destiny may be seriously compromised.

If these opportunities are to be realized and the risks minimized, an overall policy framework or strategy—a package of initiatives and options—on Native American telecommunications is needed. No single policy option will address all Native American telecommunication needs. Many options could be implemented or influenced in a variety of ways—not necessarily by any one person (or group), organization, or institution.

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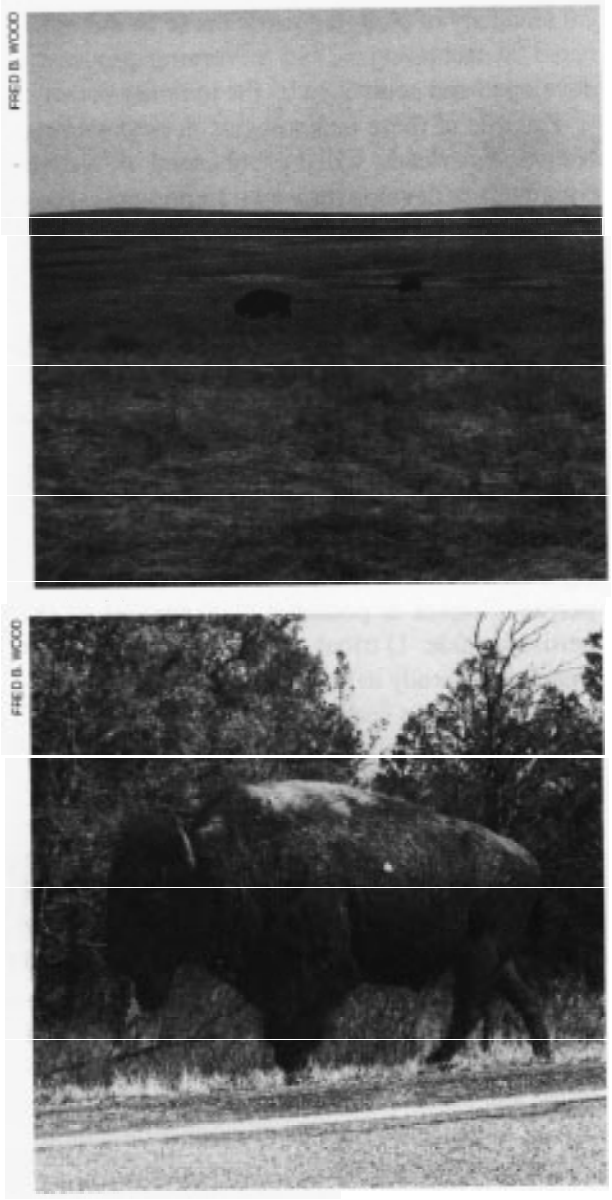
[3]Ibid.

[4]Indian Health Service, U.S. Department of Health and Human Services, *Trends in Indian Health—1993* (Rockville, MD: Indian Health Service, 1993). Also see U.S. Congress, Office of Technology Assessment, *Indian Health Care*, OTA-H-290 (Washington, DC: U.S. Government Printing Office, April 1986), and *Indian Adolescent Mental Health*, OTA-H-446 (Washington, DC: U.S. Government Printing Office, January 1990).

[5]For detailed discussion, see chapter 3.

[6]See chapter 2.

[7]See, e.g., George D. Baldwin, "American Indian Identity and Tribal Sovereignty in Cyberspace," paper prepared for the Workshop on Legal, Ethical, and Technological Aspects of Computer Network Use and Abuse," American Association for the Advancement of Science, Oct. 7-9, 1994; Randy Ross, "Tribal Rights and Cultural Identity in Cyberspace," *ArtPaper*, vol. 12, No. 10, June 1993, p. 10; and George D. Baldwin, "Networking the Nations: Information Policy and the Emerging Network Marketplace," *Journal of Navajo Education*, vol. 9, No. 2, winter 1992, pp. 47-53.



Top: *Many Indian tribes of the Great Plains depended on buffalo for food and clothing; white settlers and loss of natural habitat reduced the buffalo herds to a few surviving in protected areas, such as the Theodore Roosevelt National Park in North Dakota, shown here.* ***Bottom:*** *Buffalo grazing along the side of a scenic drive near Squaw Creek Campground, Theodore Roosevelt National Park.*

Among the many actors in Native American telecommunications are:

- tribal, village, and community leaders and governments,
- grassroots Native American advocates and service providers,
- national Native American professional and advocacy organizations,
- individual Native American telecommunications specialists and activists,
- federal and state government agencies,
- private sector profit and nonprofit organizations with an interest in Native Americans,
- communication and computer companies, and
- the U.S. Congress.

OTA has identified eight major components to a comprehensive policy framework on Native American telecommunications. Each component includes several policy options. The first four policy components emphasize a lead role for Native groups and governments-the empowerment of Native Americans in telecommunications—with the federal government in a supportive role. The second four policy components emphasize the need to rethink and refocus federal policy strategies to recognize and strengthen Native American telecommunications infrastructure and sovereignty. These require a major federal government role, but with extensive Native American participation to ensure that Native values and perspectives we understood and reflected in policy actions.

EMPOWERING NATIVE AMERICAN TELECOMMUNICATIONS

Tribal/village/community, federal agency, and congressional actions could focus on implementing these four essential components of an overall Native American telecommunications policy framework.

■ Grassroots Tribal/Village/Community Empowerment

At the grassroots level, one key is developing local sources of telecommunications expertise and tribal/village/community telecommunications plans and visions. Native American communities are struggling to regain control over their lives and destinies. Telecommunications technology has the potential to accelerate and strengthen the drive for Native empowerment; if rooted in local expertise and control, it also can help reverse the histori-

Top: *Learning Resource Center at the Kauai Community College, located on the outskirts of Lihue, Kauai Island, Hawaii, and the focal point for educational technology on campus.*
Bottom: *Kauai and other community colleges of the University of Hawaii system bring videoconferencing and distance learning to many Native Hawaiian students.*

cal tendency of Native Americans to be subordinated to technologies and governing processes developed and controlled by the majority society.

The role of these technologies in empowering Native Americans will be enhanced if Native communities develop their own technological understanding, expertise, and leadership. Telecommunication technologies offer many opportunities for use in Native governance and service delivery, and in the administration of the various governmental functions (e.g., health, education, human and social services, transportation, resource and environmental management, economic development, and public safety) being assumed by many Native communities.[8]

Native communities would benefit from having their own sources of telecommunications expertise. Current or potential local sources of expertise include: 1) tribal and community colleges (many are already using microcomputers and distance learning to some degree); 2) tribal/village/community governments (most make some use of computers for administrative and financial purposes, while a few are implementing more advanced applications);[9] 3) K-12 and health care staff familiar with telecommunications (e.g., for distance learning or telemedicine); 4) community training centers (where telecommunications and computer skills are taught or used); 5) local computer enthusiasts and entrepreneurs (a still small but growing group of Native activists using the Internet and other computer networks); and 6) telephone, cable, and computer companies and radio/TV stations serving Native communities.

Native government and educational leaders could develop strategies to increase local expertise, and seek out the necessary financial resources (new or reprogrammed funds from both public and private sources). Native government leaders

[8] For further discussion, see chapter 3.

[9] Surveys conducted for the National Indian Policy Center, The George Washington University, indicate that the majority Of tribes have computers to carry out administrative functions, but only about 10 percentrept having access to the Internet (l 8 tribes out of 143 responded as of April 1995). Also see testimony of Bambi Kraus, Assistant Director, National Indian Policy Center, in U.S. Congress, Senate, Committee on Indian Affairs, ***Oversight Hearing To Examine the Feasibility of Creating a Permanent Indian Research Center,*** S.Hrg. 103-61 (Washington, DC: U.S. Government Printing Office, May 20, 1993), pp. 16-19.

and local activists may wish to create a telecommunications coordinating committee or task force to provide additional impetus and focus.[10] These committees could include representatives from education, government, health care, information technology entrepreneurs, telecommunications providers, and others with relevant expertise and interest.

An important part of empowerment is effective local planning. Only a few Native reservations, villages, and communities have a telecommunications strategy or vision; most have, at best, some fragmented planning activities but no coherent picture or understanding of what telecommunications can do to further their well-being. Native education and health care are the two areas where Native communities are more likely to have initiated some degree of serious telecommunications coordination and planning, reflecting in part national program initiatives in distance learning and telemedicine.[11]

No single technology fix exists for meeting Native American needs. The greatest leverage is likely to result from a range of telecommunication technologies working in concert as part of tribal/village/community plans. Computer networking, satellite videoconferencing, computers and software, electronic imaging and production, telephone, telefacsimile, digital switching, broadcast radio and TV, cable TV, and cellular or wireless telephone are among the technologies likely to play significant but different roles.

Finding the exact mix of technologies will be a challenge and will depend on the geography, demography, and economy of each community; the types of applications and users; and the development of the telecommunications infrastructure in areas where Native Americans live and work.

Most Native reservations, villages, and communities would benefit from developing a plan or vision of how telecommunications could best meet their cultural, educational, health, economic development, and other needs. (See box 5-1 on the Navajo Nation Telecommunications Initiative.) Even if rudimentary, a plan could provide some sense of direction and cohesiveness to local efforts at deploying and using these technologies. Also, a plan could provide local leaders with a framework for understanding and gauging government proposals and private sector projects that may be forthcoming. With an organized strategy, Native communities could be more proactive in the telecommunications arena with regard to both federal agencies and private vendors. The support of tribal, village, and community leaders is essential to success.

Native leaders could begin by considering the visions of grassroots telecommunications activists—those from the local Native community and elsewhere. Native communities could draw on and adapt—to the extent appropriate—the prior experience of numerous cities, towns, and states in developing telecommunication plans and community networks.[12] The national Native American leadership may wish to sponsor or develop sources of planning assistance for local Native communities, including workshops and conferences on Native telecommunications infra-

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[10]The Sisseton-Wahpeton Sioux Tribe, in Agency Village, South Dakota, for example, has established a Telecommunications Committee to develop a strategy for cooperative telecommunications infrastructure development and related training and technical support. Participants include the tribal government, tribal college, Indian Health Service, Bureau of Indian Affairs, and representatives of tribal housing, planning, education, economic development, gaming, and natural resource activities. See Oct. 17, 1994, letter from Arnold R. Ryan, Tribal Chairman, Sisseton-Wahpeton Sioux Tribe, to Donald Bad Moccasin, IHS Area Director, Aberdeen, South Dakota, and "Sisseton-Wahpeton Sioux Tribe Telecommunications Project," planning paper, n.d.

[11]See, e.g., James S. Logan and David G. Swartz, *Aberdeen Area Indian Health Service: Telemedicine Assessment Final Report* (Oklahoma City, OK: Logan & Associates, Inc., Mar. 30, 1995). Also see Gonzalez, *Connecting the Nation*, op. cit., footnote 1, and W. Curtiss Priest, "Cost-Effective Networking of Schools and Homes," vision paper, Center for Information, Technology, and Society, Melrose, MA, July 7, 1995, available by e-mail from bmslib@mitvma.mit.edu.

[12]See OTA, *Making Government Work*, op. cit., footnote 1.

BOX 5-1: Navajo Nation Telecommunications Partnerships and Planning

As policies for the nation's "information superhighway" and telecommunications reform efforts are debated on Capitol Hill, the country is proceeding with a variety of public-private sector partnerships and cost-sharing arrangements. Native Americans are also searching for opportunities to participate. Native American organizations and federal agencies such as the American Indian Higher Education Consortium (AIHEC), the American Indian Science and Education Society (AISES), the Bureau of Indian Affairs (BIA), and the Indian Health Service (IHS) have pilot projects in distance learning, telemedicine, electronic mail, and online database services. Partnerships among governments, schools, hospitals, libraries, and the private sector will likely be necessary to further develop and diffuse successful applications and to cost-share the infrastructure. The Navajo Nation Telecommunications Initiative is such a partnership.

