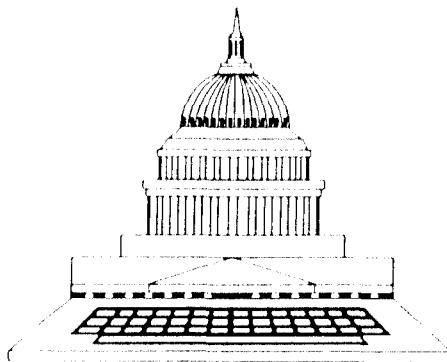


September 1991

U.S. Communications Policy: Issues for the 1990s

Results of a GAO Roundtable

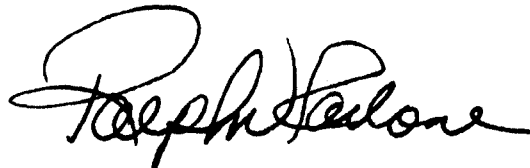


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Preface

Communications technology touches nearly every aspect of our daily lives, providing a universal highway that supports our economy, entertains and informs us at home, and educates our children. As a result, this technology has a tremendous impact on the social and economic development of this nation. Furthermore, advancing technologies and expanding global markets have created a complex, dynamic, and competitive communications market. As such, communications technology presents new challenges and new possibilities, and raises important issues that policymakers at both the federal and state levels need to address.

In February 1991 GAO sponsored a conference, "U.S. Communications Policy: Issues for the 1990s," in response to increasing congressional interest in this area. The conference brought together government officials, academicians, and industry executives, to explore and debate four critical policy issues in a series of roundtable discussions. The four issues discussed are (1) how the communications infrastructure should develop to promote innovation and maximize the benefits of competition, (2) the role of communications policy in promoting economic growth and development at home and competitiveness abroad, (3) how the United States should allocate the electromagnetic spectrum to effectively support the growth of communications services as a major element of the nation's communications infrastructure, and (4) whether the U.S. communications regulatory structure is effective at promoting opportunities for technological growth and innovation, as well as providing benefits to users. This publication presents the results of the conference, and highlights the challenges facing U.S. communications policymakers. We believe it can assist decisionmakers in future policy debates and in developing a communications policy framework.



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Contents

Preface		1
Communications: An Overview	The GAO Conference: A Policy Debate	4
	Fiber to the Home: Is It Necessary?	5
	Is Investment in the Infrastructure Adequate?	7
	Radio Spectrum: Demand High, Availability Low	9
	Is the Current Market Structure Still Effective?	11
	Observations	15
Appendixes	Appendix I: Conference Panelists	18
	Appendix II: Major Contributors to This Report	22

Abbreviations

AT&T	American Telephone and Telegraph Company
FCC	Federal Communications Commission
GAO	General Accounting Office
IMTEC	Information Management and Technology Division
IRAC	Interdepartment Radio Advisory Committee
MFJ	Modified Final Judgement
NTIA	National Telecommunications and Information Administration
PUC	public utility commission

Communications: An Overview

Communications technologies are critical to the economic and social health of this nation. The trend toward an increasingly global, information-based economy has made information a more strategic, competitive factor in business, and communications is critical to exploiting its worth. As a result, many businesses are investing unprecedented amounts of money in communications technologies because of their value to increased productivity and efficiency. In addition, communications technologies play a critical social role in educating and informing the public, aiding the political process, and fostering a sense of community among citizens.

The communications infrastructure—the telephone network, cable, over-the-air broadcast, microwave, direct broadcast satellites, cellular telephones, data networks, film, and audio and video recording—is undergoing rapid technological change. New technologies, such as cellular telephones and fiber-optic transmission, are emerging, while at the same time communications and computing technologies are converging. One significant development driving this convergence has been digitalization—the process of transforming analog messages into signals made up of discrete pulses that can be processed, stored, and transmitted electronically. In digital form, voice, video, and text can be integrated and transmitted over virtually any type of medium, including copper wire, fiber optics, and satellites.

These technological developments have given rise to new services and industries, and have dramatically reshaped the structure of the U.S. communications market. The introduction of these new services and industries has transformed a market once dominated by few communications service providers into an increasingly competitive environment in which domestic and foreign suppliers compete. While these new services are permitted to develop in an unregulated, competitive environment, many traditional communications service providers remain regulated.

The GAO Conference: A Policy Debate

The dramatic changes occurring in the communications environment have created both opportunities and challenges for policymakers. In response to increasing congressional interest in this area, GAO convened a conference, "U.S. Communications Policy: Issues for the 1990s," in February 1991, to provide a forum for high-level congressional, government, industry, and academic representatives to explore and debate critical policy issues. The conference was composed of four panel discussions, each addressing a separate policy issue.

- (1) How should the communications infrastructure develop to promote innovation and maximize the benefits of competition?
- (2) What is the role of communications policy in promoting economic growth and development at home and competitiveness abroad?
- (3) How should the United States allocate the electromagnetic spectrum to effectively support the growth of communications services as a major element of the nation's communications infrastructure?
- (4) Is the U.S. communications regulatory structure effective at promoting opportunities for technological growth and innovation, as well as providing benefits to users?

The conference was moderated by Patricia Diaz Dennis, former partner, Jones, Day, Reavis & Pogue; and Harry M. "Chip" Shooshan III, vice president, National Economic Research Associates, Inc. Appendix I lists the conference participants, the organizations they represent, and the panels on which they served. A companion volume to this special publication, U.S. Communications Policy: Issues for the 1990s: Panelists' Remarks (GAO/IMTEC-91-52B), presents the panelists' remarks.