The Navajo Nation's Information Technology Office in the Office of the President/Vice President is attempting to integrate and facilitate all the disparate projects currently under way under the umbrella of a comprehensive Technology and Information Resource Plan While several Navajo leaders, with the backing of President Albert Hale, are championing the projects, state and federal agencies are providing technical assistance and/or seed money; and a cadre of volunteers is contributing consulting services pro bono. The private sector will be selling or donating hardware and services Participants include:

- from the federal government, Department of Energy's Los Alamos National Laboratory, Lawrence Livermore National Laboratory, and Sandia National Laboratory; National Aeronautics and Space Administration (NASA); California Institute of Technology's Jet Propulsion Laboratory; Bureau of Indian Affairs, Indian Health Service, Department of Defense Advanced Research Projects Agency; and Electronic Pathways All lance, funded by the National Science Foundation.
- from health and education, Navajo Community College; Crownpoint Institute of Technology; Crown point Public Schools, Navajo Nation Library System; Office of New Mexico State Senator Leonard Tsosie, New Mexico State Library, University of New Mexico's Medical School and Native American Studies program, Northern Arizona University (NAU); and Tucson's Mayo Clinic West.
- from the private sector, Navajo Communications Co.; New Mexico Technet in Albuquerque; Motorola, and long-distance carriers.

(continued)

structure development. Current or reprogrammed federal funds, as well as private sector funds (e.g., foundation grants), may be available for these purposes.

National Native Leadership

To complement a grassroots emphasis, another key is strengthening Native American leadership on telecommunications at the national level. A handful of Native American researchers and activists recently have begun a dialog on strategies for Native American telecommunications. The number of Native American meetings, conferences, articles, and pilot projects with a telecommunications theme is increasing, but is still minimal.

National Native American organizations are beginning to focus on telecommunications, but still lag their non-Native counterparts. Specialized groups are more active. The American Indian Higher Education Consortium, for example, is taking a lead role on distance education for tribal colleges. The Native American Public Broadcasting Consortium and the Indigenous Communications Association are providing leadership on strengthening the Native radio network. Pacific Islanders in Communications, the Indigenous Communications Association, the Intertribal Geographic Information Systems Council, and other grassroots and professional groups are helping raise awareness in Native communities about

BOX 5-1: Navajo Nation Telecommunications Partnerships and Planning (Cont'd.)

Many projects, such as the Crownpoint Pilot Project, will provide agencies with Internet access through modems, dedicated data lines, fiberoptic trunk lines, and wireless links for canyon and desert areas. Another project is NAU's distance-learning project that uses microwave links to deliver courses from NAU to the reservation. Also, NASA and the community colleges are working together to develop curricula to train fiberoptic cable installers and network managers. The Information Technology Off Ice IS responsible for integrating these efforts and facilitating working partnerships, which includes the creation of an external advisory committee composed of individuals from the national labs, industry, and academia. The office recently started to develop a human resource program.

The long-term goal for the Navajo Nation is to develop telecommunications Infrastructure for all 133,000 reservation Navajos in an area covering 25,000 square miles in New Mexico, Arizona, and Utah. Navajo elders and leaders anticipate benefits in health care, education, social services, tribal government, environmental protection, and economic development. Moreover, online applications in the Navajo language will help strengthen the language. Perhaps the greatest benefit will be to stem the tide of Navajo who leave the reservation for education and employment. As expressed by New Mexico Senator Leonard Tsosie, a Navajo, "Many hope that providing the reservation with the latest (telecommunications) technology will bring more Navajo youth back home."[1]

SOURCE Office of Technology Assessment, 1995, with information from John Billison, information Technology Office, Navajo Nation; Teresa Hopkins, Agency Network Project, Navajo Nation, Tommy Lewis, President, Navajo Community College, William Bostwick, Staff, Computer Information and Communications Division, Los Alamos National Laboratory, Gary Coulter, Special Assistant for Education and Outreach, NASA (on leave from Colorado State University), Jake Jacobson, Manager, Advanced Communications Lab, Jet Propulsion Laboratory, and Steve Grey, Director, American Indian Program, Lawrence Livermore National Laboratory, personal communications, February-April 1995

[1]Crownpoint Community Network project home page, press release (Reuter), Albuquerque, NM, Sept 26, 1994

the telecommunications revolution. And Americans for Indian Opportunity and the American in dian Science and Engineering Society have focused attention on the larger opportunities and challenges of telecommunications.

The major umbrella organizations, however, notably the National Congress of American in dians (NCAI) and Alaska Federation of Natives (AFN), are just beginning to organize around this topic. The NCAI held a conference session on tribal telecommunications, [13] and has passed a resolution to establish a standing committee on "tele communications access and ownership issues for tribal Nations."[14] These organizations could not only set up formal committees, but also develop strategies on telecommunications policy (or the national information infrastructure or a similar focus), such has been done over the last several years by the National Conference of State Legislatures, the Council of State Governments, and similar non-Native organizations.[15] Such committees typically help organize conference sessions, pre-

[13]"Where the Red Road Meets the Information Highway," National Congress of American Indians Annual Conference, Denver, CO, NOV. *16, 1994.*

[14]National Congress of American Indians, Resolution #94-DEN-EF-lCH-124, "Communication Based Delivery of Health Care, Education, and Economic Development for American Indians," Denver, CO, NOV. 13-18, *1994.*

[15]See OTA, *Making Government Work,* op. cit., footnote 1.

BOX 5-2: First Americans Commission for Te

in 1978, the American Indian Telecommunications Satellite Demonstration Project linked the Crow Indian Reservation in Montana and the All-Indian Pueblo Council, Inc., in New Mexico with federal officials in Washington, DC. The National Aeronautics and Space Administration (NASA) provided technical consultative services, facilities, and satellite time, and Indian tribes planned and conducted the program,.Nontribal participants Included the Congress; White House; Departments of Interior (including the Bureau of Indian Affairs), Agriculture, and Health, Education, and Welfare; Humboldt State University, Arcata, CA, California State University, Long Beach, CA; and the Office of the Governor of Montana.

A NASA report concluded that the three-day project successfully demonstrated the technical feasibility of providing two-way Interactive television with the TV signals transmitted by satellite.[1] Moreover, the report concluded that videoconferencing strengthened the tribal, federal, and congressional processes and opened up the legislative process.[2] Participants recognized that both tribal and federal government support, and tribal needs analysis, would be needed before a long-term project could be implemented, Many tribal participants, including the host tribes, came together a year later to form the First Americans Commission for Telecommunications (FACT).

FACT, incorporated in May 1979, represents the first concerted effort on the part of native American tribes and Individual activists '(to employ communications systems, including satellite telecommunications, to more effectively convey and share policy, program, and technical Information between 1) Native peoples and the federal government; 2) Individuals and groups of Native people, and 3) native peoples and educational institutions."[3] in a special White House briefing to the Domestic Council,[4] June 1979, FACT outlined the potential of satellite communications in rural native areas. Telecommunications technologies have since expanded to include direct broadcast TV, computer networking, land-line videoconferencing, and within a few years, perhaps, wireless personal communications devices utilizing low-earth-orbiting satellites. But the impetus for telecommunications, after 16 years, has not changed significantly. And, although FACT is now defunct, its objectives are alive, with new technologies and a new generation of activists.

SOURCE: Office of Technology Assessment, 1995, with information from materials provided by Jerry C Elliott, High Eagle, Assistant Chief Technologist, Technology Transfer and Commercialization Office, Lyndon B Johnson Space Center, National Aeronautics and Space Administration, Houston, TX

[1] National Aeronautics and Space Administration, *American Indian Telecommunications Satellite Demonstration Project, Summary Report* (Houston, TX: Lyndon B Johnson Space Center, May 1979)

[2] Another NASA-supported project at about the same time specifically Investigated the role that satellite videoconferencing might play in improving the dialog between Congress and the public Fred B Wood, Vary T Coates, Robert L Chartrand, and Richard F Ericson, *Videoconferencing Via Satellte: Opening Congress to the Peep/e,* Summary Report (Washington, DC The George Washington University, February 1978)

[3] *Constitution and Bylaws of the First Americans Commission for Telecommunications, Inc.,* Jan. 10, 1979.

[4] *The First Americans Commission for Telecommunications, Inc., Proposal for Satellite Telecommunications,* submitted to The White House Domestic Council, June 1979

pare policy and planning papers, develop relationships with universities and think tanks, seek project grants, and testify before legislative bodies. Native groups could establish an umbrella intertribal telecommunications organization. Prior efforts to do so were not successful (see, for example, box 5-2), but the technology and timing seem more favorable now.

Universities that provide leadership education to Native Americans could include a component on telecommunications. Some major universities with American Indian academic or research pro-

grams, such as Harvard, Cornell, Washington State, and George Washington Universities, also have telecommunications expertise located elsewhere around campus. The same applies for the Universities of Alaska and Hawaii (and their associated community colleges), which provide educational and leadership services to Alaska Natives and Native Hawaiians, respectively. Leadership programs, such as the National Executive Education Program for Native American Leadership administered by Northern Arizona and Harvard Universities, could do likewise. Other universities that serve large Native populations, such as Oklahoma State, Arizona State, New Mexico, Northern Montana, and Oregon State, could develop Native American telecommunications programs.[16] Also, some community service organizations could provide leadership and technology training at the grassroots level for current and aspiring leaders. Native organizations could partner with the private sector, as well as educators, in developing telecommunications technical assistance centers in Native areas. Various other regional and specialized Native groups also could participate.[17]

Integrated Infrastructure Development

Tribal, village, and community cost-sharing is essential to develop telecommunications infrastructure. Most Native communities do not have the market and financial resources to develop multiple, independent, uncoordinated telecommunications infrastructures. Infrastructure is defined here to include the necessary training and technical support, as well as hardware and software (e.g., computers, printers, networks, switches, video equipment, and satellite earth stations). Funds and expertise for building an adequate infrastructure are in short supply. In rural Native areas, the cost of telecommunications infrastructure can be several times national or metropolitan area averages due to fragmented supply and demand and multiple service areas, in addition to the inherently higher costs of reaching remote, dispersed users.[18]

The large unmet need for basic educational, social, and health services in Native communities, coupled with the continuing constraints on the overall federal budget, means that federal funding for Native American telecommunications infrastructure is likely to be less than desired or needed. This bleak fiscal outlook increases the need to maximize the use of available funds.

Telecommunications infrastructure is more costly to deploy in many Native communities because of their remote, isolated locations combined with weak local economies. One effective strategy is to aggregate the local telecommunications market through close cooperation among schools, health clinics, family and community service centers, tribal or local governments, and businesses located on or near Native reservations, villages, or communities.[19] These groups may be unable to afford new technologies when acting individually,

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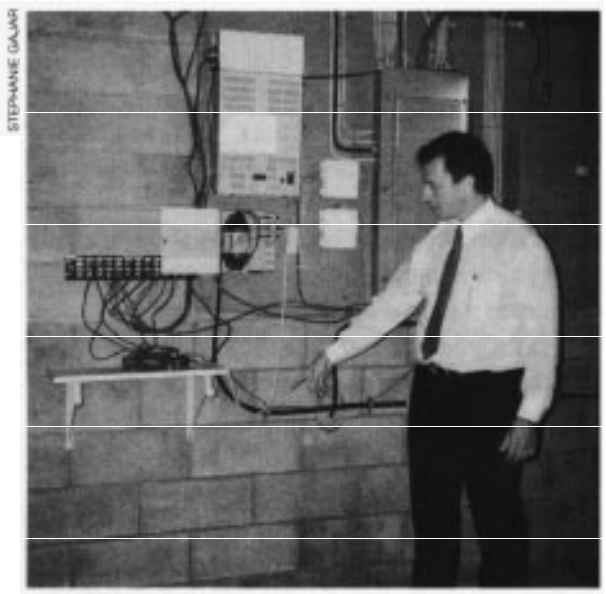
[16]For an overview of American Indian higher education programs, see American Indian Science & Engineering Society, *Annual College Guide for American Indians* (Boulder, CO: AISES Publishing, Inc., 1994).

[17]Other groups include, e.g., the National Indian Youth Council, Association of American Indian Physicians, Native American Journalists Association, Native American Bar Association, First Nations Development Institute, Native American Rights Fund, and various regional intertribal councils. See National Indian Policy Center, "Tribal Representation in Washington, DC: Its Past and Future Role in Executive Branch and Congressional Policy-Making," The George Washington University, Washington, DC, November 1993.

[18]Frank H. Tyro, Director, Media and Teleproductions, Salish Kootenai College, Flathead Indian Reservation, Pablo, MT, personal communication, May 3, 1995; and Marvin P. Mitchell, Head, Audiovisual/Video Communications, Mayo Clinic, Rochester, MN, personal communication, May 2, 1995.

[19]See chapter 3. On community computer networking, see, e.g., Frank Odasz, "Community Economic Development Networks: A Grassroots Leadership Challenge," *Internet Research*, vol. 4. No. 1, spring 1994, pp. 2-6; and The Morino Institute, "Assessment and Evolution of Community Networking," paper presented by Mario Morino at the *Apple Conference on Building Community Computing Networks*, Cupertino, CA, May 5, 1994. Also see Gonzalez, *Connecting the Nation*, op. cit., footnote 1, and Priest, "Cost-Effective Networking," op. cit., footnote 11.



Top: *The Oneida Nation is implementing an advanced telecommunications network to meet a range of tribal needs for members living on the reservation near Oneida, New York.* ***Bottom:*** *The Oneida network includes a fiberoptic backbone linking tribal administrative, cultural, law enforcement, housing, and community service facilities.*

but when acting collectively they may be able to pool resources and justify the investment. Also, the aggregated market may be sufficient in some cases to attract outside investments or enhanced offerings from telecommunications service providers (e.g., telephone, cable, and computer companies), or even help to justify the establishment of Native-owned and -operated telecommunication and computer companies. Market aggregation also could apply regionally and nationally, as the American Indian Radio on Satellite project is doing for the production and distribution of Native American radio programming.

Both the recipients of federal funds (in this case, Native tribes, villages, and communities) and the funding agencies would benefit by carefully examining proposed telecommunications investments to increase the chances that technologies and systems are compatible, complementary, user-friendly, and cost-effective. This review could extend to expenditures for relevant federal agency telecommunications systems because many of these connect with field offices located in or near Native communities. An integrated approach should help minimize overlap and duplication, and maximize both the leverage of the infrastructure investment and the return on taxpayer dollars.

Pilot projects provide an important opportunity to assess the potential benefits, costs, and problems associated with tribal/village/community use of telecommunications. A few pilot projects have been completed or are under way, typically with some federal support. But the number and breadth of projects are still limited compared to the range of possible applications.

Additional projects would be helpful, especially in defining the role of telecommunications in the areas of cultural heritage, community well-being, economic development, and governance. Cultural heritage as defined here includes tribal/village/community traditions, ceremonial activities, religion, and art. Community well-being includes education, health care, family wellness, nutrition, and recreation. Economic development covers technical, human resource, financial, management, and market factors that affect business startup, relocation, and job creation. Governance includes selection/election of local officials, conduct of tribal/village government meetings and policymaking, administration of various tribal/village government functions, and citizen moni-

toring of and participation in these activities. In reality, of course, the overall health of Native communities depends on the interaction of all these elements.

Pilot projects could explore how an integrated tribal/village telecommunications infrastructure can best support applications to specific aspects of community life. The community communication center is a concept to consider, especially in areas where it is unrealistic for most homes and offices to have anything more than basic telecommunications in the short to medium term. A local high school, community college, library, multiservice center, or tribal/village office could be designated as a community communication center where a wide range of telecommunications equipment and services is available to residents, including students and entrepreneurs (also see chapter 3). Such a center may be able to offer videoconferencing, computer networking, multimedia, and other services that may not be affordable or cost-effective in most individual homes and many businesses for some time. The multiservice center concept also is relevant as a way of providing technology-enhanced "one-stop shopping" for a range of social, economic, and health services.[20]

Native Entrepreneurial Activity

Formation of Native and tribally-owned and -operated telecommunications companies is a highly leveraged way to create jobs and stimulate local economic development. Native American reservations, villages, and communities range from the relatively affluent to the impoverished. Overall, however, most Native communities face serious difficulties in providing jobs for able-bodied adults or heads of families. Unemployment and poverty rates average about 50 percent on Indian reservations and in Alaska Native villages. Most jobs are government-related. Significant private sector job creation has been limited to a relatively few reservations and villages—primarily those with marketable natural resources and/or significant and accessible tourist attractions. Native Hawaiian unemployment is lower than rural Indians and Alaska Natives, but still higher than national and state averages.

Today, the number of Native-owned and -operated telecommunications companies is very small—a few telephone and cable companies and radio stations. Native entrepreneurs wishing to form telecommunications companies must overcome significant financial, technical, and human resource barriers. Some Native communities may find that needed telecommunications are accessible and affordable from non-Native companies. Many Native communities may not have a market large enough to justify and sustain the formation of new telecommunications providers. Contiguous or adjacent Native communities could, in some cases, join forces to create a larger market. Congress could direct the NTIA and FCC, and other relevant federal agencies, to review how Native telecommunications entrepreneurs might be encouraged in locations where market conditions are at least minimally supportive. Success stories like the Cheyenne River Sioux Tribe Telephone Authority (see box 5-3) demonstrate that Native-owned and -operated telephone, cable TV, satellite broadcast TV, and cellular and wireless companies are within reach. Also, Native leaders could consider ways to apply some portion of tribal revenues to support telecommunications startup ventures.

Although Native telecommunications companies alone will not guarantee an economic revival, they can help leverage the use of telecommunications in at least four important ways: 1) facilitating the education and training of a skilled, marketable workforce in Native communities (a key factor in business location and investment decisions); 2) providing part of the technology infrastructure many businesses and investors now consider to be essential (e.g., to facilitate telecommuting, remote computer applications, electronic data interchange, and the like) and, thus, indirectly attract-

[20]For related discussion, see chapter 3.

BOX 5-3: Cheyenne River Sioux Tribe Telephone Authority: A Catalyst for Reservation Development

The Cheyenne River Sioux Tribe (CRST) Telephone Authority, one of only a few tribally owned telephone cooperatives, is a story of tribal business and community leadership. Delivering basic telephone service since 1958, it now serves as a driver for economic development, and continues to assess the future advanced telecommunications needs of the community, including its schools and hospitals Oversight is provided by an independent board as well as the tribal government. The federal government has also had a role by providing critically needed loans and grants.

Located in central South Dakota, the Cheyenne River Indian Reservation has 9,000 Lakota-Sioux members and covers 46,000 square miles, in 1977, the town of Eagle Butte housed one exchange with multiparty lines that were subject to outages due to ice storms. With the help of a Rural Electrification Administration (REA) loan, a newly created Telephone Authority purchased and consolidated local telephone systems and put in new underground lines for single-party service. Today there are five digital switches linked with fiberoptic cables, and the penetration rate is 72 percent. Ducts to hold future fiberoptic cable extend to the edge of town in anticipation of distance-learning and telemedicine applications.

The Telephone Authority diversified in 1984 into customer premise equipment (CPE) with the formation of CRST Telephone Sales and Service. Three years later, it purchased local companies and created Cheyenne River Gas and Cheyenne River Cable TV, which offers Direct Broadcast Satellite. These businesses now employ 55 local people. in 1994, with an Indian Community Development Block Grant, the Telephone Authority set up the Lakota Thrifty Mart, a 17,000-square-foot supermarket that employs 35 local people. The Telephone Authority has plans for a convenience store and gas station in a remote community.

Eagle Butte is now the third fastest-growing town in South Dakota. And the future looks good. With a $20,000 license purchased in 1991 for a Super 8 Motel and a recent guaranteed loan from the Small Business Administration, the tribe wiII soon have its first 40-room motel. With this facility the tribe is planning to draw on its native culture to attract tourism. And the tribally owned Buffalo Corporation is reintroducing buffalo on the reservation. While not yet a profitable business venture, the presence of buffalo symbolizes both economic prosperity and spiritual wellness.

(continued)

ing jobs; 3) creating jobs in computer, communication, and other high-technology companies that decide to locate on or near reservations or in Native villages; and 4) indirectly creating jobs by expanding markets for Native products and services through intertribal, regional, national, and international telemarketing—to the extent the companies and jobs are actually located in or near Native communities and are open to Native Americans.

REFOCUSING THE FEDERAL ROLE

Consistent with empowering Native American communities, Congress and appropriate federal agencies could take action in the following areas to develop a federal Native American telecommunications policy, with the involvement of Native American groups, leaders, and telecommunications activists.

▮ Interagency Federal Strategy and Funding

Dozens of federal agencies administer hundreds of federal programs that serve Native Americans. Several already provide some support for Native American telecommunications, but these efforts are uncoordinated and fragmented. Agencies with relevant programs include, for example, the Bureau of Indian Affairs in the Department of the in

BOX 5-3: Cheyenne River Sioux Tribe Telephone Authority: A Catalyst for Reservation Development (Cont'd.)

The feeling of community renewal and hope permeated the recent 1994 Jimmy Carter Work Project, sponsored by Habitat for Humanity. Thirty homes were built by volunteers from all over the country. The Telephone Authority donated $100,000 worth of outside telephone plant, and every employee and board member volunteered for at least a day to help build the homes. Thus 17 years after the CRST Telephone Authority received a Rural Electrification Administration (REA, now the Rural Utilities Service) loan former President Jimmy Carter stood on the reservation and remarked, "I think [the REA] is one of the finest organizations that I've ever known, REA has a solid foundation with farms, with agricultural families, its historical Importance, its ability to bring people together in a democratic organization and let them say what is best for their own community..." Today the Telephone Authority is waiting for approval of another RUS loan to further upgrade and extend telecommunications Infrastructure, and may apply for an RUS grant for a distance learning pilot.

This story Illustrates the Importance of tribal leadership as well as federal support for reservation development Says Orville Mestes, director of the Office of Planning and Economic Development, "One of the things that's happened as a result of the successful ventures of the Telephone Authority is management expertise. We are training our own people to become managers. I think that's key to anything. " According to Bernie La Plante, Manager of the Thrifty Mart, "We took inexperienced workers and gave them the chance to learn the grocery business from the ground up. " As explained by J. D. Williams, General Manager of the CRST Telephone Authority, "There is skepticism abut Indian people running their own businesses We've had our failures, but I think that CRST Telephone Authority and the Cheyenne River Sioux Tribe (are) proving the skeptics wrong. "

SOURCE: Office of Technology Assessment, 1995, with information from J D Williams, General Manager, Cheyenne River Sioux Tribe Telephone Authority, Eagle Butte, SD, personal communication, February 1995, and Jim Felter, "A Prophecy Fulfilled Building the Lakota Community" *Rural Telecommunications Journal of the National Telephone Cooperative Association,* November/December 1994 pp. 14-18

terior, Administration for Native Americans and Indian Health Service in the Department of Health and Human Services, Office of Indian Education in the Department of Education, Native American Programs Division in the Department of Labor, Rural Utilities Service (RUS) in the Department of Agriculture, National Telecommunications and Information Administration in the Department of Commerce. National Science Foundation, Smithsonian Institution, National Endowment for the Arts, and Corporation for Public Broadcasting.[21] Also, many of the activities and working groups of the Administration National Performance Review and National Information Infrastructure programs are relevant to Native Americans, and these initiatives cut across virtually every federal agency and program.

Interagency Strategy

The federal executive branch, with the support and oversight of Congress, could develop an interagency strategy to help provide direction and

[21]Several other agencies also have relevant programs, such as the: National Park Service, Fish and Wildlife Service, and Bureau of Land Management in the Department of the Interior; Department of Energy (including various research laboratories); Army Corps of Engineers and Advanced Research Projects Agency, among others, in the Department of Defense; regional educational research laboratories in the Department of Education: Federal Highway Administration in the Department of Transportation; Department of Housing and Urban Development; Economic Development Administration in the Department of Commerce; Environmental Protection Agency; Small Business Administration; and National Aeronautics and Space Administration.

coordination for Native American telecommunications activities. This could include an interagency task force or working group. The strategy could identify opportunities to make the best use of scarce federal dollars for telecommunications education, training, pilot-testing, and infrastructure development in Native American communities.

The strategy could include use of existing or new electronic clearinghouses to provide information on relevant programs and projects, accessible by Native American leaders and technology activists as well as federal personnel. An electronic clearinghouse would help ensure that federal agencies are at least aware of what others are doing. It also would help Native American activists and advocacy groups learn about federal plans and programs, and have timely opportunities to participate. The clearinghouse could be managed and operated directly by a federal agency, a Native organization or university program serving Native Americans, or a private company (ideally, Native-owned and -operated).

The clearinghouse could include a Native American electronic home page with pointers to home pages of all agencies with information and programs relevant to Native American telecommunications. OTA developed a home page for this study, known as the "Native American Resource Page," that includes links to a variety of other home pages with Native American information (see appendix B). The clearinghouse presumably would be accessible via the Internet and other computer networks.

Over the last decade, Congress has systematically revised and updated many statutory programs to clarify their applicability to Native Americans (e.g., various education, health care, employment, training, and housing programs). Typically, these changes specifically identify American Indians and Alaska Natives, and less frequently Native Hawaiians, as eligible for program services and funding, and occasionally stipulate a required percentage or dollar set-aside for Native Americans. Statutory revisions concerning BIA and IHS programs have further reinforced

Top: *Byron Glacier located about 50 miles southeast of Anchorage, is one of hundreds of glaciers in Alaska; glaciated mountain ranges dominate the landscape in many parts of the state.* ***Bottom:*** *The federal government plays a major role in Alaska, in part because of the large expanse of National Forests, Parks, Preserves, and Wildlife Refuges, and has a responsibility for respecting and protecting Alaska Native sacred sites and cultural traditions.*

the congressional intent that, where feasible, program management and administration be shifted from federal agencies to tribal/village governments. Other statutory actions have continued the shift toward reinforcing Native culture and empowering Native communities to be responsible for their own governance.

The current Congress is considering a wide range of program consolidations and block grant proposals, as part of the larger deficit reduction effort. Native American leaders are concerned that program consolidations may have the unintended effect of reducing Native participation in program decisions and management, possibly cutting funding for Native programs, and undermining the federal trust responsibility and commitment to

Native self-determination. The current budgetary outlook obviously intensifies competition for scarce funds, and increases the difficulty of securing funding support for new and emerging priority areas such as telecommunications. Congress could provide programmatic guidance to ensure that Native American telecommunications activities get adequate attention.

Congress and the President could direct the Administration to conduct a cross-cutting review of all federal programs and activities that are relevant to Native American telecommunications. The Office of Management and Budget (OMB, in the Executive Office of the President) and NTIA, for example, could coordinate the review. The review could organize relevant programs around key themes such as: 1) developing local telecommunications infrastructure; 2) providing education and training on telecommunications applications; 3) strengthening tribal, Alaska Native, and Native Hawaiian expertise in telecommunications planning; 4) supporting the formation of Native-owned and -operated telecommunications companies; and 5) designing creative strategies to leverage telecommunications for education, health care, multiservice delivery, and economic development. This could provide a framework for estimating current funding and other support for Native telecommunications, including both government-wide totals and allocations to the thematic areas. The results should help identify new opportunities for collaborative, multipurpose investments and activities, and provide a stronger basis for ensuring that the federal commitment to Native American telecommunications is sustained at the level desired by Congress. Absent such a framework, it will be difficult, if not impossible, to understand the aggregate implications of numerous separate programmatic and budget decisions that may impact Native telecommunications.

Guidance from Congress, the White House, OMB, and/or NTIA could extend to the Information Resources Management (IRM) and National Performance Review (NPR) programs of the BIA, IHS, and other agencies with a major mission related to Native Americans. Aspects of the National Information Infrastructure (NII) program that are most relevant to Native Americans also could be included. Specific NPR, NII, and IRM plans could be prepared for: 1) electronic delivery of federal (and other) services to Native Americans over the NII; 2) pilot-testing of telecommunications applications in Native American communities; and 3) development of Native American telecommunications infrastructure.[22] These plans also could address the need for tribes and Native organizations to make use of the NII for a wide range of self-governance functions.

Agency-Specific Strategies

NTIA could develop a strategy that gives higher priority in current grant programs to building Native American telecommunications expertise and infrastructure.[23] NTIA could establish a new grant program for tribes and Native organizations that consolidates PEACESAT[24] and a portion of resources currently allocated to the Public Telecommunications Facilities Program[25] and the Telecommunications and Information Infrastructure Applications Program. NTIA would be a logical agency to coordinate with the National Institute of Standards and Technology, also in the Department

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[22]BIA and IHS, for example, could pool their IRM and telecommunications resources in a joint effort to meet both agency and tribal needs. Randy Ross, Telecommunications Consultant, Rapid City, SD, personal communication, Apr. 8, 1995.

[23]For example, NTIA is funding a planning grant for tribal councils to explore options for computer networking. Roanne Robinson, Special Assistant, NTIA, personal communication, May 3, 1995.

[24]PEACESAT stands for the "Pan-Pacific Educational and Communications Experiment by Satellite" program that uses satellite telecommunications for distance education and telemedicine between the Hawaiian and other Pacific Islands.

[25]See NTIA, "NTIA/PTFP Native American Grants," December 1994. NTIA provided funding to various tribal governments and organizations for construction of public radio and television facilities.

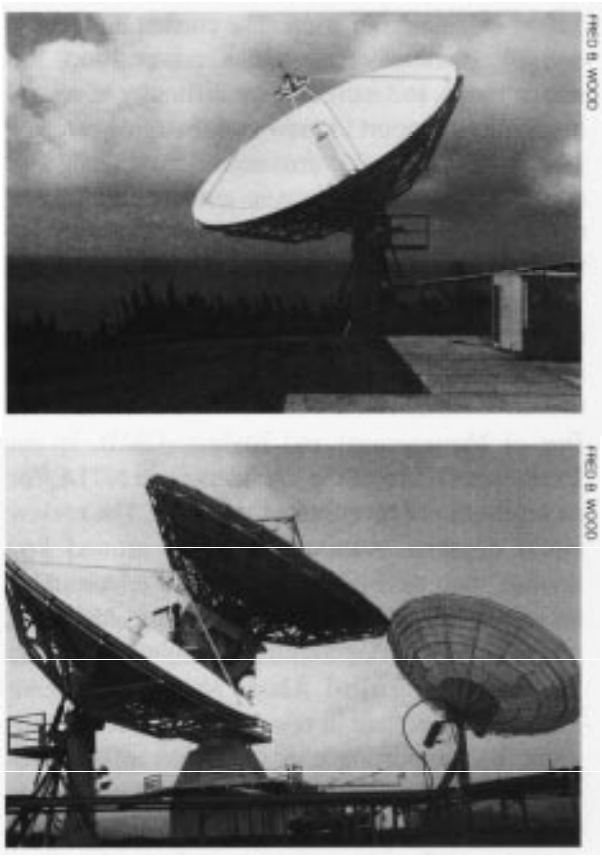
of Commerce—as well as with the FCC-on tribal telecommunications security and standards issues, and with the Office of Information and Regulatory Affairs (in the Office of Management and Budget, Executive Office of the President) on tribal privacy, intellectual property rights, and information management topics.

The Rural Utilities Service (formerly the Rural Electrification Administration, within the Department of Agriculture) could clarify and strengthen its policy on tribal participation. Rural telephone companies owned and operated by tribes or Native Americans are eligible to apply for telephone equipment and infrastructure loans. Few applications are received from Native organizations, however, due to their limited awareness of the program and limited expertise and capital. RUS could develop an outreach program to better inform tribal and other Native governments about RUS loan eligibility and application requirements. RUS could work with BIA, ANA, and other agencies to upgrade technical assistance available to tribes.

RUS also could coordinate with the FCC, and probably NTIA, to make sure that various federal policies and programs work to encourage, rather than discourage, the formation of tribal and Native-owned and -operated telecommunications companies.[26] To ensure that the sum is greater than the parts in facilitating the formation and viability of Native telecommunications enterprises, RUS, FCC, and NTIA could review a wide range of policies and programs: RUS loans; universal service funds; NTIA grants; financial accountability; frequency spectrum auctions or assignments; tribal partnerships with commercial telecommunications companies; technical network and interconnection requirements; and compatibility of RUS, FCC, state regulatory, and tribal telecommunications rules and procedures.

The Bureau of Indian Affairs, Indian Health Service, and Administration for Native Americans could develop both individual and coordinated strategies in Native telecommunications. The BIA and IHS serve the 550 federally recognized tribes and Alaska Native organizations. ANA serves, in addition, about 60 state-recognized tribes, tribes seeking federal recognition, and various Native Hawaiian and Native Pacific-Island American groups.

The BIA uses telecommunications for its own agency purposes, provides some technology support for tribal schools (e.g., classroom computers,



Top: *Satellite earth station operated by COMSAT at Paumalu on the north shore of Oahu Island, Hawaii.* ***Bottom:*** *Satellites provide vital telecommunications links between the Hawaiian Islands and both the mainland and other Pacific Islands. The COMSAT facility at Paumalu monitors telemetry necessary for operational control of satellites sewing the Pacific Basin.*

[26] RUS also administers a distance learning and medical link grant program. See U.S. Department of Agriculture, RUS, "Distance Learning and Medical Link Grant Program Application Kit'' Washington, DC, Dec. 1, 1994, and "The Information Superhighway and the Rural Utilities Service." n.d.

distance learning, computer networking[27]), and supports computer systems for the benefit of tribes at its Geographic Data Service Center and Division of Energy and Mineral Resources (e.g., the National Indian Oil and Gas Evaluation and Management System, National Indian Energy and Mineral Resources Database, and National Indian Seismic Evaluation System). BIA does not, however, have a policy or strategy for the overall development of tribal telecommunications capabilities or infrastructure, although it is working on a draft strategy under the leadership of its Information Resources Management office. IHS also uses telecommunications for its own agency purposes, provides technology support to tribal hospitals, and actively promotes telemedicine, teleradiology, computerized medical records, and other telecommunications-based medical and health applications. IHS has a general strategy on medical technology development, including telecommunications, but has not fully linked this strategy to other aspects of tribal telecommunications such as infrastructure development. ANA primarily administers grant programs for social, economic, and, recently, cultural development on reservations and in Native villages. ANA is interested in telecommunications, but does not have a policy or strategy or programmatic emphasis on telecommunications.

These three agencies could develop a coordinated strategy for the development of telecommunications expertise and plans at the Native community level. The agencies could find ways to leverage scarce resources by training local technical experts, using the BIA and IHS telecommunications infrastructure where appropriate and feasible, and collaborating with telecommunications policy and funding agencies (e.g., the FCC, NTIA, RUS) and with other federal agencies that serve Native Americans (e.g., Small Business Administration, Economic Development Administration, Agriculture Extension Service, Federal Highway Administration, and Employment and Training Administration).

Most importantly, BIA, IHS, and ANA could develop a clear vision of the role of telecommunications infrastructure in meeting larger policy objectives, such as strengthening Native self-governance and improving the delivery of services to Native Americans. This vision could be closely tied to agency reinvention activities under the National Performance Review. Native leaders, groups, and activists would need to be centrally involved in the creation and implementation of a strategic telecommunications vision, as well as detailed followup plans.

Telecommunications Policy

Over the past two years, Native American telecommunications activists have asserted that federal telecommunications policy ignores or contradicts the principles of Indian law and federal Indian policy.[28] Based on its research, OTA reached a similar conclusion. The federal agencies with major responsibility for telecommunications policy, such as the FCC and NTIA, have not applied Indian law to telecommunications policy. The agencies with lead responsibility for Native American programs, such as the Bureau of Indian Affairs, Indian Health Service, and Administration for Native Americans, do not have a Native American telecommunications policy; nor are they effectively engaged in the wider telecommunications policy debate. The federal government does not have a coherent focus on telecommunications policy as it relates to Native Americans.

The NTIA and FCC could initiate policy inquiries on Native American telecommunications, and invite active participation from tribal govern-

[27]Including ENAN, the Educational Native American Network.

[28]See, e.g., Americans for Indian Opportunity, *First Native American Telecommunications Forum* (Bernalillo, NM: Americans for Indian Opportunity, December 1993), final report prepared for the National Science Foundation; James A. Casey, Esq., Fletcher, Heald & Hildreth, Arlington, VA, "Sovereignty," discussion paper, Jan. 30, 1995, and "Tribal Sovereignty and Telecommunications Opportunities: A Brief Discussion," n.d.

Left: *AT&T Long Lines ship docked in Honolulu Harbor preparing to lay undersea fibre optic cable between several of the Hawaiian Islands.* ***Right:*** *Undersea fiberoptic lines complement satellites in linking Hawaii electronically with the rest of the world. GTE Hawaiian Telephone Co. contracted with AT&T to lay interisland fiberoptic cable that connects with trunk lines on the islands and transoceanic undersea links to the U.S. mainland and Pacific Rim.*

ments, Native technology activists, state regulators, private companies, and the like.[29] These policy initiatives could address both the need for and content of a government-wide policy statement and strategy, and specific topics like sovereignty and self-determination, universal access, and strategic partnerships.

Government-wide Policy Statement

Congress and the President could designate a lead agency, such as NTIA, to develop and draft a policy statement that would apply established Indian policy principles[30] to Native American telecommunications. NTIA could work with the FCC, state telecommunications or public utility regulatory commissions, tribal and other Native governments, and other relevant individuals and organizations in preparing a draft policy. Broad participation and review by tribes and other Native governments, and by Native leaders and telecommunications activists, would help ensure a credible result.

The policy statement could, for example: 1) define the applicability of the federal trust responsibility to telecommunications, an essential component of ensuring tribal well-being and survival; 2) clarify the role of tribes as sovereign governments-equivalent to states—for the purpose of regulating and operating tribal telecommunications where tribes wish to do so; and 3) encourage tribes to develop the capacity for self-determination regarding telecommunications activities on tribal lands. The policy statement might also address more specific telecommunications policy topics such as: universal access on tribal lands, allocation of federal frequency spectrum to tribal governments, interoperability of telecommunica-

[29] The White House has appointed one American Indian—LaDonna Harris, President, Americans for Indian Opportunity—to the Administration's National Information Infrastructure Advisory Council, a private and public sector advisory committee that makes recommendations to the Secretary of Commerce. Information on NIIAC activities, including Native American testimonies at a meeting in Santa Fe, NM, on Apr. 12, 1995, can be found on a Department of Commerce Gopher server, gopher://iitf.doc.gov.

[30] See chapter 4.

tions systems on tribal lands, and quality of tribal telecommunications service.

A federal policy presumably would apply to all federally recognized tribal and Alaska Native governments (approximately 550 in total). The policy could, however, afford flexibility to individual tribes, recognizing that they will have differing levels of interest and capability in assuming telecommunications responsibilities. And tribal interest and capability likely will change over time. The policy could direct federal agencies to apply these principles—to the extent appropriate—to state-recognized tribes and Native Hawaiian groups or communities. The policy could establish new consultative mechanisms to improve coordination and collaboration between tribes, Alaska Native villages, Native Hawaiian communities, and their respective state government telecommunications agencies.

Congress could amend federal telecommunications law, and the Communications Act of 1934 in particular, to include a clear statement acknowledging the unique status of tribal governments, requiring tribal involvement in all aspects of telecommunications policy, and mandating the NTIA, FCC, and other appropriate federal agencies to develop detailed policy and legislative proposals. Tribal telecommunications provisions could be included in broader telecommunications policy reform bills, or through subsequent amendments or separate legislation—such as a "Tribal and Native American Telecommunications Act" or the equivalent. Congress could amend other statutes to provide guidance to relevant federal agencies on their role in Native American telecommunications. Where appropriate, legislation could address various agency policy and programmatic initiatives.

The FCC could develop an American Indian and Alaska Native tribal policy, or a broader Native American policy; set up an office of tribal or Native American affairs; and include tribal governments in regulatory proceedings on the same basis as states. This would be particularly important on issues such as universal access and sales of rural telephone exchanges that may significantly affect reservation and other Native American areas. Tribes could be represented on the joint federal-state board that helps determine universal service fund procedures and allocations.[31] Also, the FCC could consider giving preference or priority to participating tribes in auctions or allocations of frequency spectrum over Indian lands where this is desired by and would benefit tribes.[32] The FCC could review its policies, programs, and rulemakings to ensure that Indian policy principles are applied to any activities that have significant impacts on tribes and tribal lands. The FCC could open up a new formal notice of inquiry and rulemaking on Native American telecommunications issues.

The logical application of Indian law and federal Indian policy[33] to the jurisdiction of the FCC would suggest that the FCC: 1) recognize tribes as governmental entities and make the distinction between minorities as individuals under existing minority policy, and tribes as governments under Indian policy; 2) thoroughly consider the implications of proposed FCC actions for tribes; 3) afford tribes opportunity for full participation in FCC rulemakings; 4) encourage tribal self-determination with regard to telecommunications on tribal lands; 5) afford tribes a governmental status equivalent to that of states with regard to telecommunications regulation and operations on tribal lands, for those tribes desiring this status; and 6) encourage increased cooperation between and among state and tribal governments and the FCC.

A major challenge would be defining a new telecommunications regulatory regime that involves the FCC, states, and tribes working as part-

[31]The federal-state board could be expanded by administrative or legislative action to include some tribal representation.

[32]See chapter 4 for discussion of the FCC's current policies.

[33]For detailed discussion of Indian law and policy, see chapter 4.

ners in government-to-government relationships. These relationships could be complex.[34] As a general rule, state governments lack jurisdiction over tribes and over Indians living on reservations, unless Congress has expressly granted such jurisdiction. However, states generally do have jurisdiction over non-Indians living on reservations, unless: 1) preempted by federal law;[35] 2) the non-Indians have consented to tribal jurisdiction; or 3) the exercise of state authority would infringe on the ability of a tribe to govern itself or would threaten the economic security, health, or welfare of the tribe.[36] Thus, if a tribe's jurisdiction is challenged, a court will conduct an inquiry into the nature of the state, federal, and tribal interests at stake to determine if the state may regulate activity on tribal lands. If the activity is subject to regulation under federal statute, then the court will analyze whether state regulation is preempted. If no federal statute applies, then the court will balance the interests of the tribe and the state. In the field of telecommunications, the existing balance of federal-state authorities and responsibilities would, presumably, need to be adjusted to accommodate heightened tribal involvement.[37]

The essence of the tribal telecommunications policy challenge is the application of principles of tribal sovereignty to this technological arena. Tribal telecommunications policy is in its infancy. Tribal technology advocates believe that telecommunications offers the potential to help revitalize Native communities while preserving and strengthening Native values and traditions. This is only likely to occur, however, if tribal sovereignty that is now established policy in the realms of education, health care, public works, and governance is extended to another key part of the community infrastructure—telecommunications. Native American advocates believe that only in this way can tribal sovereignty in cyberspace be reasonably ensured.[38]

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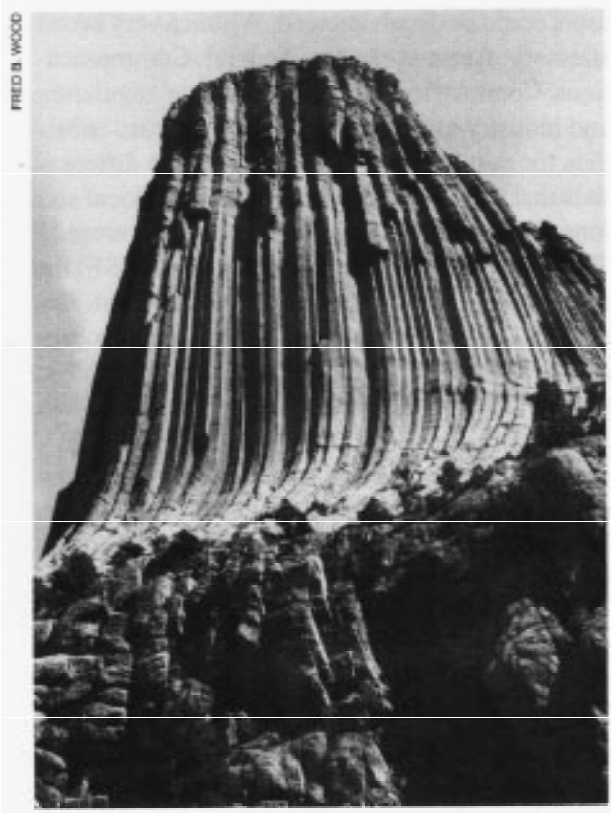
[34]State laws and legislative activity on Native American issues are extensive. See, e.g., Kimberly A. Morin, *1994 State Legislation on Native American Issues* (Denver, CO: National Conference of State Legislatures, September 1994); and Alex White-Tail Feather, James B. Reed, and Judy Zelio, *State-Tribal Legislation: 1992 and 1993 Summaries* (Denver, CO: National Conference of State Legislators, February 1994). For an example of the complexities involved, see the 1995 proceedings of the South Dakota Public Utilities Commission on the proposed acquisition of local telephone exchanges by a tribally-owned telephone company (Owl River Telephone, Inc., a wholly owned subsidiary of the Cheyenne River Sioux Tribe Telephone Authority).

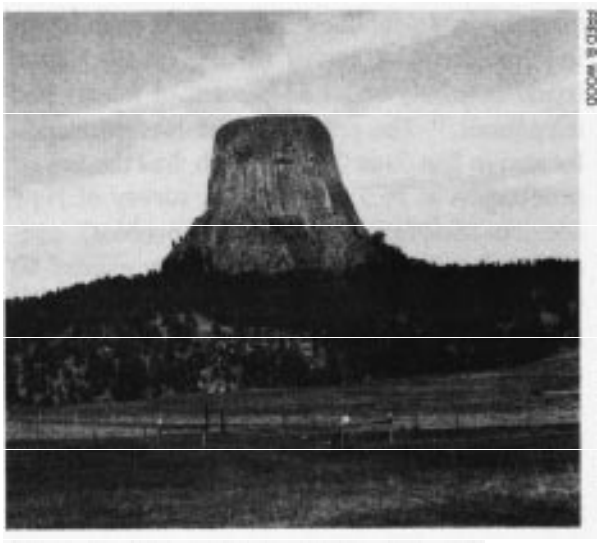
[35]See, e.g., *New Mexico* v. *Mescalero Apache Tribe*, 462 U.S. 324, 338-44 (1983).

[36]*Montana* v. *United States*, 450 U.S. 544, 565-66 (1981).

[37]The increasing involvement of tribal governments in the public utility industry, e.g., energy and electric power, may provide some insights and precedents for tribal telecommunications activities. The Energy Policy Act of 1992 (Public Law 102-486) essentially decentralized the electric power industry by expanding the range of companies that can enter the electric power generation market and ending electric power company monopoly control over interstate transmission lines. Title 26 of the act encouraged tribes to develop and regulate energy sources such as solar and wind energy, hydropower, and cogeneration. The involvement of tribes in the energy business has, however, created complex tribal-state-federal regulatory issues that may be indicative of the kinds of issues likely to arise should tribes became major players in telecommunications. See generally Martin V. Kirkwood, "Federal and State Regulation of Tribal Utilities," *Natural Resources & Environment*, vol. 7, No. 4, spring 1993, pp. 27-29, 59-61.

[38]This phrase derives from Baldwin, "American Indian Identity and Tribal Sovereignty in Cyberspace," op. cit., footnote 7; and Randy Ross, "The Net and Federal Indian Law," statement prepared for the National Information Infrastructure Advisory Council meeting, Santa Fe, NM, Apr. 12, 1995. Tribal legal advocates believe that tribes should have legal authority over telecommunications on or over Indian lands, and that the federal trust responsibility should include frequency spectrum allocation and use. Karen Funk and Sandra Ferguson, Esq., Hobbs, Straus, Dean & Walker, Washington, DC, personal communication, Feb. 6, 1995; James A. Casey, Esq., Fletcher, Heald & Hildreth, Washington, DC, personal communication, Apr. 27, 1995; John Tahsuda, Esq., Holland & Hart, Denver, CO, personal communication, Apr. 28, 1995.





Left: *Devil's Tower stirred the imagination of Indians, who called it* Mateo Tepee, *meaning Grizzly Bear Lodge.* Kiowa *and Cheyenne Indian legends hold that the rock rose into the air protecting tribal members from a gigantic bear leaving claw marks gouged into the rock.* ***Right:*** *Devil's Tower rises 1,200 feet above the Belle Fourche River in northeast Wyoming, Devil's Tower National Monument was established in 1906 as the first national monument. Over the generations, the Shoshone, Comanche, Kiowa, Crow, Arapaho, Cheyenne, and Sioux Indians, among others, came to this area to camp and hunt.*

Universal Access

The universal service component of national telecommunications policy could be revised to better meet Native American needs. Native Americans living in rural areas historically have had limited access to telecommunications. This results from the higher costs and technical difficulties of serving geographically remote areas, combined with the distressed socioeconomic conditions in many Native communities. American Indian reservations and Alaska Native villages are, as a whole, among the most underserved areas of the United States with regard to telecommunications. There-cent increase in pilot tests and small-scale operational projects in rural areas is encouraging. But the gap is still wide between the technologies and services available in major U.S. metropolitan areas and those in rural, remote areas that are home to more than one-third of all Native Americans.

With regard to basic telephone service, the nationwide rural telephone penetration rate averages 91.6 percent of homes.[39] While less than the 95.6 percent average in urban areas, the rural average seriously overstates actual telephone penetration in rural Native American communities. Analysis of U.S. Census data indicates that rural Native Americans as a group have an average telephone penetration rate of 55 percent-the lowest of any ethnic group in any geographic area. [a]This means that almost half of rural Native homes do not have

[39] National Exchange Carrier Association, Inc., "Comments" prepared in response to NTIA Notice of Inquiry of Universal Service and Open Access Issues, Docket No. 940955-4255, Dec. 14,1994, p. 24.

[40] Ibid. Note that the 55 percent penetration estimate was a weighted average based only on communities with 50 percent or higher Native American population. For further details, contact the National Exchange Carrier Association. Also see Bureau of the Census, U.S. Department of Commerce, News Release No. CB94-127, Aug. 22, 1994, on Native American reservation household telephone penetration.

that almost half of rural Native homes do not have telephones. Telephone penetration is even lower in some areas. A survey of the Navajo Nation found that only about 35 percent of homes had telephones.[41] The portion of the Navajo Nation located in San Juan County, Utah, had the lowest penetration at 26.5 percent.[42] A survey of New Mexico reservations (including pueblos) concluded that "rural reservations rarely exceed 60 percent [residential telephone] penetration."[43] Alaska Natives and Native Hawaiians in rural areas generally have higher telephone penetration rates than rural American Indians, but still below the national averages.

Low telephone penetration in rural Native areas generally reflects a combination of infrastructure deficiencies, low family income, and, in some cases, cultural preferences. Some rural Native Americans prefer not to have a telephone for cultural or lifestyle reasons, even when costs are significantly subsidized through universal service funds and telephone lifeline programs.[44]

The principle of universal access dates to the early days of telephony, and reflects the congressional and governmental desire that all areas of the nation have reasonable access to telecommunications services. Congress was concerned that individual telephone customers, local users, and rural users could be disadvantaged. Within a very broad statutory framework, the Federal Communications Commission worked with state regulators and industry to establish a system of cross-subsidies (or cost-shifting) to reduce the rate differentials that would otherwise exist between local and long-distance calls, and rural and urban areas.[45] This includes a Universal Service Fund (USF) for rural areas (administered by the National Exchange Carrier Association) and a telephone lifeline assistance program (offering low-cost basic service) for low-income users in rural and urban areas.[46]

Also, Congress established a rural telephone program, now administered by the Rural Utilities Service, within the U.S. Department of Agriculture, to provide subsidized and government-guaranteed loans to rural telephone companies.[47] Congress acted on the assumption that rural, remote America would be disadvantaged because of the inherently higher costs of telephone service in areas with much lower customer density and much longer distances to wire (i.e., higher costs spread over fewer customers).[48]

Advancing technologies and services, deregulation, and increasing competition have compli-

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[41]Rodger Boyd, testimony before the National Telecommunications and Information Administration and New Mexico State Corporation Commission, Hearing on Universal Service, Albuquerque, NM, Dec. 16, 1993.

[42]Ibid.

[43]Miller Hudson, John Cordova, and Stan Pino, "New Mexico Tribal Telecommunications Research Study 'Community of Interest Network—Information Highway Project,'" prepared by TakeOne Productions, Denver, CO, for US West, Jan. 30, 1995. US West also sponsored a similar study of Arizona tribal telecommunications.

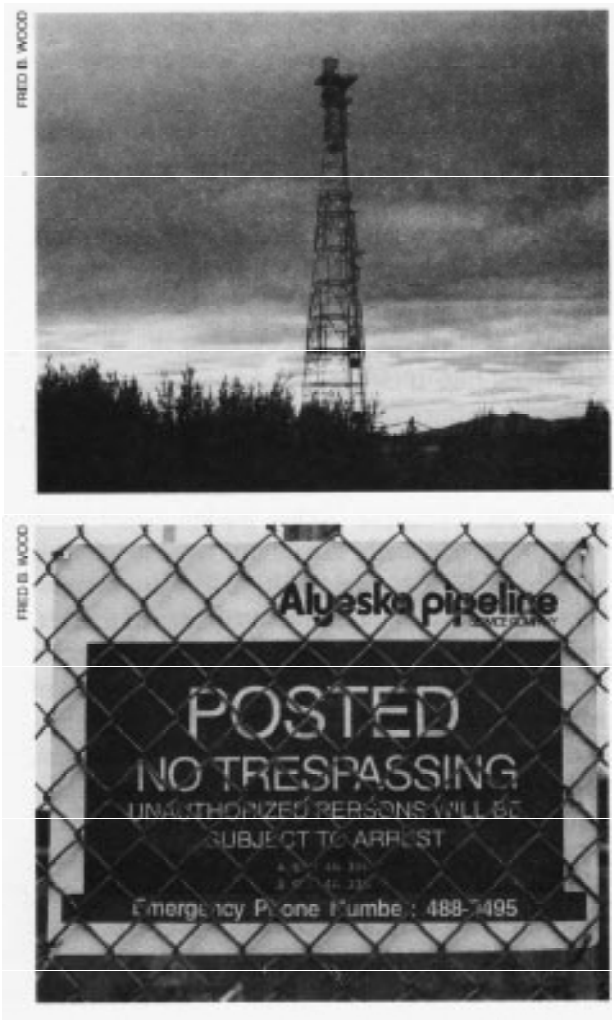
[44]GTE Telephone has found this often to be the case in its New Mexico service area. Duane G. Johnson, Assistant Vice President, Regulatory Affairs and Government Relations, GTE Telephone, Irving, TX, personal communication, May 2, 1995.

[45]See generally, U.S. Congress, Office of Technology Assessment, *Rural America at the Crossroads: Networking for the Future*, OTA-TCT-471 (Washington, DC: U.S. Government Printing Office, April 1991).

[46]See National Exchange Carrier Association, "An Industry Agent of Universal Service," Washington, DC, Nov. 9, 1994.

[47]See Rural Electrification Administration, U.S. Department of Agriculture, *Rural Electrification Act of 1936, With Amendments as Approved Through December 17, 1993*, Informational Publication 100-1 (Washington, DC: Rural Electrification Administration, 1994), and "An Overview of the REA Telephone Loan Program," n.d.

[48]OTA, *Rural America at the Crossroads*, op. cit., footnote 45.



Top: *Microwave relay tower along the Richardson Highway and the Trans-Alaska Pipeline, operated by the Alyeska Company This tower is located between Paxson and Delta Junction, Alaska.* ***Bottom:*** *The Alyeska Company depends on microwave communication links for telephone service along much of the pipeline route. Pipeline operations, maintenance, and security depend on telecommunications.*

cated the definition and implementation of universal access. Congress is in the process of revising national telecommunications policy, and could consider and refine the universal access proposals to specifically address Native American needs. The FCC is examining universal access as well, and could give greater attention to the implications for Native tribes, villages, and communities.[49] Also, NTIA is studying universal access as part of the NII initiative.[50] These inquiries could focus more explicitly on the availability of universal service funds and telephone lifeline services in rural Native areas. Pending legislation would reaffirm the national commitment to universal service and provide statutory guidance to the FCC in its efforts to revise and update universal service in light of changes in technology and competition.[51]

Congress, the FCC, and NTIA could consider, from Native American Perspectives: 1) the definition of universal service (e.g., what technologies and services to include); 2) benchmark levels of service (e.g., need and ability to pay for specific types of services, and surrogate indicators like per-capita income or customer density per square mile); 3) cross-subsidies required (based on assumptions about services, costs, needs, and ability to pay); and 4) alternative ways to provide the cross-subsidies (e.g., surcharge on service costs, percentage of gross revenues, reserve capacity, or customer vouchers). Congress and the Administration could review and possibly revise the RUS's rural telephone programs that currently or potentially benefit Native American service areas (specifically including Native Hawaiian commu-

[49] Federal Communications Commission, Notice of Inquiry on Amendment of Part 36 of the Commission's Rules and Establishment of a Joint Board, Common Carrier Docket No. 80-286, Aug. 30, 1994.

[50] National Telecommunications and Information Administration, U.S. Department of Commerce, Notice Of Inquiry of Universal Service and Open Access Issues, Docket No. 940955-4255, Sept. 13, 1994.

[51] See S.652, the "Telecommunications Competition and Deregulation Act of 1995," 104th Cong., 1st Session, passed as amended by the U.S. Senate; and H.R.1555, the "Communications Act of 1995," 104th Cong., lst Session. Also see U.S. Congress, Senate, Committee on Commerce, Science, and Transportation, Telecommunications Competition and Deregulation Act of 1995, S.Rpt. 104-23 (Washington, DC: U.S. Government Printing Office, Mar. 30, 1995). See generally Angele A. Gilroy, Congressional Research Service, "Telecommunications Regulatory Reform," CRS Issue Brief IB95067, Apr. 21, 1995 (updated regularly).

nities as well as American Indian reservations and Alaska Native villages).

The general opinion of Native activists and leaders is that universal service should be a dynamic, not static, concept. Telecommunications services available to rural Native areas should improve over time in approximate parallel with service upgrades in non-Native rural areas and metropolitan areas. In this view, basic telephone service—a goal not yet achieved in many rural Native areas—should be a minimum standard; enhanced services will be needed if rural Native Americans are to fully leverage the technology for educational, health care, economic development, and other purposes.[52] In large part because of universal service funds and RUS loans, rural telephone companies have been able to upgrade rural telephone equipment and networks in recent years—digital switching is now commonplace and fiberoptic backbone is increasing rapidly.[53] However, reservation areas are among the most expensive to serve and among the last to get the technology upgrades.

Without universal service funds, telephone rates in rural areas could, and probably would, increase significantly—estimated at 30 percent or more.[54] Given the already depressed incomes on many Indian reservations and in most Alaska Native villages, this would further impede realization of even basic telephone service for many Native Americans. Telephone penetration rates drop significantly for households with an annual income under $20,000, and even more dramatically when annual income dips below $10,000.[55] Many rural Native household incomes fall within this range, and thus are most vulnerable to rate increases.[56]

Strategic Partnerships

Strategic partnerships between the private sector and tribes, villages, communities, and Native service providers could be encouraged by the FCC, NTIA, and Congress. Native leaders could work with the private sector to examine ways to upgrade service to Native communities. Private companies could develop their own estimates of market, demand, and cost factors in Native American areas. The companies could estimate what mix of market forces, customer demands, cross-subsidies, federal (and other governmental) programs, and perhaps nonprofit-sector programs would result in upgraded services to Native Americans.

This could involve participants such as regional Bell operating and other telephone companies; long-distance telephone carriers; competitive access carriers (including electric power utilities);

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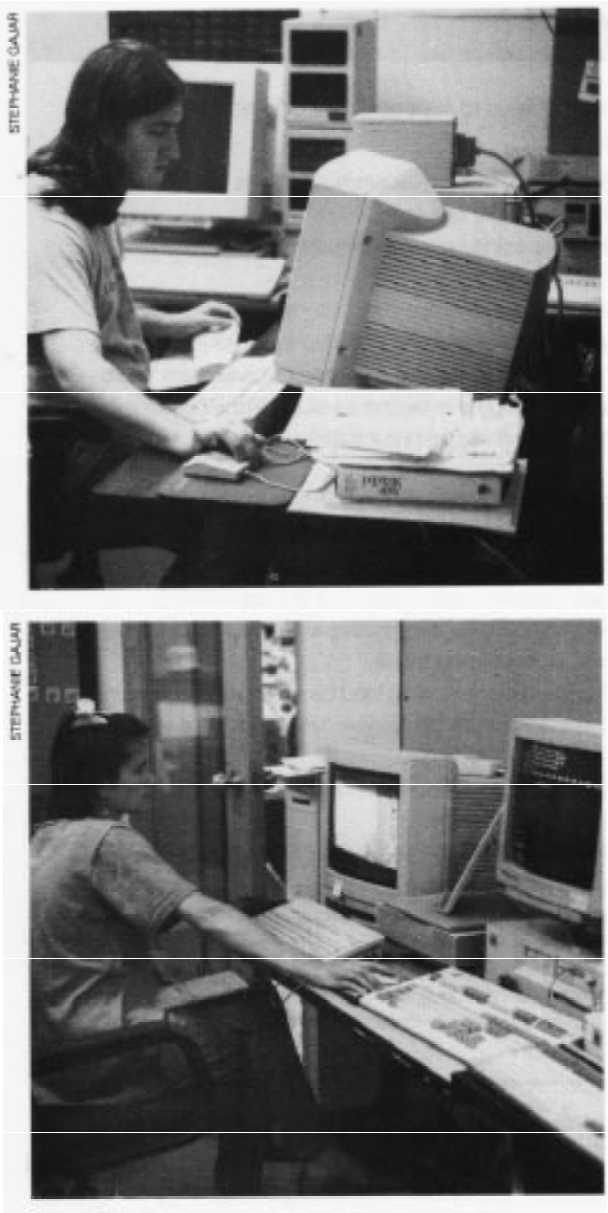
[52]See National Telecommunications and Information Administration, U.S. Department of Commerce, *The NII Field Hearings on Universal Service and Open Access: America Speaks Out* (Washington, DC: NTIA, September 1994), a report of the Information Infrastructure Task Force, Telecommunications Policy Committee. Also see statement by LaDonna Harris, Americans for Indian Opportunity, Bernalillo, NM; James H. May, California State University at Chico; and George Baldwin, Henderson State University (now at California State University at Monterey Bay), "Opinion Statement on Universal Service for American Indians and Alaska Natives," prepared for the National Telecommunications and Information Administration, n.d.

[53]See Rural Electrification Administration, U.S. Department of Agriculture, *1993 Statistical Report: Rural Telephone Borrowers*, Informational Publication 300-4 (Washington, DC: REA, August 1994); and National Exchange Carriers Association, "Building the Telecommunications Infrastructure in Rural America: Achievements Toward the Promise," Washington, DC, November 1993.

[54]See Rocky Mountain Telecommunications Association, Scottsdale, AZ, and Western Rural Telephone Association, Santa Rosa, CA, Universal Service Subcommittee, "Universal Service in the Nineties," A Western Alliance Report, n.d.; Carol Weinhaus, Sandra Makeeff, Peter Copeland, et al., "What is the Price of Universal Service? Impact of Deaveraging Nationwide Urban/Rural Rates," Telecommunications Industries Analysis Project, School of Business, University of Southern California, July 25, 1993; and Carol Weinhaus, Teresa Pitts, Rob McMillan et al., "Abort, Retry, Fail? The Need for New Communication Policies," Telecommunications Industries Analysis Project, College of Business Administration, University of Florida, Oct. 10, 1994.

[55]See NECA, "Comments," op. cit., footnote 39; Jorge Reina Schement, Alex Belinfante, and Larry Povich, "Telephone Penetration 1984-1994," paper prepared for the Federal Communications Commission's Chairman Reed Hundt, Oct. 17, 1994; Jorge Reina Schement, Rutgers University, "Beyond Universal Service: Characteristics of Americans Without Telephones, 1980-1993," Mar. 1, 1994.

[56]For the Navajo Nation, for example, about 55 percent of households have annual incomes below $19,000. See Boyd, op. cit., footnote 41.



Top: *NYSERNet's computer operations center in Liverpool, New York. NYSERNet, Inc., provides computer networking services, training, and technical support to educational, research, governmental, and other users-including Indian tribes.* ***Bottom:*** *NYSERNet provides Internet connectivity for the Oneida Nation in New York. The Oneida Nation has developed home page that is accessible via Internet at http:llnysernet.orgloneidal. Also see appendix B.*

rural telephone cooperatives; cable television companies; cellular telephone, satellite, and other wireless companies; radio/TV broadcasting stations; and computer technology, service, and networking companies. The examination could identify economic development, community infrastructure, and other policies, in addition to telecommunications policy, that might work together to help upgrade service.

Telephone companies, for example, vary in their approach to the rural reservations and villages in their service zones. Some are upgrading service to rural areas, including reservations. Some companies provide grants or other forms of special assistance to Native and other underserved rural areas. Others are selling off rural telephone exchanges that are too costly to serve or do not fit in with corporate objectives. Tribes have a major say, if they wish to exercise it, in who provides telecommunications on reservation lands and how it is achieved. In some situations, tribes may wish to enter into formal partnerships with telecommunications providers, or organize their own tribally controlled and operated telecommunications companies and cooperatives. The results of a New Mexico tribal telecommunications survey identified 12 keys to successful introduction of new technologies in tribal communities (see box 5-4).

The few tribes with significant gaming revenues could invest some portion of net profits in telecommunications infrastructure and services, including the formation of tribal telecommunications companies or partnerships. The Indian Gaming Regulatory Act[57] permits use of net revenues from tribal gaming to fund tribal government operations and programs, provide for the general welfare of the Indian tribe and its members, and promote tribal economic development. Investments in tribal telecommunications and tribal telecommunications companies and partnerships, properly defined and organized, should serve one or more of these purposes.

[57] Public Law 100-497, 25 USC Sec. 2710(b)(2)(B).

BOX 5-4: Keys to Building Telecommunications Infrastructure in Native American Communities

A survey of New Mexico tribes and pueblos identified 12 keys to successful introduction of telecommunications technology in traditional Indian communities:

1. Form collaborate relationships with key participants early in the telecommunications infrastructure development process and emphasize perceived community needs.
2. Determine individual and community goals before proposing specific telecommunications service options.
3. Provide specific information about the strengths and weaknesses of new telecommunications technology and how the technology can contribute to individual and community goals.
4. The new telecommunications technology—and the participants and partners involved with implementation—must be "culturally appropriate" if the technology is to become valued in the community.
5. Exercise sensitive and appropriate interpersonal cross-cultural communication skills and behaviors when working in and with Indian communities.
6. Demonstrate an awareness, sensitivity, and appreciation for issues related to the preservation of traditional cultural and sacred places.
7. Tell the entire story about an operational telecommunications development project, including the role local participants played in changing the living and learning environment of the community
8. New telecommunications technology and/or services should be sustainable and should build on existing capacities for addressing community needs, desires, and goals.
9. New telecommunications technology should be targeted at increasing total benefits to the community. Long-term benefits to providers, partners, and entrepreneurs will also be optimized if this strategy is employed.
10. Knowledge about new telecommunications technology should be disseminated with care so that the effectiveness of the technology is fully and accurately understood.
11. Communicate all anticipated outcomes of telecommunications projects to clients, decisionmakers, and the broader public in a culturally influential and comprehensible way.
12. Design and Implement telecommunications development projects in partnership with others so as to maximize benefits and minimize costs at the community level.

SOURCE: Office of Technology Assessment, 1995, based on Miller Hudson, John Cordova, and Stan Pine, "New Mexico Tribal Telecommunications Research Study 'Community of Interest Network—information Highway Project," prepared by TakeOne Productions, Denver, CO, for US West, Jan 30, 1995

▮ Information Policy

Federal officials need to explicitly consider Native American perspectives when formulating information policy. And Native groups need to be encouraged to develop positions on privacy, intellectual property rights, and other information policy issues.

For more than a decade, computer activists and advocates in the U.S. research and business communities have been concerned about the risks and complications, as well as the benefits, of using electronic networks to retrieve, distribute, and exchange information.[58] Paramount among information policy issues are privacy, intellectual

[58]See, e.g., OTA, *Making Government Work,* op. cit., footnote 1; U.S. Congress, Office of Technology Assessment, *Finding a Balance: Computer Software, Intellectual Property, and the Challenge of Technological Change,* OTA-TCT-527 (Washington, DC: U.S. Government Printing Office, May 1992): and *Critical Connections: Communication for the Future,* OTA-CIT-407 (Washington, DC: U.S. Government Printing Office, February 1990). Also see U.S. Office of Management and Budget, Circular A-130, "Management of Federal Information Resources," June 25, 1993, and the "Paperwork Reduction Reauthorization Act of 1995," Public Law 104-13.

(and cultural) property rights, security, computer crime, and electronic freedom of speech and press. These concerns have been intensified by the decreasing costs of computers and telecommunications and the rapid increase in the use of networks in recent years.

Native Americans familiar with electronic networks are concerned that telecommunications could increase the likelihood of electronic invasions of tribal privacy, and electronic abuse or misuse of information, products, and services created or provided by tribes and tribal members.[59] One concern is that sensitive Native religious and spiritual information, if computerized, could more easily be accessed by unauthorized persons and used for inappropriate purposes. Computer networking makes it more difficult to verify the authenticity of users; some non-Indians have been using Indian names and computer addresses on the Internet. Native arts, crafts, and traditional practices are especially vulnerable to misuse and misrepresentation. Non-Natives may use or sell Native artwork electronically without authorization or fair compensation, or may advertise and sell non-Native art as Native. These kinds of activities are clear violations of privacy and intellectual property rights, and also compromise Native cultural identity and self-determination.

The volume of Native information and cultural materials created and marketed electronically is still small, as is the number of tribes and Native Americans using computer networking. Computer and telecommunications use by Natives is growing rapidly, however. Younger generations are much more familiar with the technology than their tribal elders, and will further accelerate the growth of computer networking and use of multimedia and other electronic technologies that are well suited to recording and sharing Native culture. Also, as Native governments make greater use of telecommunications, they will need to give heightened attention to protecting the privacy and security of medical and other personal information needed for tribal administration and for delivery of health, social, and employment services.[60]

Native Americans, therefore, have a significant and growing interest in the overall evolution of U.S. privacy and intellectual property policy, as well as development of tribal-specific policies that may vary depending on local values and customs. Native participation in national information policymaking efforts seems essential to ensure that policies reflect Native concerns and protect the religious and cultural heritage of Native Americans.

Regional and national Native groups, such as the National Congress of American Indians and Federation of Alaska Natives, could include information policy issues within the purview of any telecommunications committees that they establish. Grassroots groups, such as the Indigenous Communications Association, Americans for Indian Opportunity, and Pacific Islanders in Communications, could collaborate with non-Native computer advocacy and community networking groups concerned with similar issues. The National Public Telecomputing Network, Big Sky Telegraph, Center for Civic Networking, Computer Professionals for Social Responsibility, American Library Association, Consortium for School Networking, and Electronic Frontier Foundation are among the many organizations with whom Native groups might seek common understanding and alliances. Similarly, the American Indian Science and Engineering Society could collaborate with

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[59]See Ross, "Tribal Rights and Cultural Identity in Cyberspace," op. cit., footnote 7; Baldwin, "American Indian Identity and Tribal Sovereignty in Cyberspace," op. cit., footnote 7; and George D. Baldwin, "Public Access to the Internet: American Indian and Alaskan Native Issues," paper prepared for the John F. Kennedy School of Government, Harvard University, February 1994.

[60]See, generally, OTA, *Making Government Work*, op. cit., footnote 1; *Protecting Privacy in Computerized Medical Information*, OTA-TCT-576 (Washington, DC: U.S. Government Printing Office, September 1993); *Information Security and Privacy in Network Environments*, OTA-TCT-606 (Washington, DC: U.S. Government Printing Office, September 1994); and *Issue Update on Information Security and Privacy in Network Environments*, OTA-BP-ITC-147 (Washington, DC: U.S. Government Printing Office, June 1995).

Left: *US West participant at the 1994 annual conference of the American Indian Science and Engineering Society. AISES members include American Indian students, faculty, and science and technology professionals from industry and government.*
Right: *Intel Corporation computer display at the 1994 AISES conference in San Jose, California. AISES provides a forum for discussion of telecommunications and information technology policy issues relevant to American Indians.*

the Institute of Electrical and Electronics Engineers and the American Association for the Advancement of Science. NTIA could initiate an inquiry specifically on tribal information policy issues. The National Science Foundation could fund policy analysis by Native Americans and Native groups on these issues. Universities with Native American programs could add courses and develop curricula on Native information policy.

Native communications professionals appear to agree on the potential of electronic technologies to reaffirm and strengthen Native culture. But they are concerned about "tribal rights and sovereignty in the realm of cyberspace."[61] They want to ensure that telecommunications policy will promote the cultural and economic progress of Native peoples, rather than perpetuate the historical subjugation of Native Americans to the majority society.[62]

■ Further Research and Evaluation

This is the first federal government report on Native American telecommunications, and, to the best of OTA's knowledge, the first comprehensive report on this topic. The report builds, in part, on the work of Native American telecommunications activists and researchers who have been among the first to understand the potential. Clearly, the field of Native American telecommunications is still in its early stages. While some policy decisions could be responsibly made today, future applications and policymaking would benefit from

[61] Baldwin, "Public Access to the Internet," op. cit., footnote 59.

[61] See Americans for Indian Opportunity, *First Native American Telecommunications Forum,* op. cit., footnote 28.

significant, continued research on many of the topics discussed in this report.

During the course of this study, OTA identified a variety of areas for further research, including:

1. identification of the prerequisites of effective Native leadership and governance with regard to telecommunications;
2. impacts of telecommunications applications and policy options on diverse Native cultures;
3. reinvention of Native governments, in part through the use of telecommunications;
4. statistics and demographics on Native Americans and their use of telecommunications;
5. statistics on the current and evolving telecommunications infrastructure in Native communities;
6. impacts and sustainability of telecommunications pilot projects in Native communities;
7. effects of telecommunications on Native customs, values, well-being, and economic prospects;
8. need for telecommunications infrastructure development, applications, and services in Native areas;
9. cost estimates of various telecommunications projects and programs;
10. role of telecommunications in successful Native entrepreneurial efforts;
11. evaluation of federal and state programs relevant to Native American telecommunications;
12. development of Native American information policies on both tribal/village/community and national levels;
13. application of library and information science to Native American telecommunications infrastructure development and policies; and
14. legal, regulatory, and constitutional issues associated with Native American telecommunications.

This report does not consider the telecommunications needs of Native Americans living on other Pacific Islands such as the U.S. territories of Guam and American Samoa and the U.S. Commonwealth of the Northern Marianas Islands.[63] While the thrust of this report is generally applicable, further research would be needed to better understand how telecommunications could help improve socioeconomic conditions on the Pacific Islands and help strengthen the ancestral, cultural, and economic ties between Native Hawaiians and Pacific Islander Americans.

Federal policy could redirect agency research programs and encourage the development of centers of telecommunications expertise in Native organizations and in universities that serve Native Americans.[64] Native research centers could be encouraged to use telecommunications both to conduct research and to disseminate the results (see box 5-5). Federal agencies that support Native American telecommunications pilot projects and infrastructure development could be required to include an evaluation component. The Office of Management and Budget (in the Executive Office of the President) could require the federal statistical agencies to improve data collection and analysis on American Indians, Alaska Natives, and Native Hawaiians—as individual racial/ethnic groups and as Native Americans collectively. The statistical agencies could develop and issue a special report, or series of reports, linking demographic characteristics, socioeconomic and health conditions, and use of telecommunications technology—with a special focus on rural Native areas.

An appropriate federal agency, university research center, and/or Native organization could, for example: 1) conduct a survey of Native American telecommunications infrastructure (see appendix C for an illustrative survey research instrument); 2) maintain and update the Internet-

[63]Other islands formerly part of the U.S. Pacific Island Trust Territories include the Federated States of Micronesia, Republic of the Marshall Islands, and Republic of Palau (in the process of implementing a compact of free association).

[64]Among the several universities with relevant programs are Harvard, Northern Arizona, Washington State, George Washington, Syracuse, Illinois, and California State at Monterey Bay.

BOX 5-5: Electronic Clearinghouse Activities of the National Indian Policy Center

The National Indian Policy Center (NIPC) conducts or sponsors research on a wide range of Indian policy issues and operates a clearinghouse for the dissemination of research results and other relevant information in a variety of formats—paper, telefacsimile, and electronic. NIPC is funded by the Administration for native Americans (within the Department of Health and Human Services) with additional support from The George Washington University, where the Center is located.

NIPC prepares or sponsors research reports in seven major areas: 1) cultural rights and resources, 2) economic development, 3) education, 4) health and human services, 5) law and administration of justice, 6) natural resources, and **7)** tribal governance. Most research reports are available in hard copy or online From March 1 through September 30, 1994, NIPC received about 4,000 requests for research reports—roughly 70 percent of requests were for electronic copies and 30 percent for paper copies. During this same period, NIPC received about 27,000 other requests for online clearinghouse information that was downloaded electronically by users at remote locations.

Based on a three-month sample (January 1 through March 31, 1995), NIPC estimates that requests for research reports are distributed approximately as follows: educational institutions (including those with American Indian programs), 38 percent, tribal governments, 27 percent; Indian organizations, 18 percent, federal government agencies, 9 percent; and state governments, 8 percent.

NIPC is currently expanding its clearinghouse activity to include information on hearings and pending legislation relevant to Native Americans and testimony by tribal leaders and government officials before congressional committees. For these purposes, NIPC uses broadcast telefacsimile for the roughly 450 tribal governments that have telefacsimile equipment and uses mail for the rest.

NIPC would like to expand use of the Internet for distribution of reports and other clearinghouse information to tribal governments At present, however, only a small minority of tribal governments has access to the Internet A 1995 NIPC survey found that only 18 tribal governments reported being on the Internet, out of 150 tribes responding. Another 16 tribes reported that they were considering or in the process of obtaining Internet access Until more tribal governments have and use Internet, NIPC will continue to rely on the telephone, telefacsimile, and mail.

SOURCE: Office of Technology Assessment, 1995, based on Bob Arnold, Bambi Kraus, and Orna Weinroth, National Indian Policy Center, 1995, personal communications Also see National Indian Policy Center *Progress Report on the Feasibility Study for a National Indian Policy Center* (Washington, DC The George Washington University, NIPC, Aug. 15, 1991); NIPC brochure, n.d. ; and U.S. Congress, Senate, Committee on Indian Affairs, *Oversight Hearing To Examine the Feasibility of Creating a Permanent Indian Research Center,* S.Hrg. 103-61 (Washington, DC: U.S. Government Printing Office, May 20, 1993)

accessible Native American Resource Page developed by OTA for this study (see appendix B);[65] and 3) help the Native American research community make best use of the already significant range of telecommunications resources available to them (see appendix A on computer networking for Native Americans).

[65]Internet traffic suggests significant interest in the Native American Resource Page. During the period Jan. 10 through Apr. 4, 1995,this page was accessed 8,282 times accounting for about 6 percent of total Internet inquiries to OTA and 23 percent of total information downloaded from the OTA Internet site.