The issues discussed at the conference represent broad policy concerns with no short-term solutions. By their very nature, these issues are interdisciplinary. For example, communications regulatory policies affect infrastructure development, which in turn affects the ability of U.S. businesses to compete in global markets. Thus, although these issues were discussed separately, they must be viewed as falling within the context of an overall communications policy framework.

In preparing this publication, we relied primarily on information developed during the four panel discussions. However, we also used information obtained during conference preparations, including interviews and discussions with knowledgeable representatives from government, industry, and academia, as well as written materials on communications policies and technologies.

Fiber to the Home: Is It Necessary?

The communications infrastructure has become a critical element in U.S. competitiveness. As a result, most panelists agree that the United States needs a broadband, high-speed network for voice, data, and video; fiber optics has been the most frequently mentioned transmission medium for such a network. Although the United States has one of the best voice

networks in the world, it lacks the broadband, ubiquitous network capable of transmitting information at high speeds.¹ Even though many individual companies have developed sophisticated broadband, fiber networks of their own, these islands of information do not interconnect; therefore, businesses cannot transmit data between firms.

There is no question that end-to-end fiber optics will dominate high-volume traffic for large business users, but whether and when it is deployed to other users is still hotly debated. For example, many argue that it is not necessary to provide a broadband, fiber loop to every home. Few residential users demand services that require such a broadband capability. Telephone lines are adequate for currently offered services, such as home shopping, financial transactions, and access to a multitude of information services such as Prodigy and CompuServe, interactive information services. Nevertheless, telephone companies have been making a case for deploying fiber-optic lines all the way to the home. They argue that if they are permitted to deliver video to the home, they could provide switched, on-demand video to fund the deployment of fiber optics. They further assert that once the fiber is fully deployed to the home, they can offer additional services at low incremental costs. There is concern, however, that the telephone companies have been unable to specify what additional services will be offered. Likewise, some panelists express concern that the local telephone companies will pay for fiber from the general body of telephone service customers through regulated rates, regardless of demand.

Many—primarily competitors—view telephone companies' interest in fiber optics as a strategy to get into the video market—a market already well established by cable and broadcast. Cable companies are currently adding fiber-optic backbone trunk lines, thus improving signal quality and expanding channel capacity. According to John Sie of Tele-Communications, Inc., cable is likely to have fiber closer to the home sooner than any telephone company. Cable currently passes about 90 percent of U.S. households, and about 60 percent of those households subscribe.

“The road to stagnancy is paved with people who have said that we do not need this or that.”

Many panelists assert that regardless of the telephone companies' motivations for deploying fiber, the United States needs a broadband, ubiquitous network. They further assert that we should not deter technological advances simply because we cannot now determine all

¹The House of Representatives recently approved legislation to build and support the National Research Education Network—a high-speed network linking colleges and universities, letting them access supercomputer databases and share information.

future applications and services. According to Irwin Dorros of Bellcore, "the road to stagnancy is paved with people who have said that we do not need this or that." More and more people are using the communications network for more than making telephone calls. Today, 35 million people in this country are working at home, according to Jan Suwinski of Corning, Inc., and that number is growing every year. More important, once the fiber-optic network is in place, new services and applications can be offered at low incremental costs.

A few panelists are concerned that much of the discussion about development of the communications infrastructure focuses on technology, without regard to how the information will be used. The debate about "fiber to the home" is more than technology; it is about the transformation of American society into an information society. According to Carl Cargill of Digital Equipment Corporation, the technology used is unimportant; what is important is how we use the information once it reaches the home and what goals we want to accomplish. Is it democracy? Is it to better educate our citizens? Is it market dominance? Today, managers have entire data bases on their desks; they are, according to Mr. Cargill, up to their eyeballs in information but have no idea how to convert that information into knowledge. An effective transition into the information age requires that policymakers establish long-range goals for the use of information—"what people need from information, what they want, and what America must have" to be competitive. Once this is decided, industry can then determine the appropriate technology—whether fiber optics, cable, or copper wire—to get us there.

Is Investment in the Infrastructure Adequate?

Some panelists are concerned about the level of investment in the U.S. communications infrastructure. According to William Davidson of the University of Southern California, investment in the U.S. infrastructure is lagging behind that of other countries such as France, Japan, and the United Kingdom, which are moving much more quickly to deploy modern communications networks. Dr. Davidson further states that some attribute the lower level of investment to the advanced status of the U.S. network; the network does not require large investments, whereas other countries are investing heavily to catch up.² Other panelists, however, assert that the difference in investment levels results from much of the investment being made in private networks—communications systems operated for the sole purpose of business users.

²William H. Davidson, Ph.D., *A Comparative Assessment of National Public Telecommunications Infrastructures*, Management Education Services Associates, Inc. (Redondo Beach, CA, 1990).

“The question is not really whether we’re behind or whether we’re ahead, but whether there are any artificial impediments to the private sector’s being able to respond to customers’ needs in the business and residential sectors.”

According to Charles Oliver of the National Telecommunications and Information Administration (NTIA), however, “the question is not really whether we’re behind or whether we’re ahead, but whether there are any artificial impediments to the private sector’s being able to respond to customers’ needs in the business and residential sectors.”

One such impediment to investment in the public network, according to several panelists, is current depreciation policy. Most panelists agree that the current policy does not reflect economic reality, hampering technological modernization in the public network. Most modern telecommunications equipment, such as digital switches, is software-driven and should reflect a faster depreciation schedule, similar to that of computer equipment. In addition, businesses can depreciate their telecommunications equipment faster than telecommunications providers, thereby enabling them to recover equipment costs in fewer years and better maintain modern communications systems. While accelerated depreciation may stimulate investment in the network, according to some panelists, it could also increase costs to the consumer.

Another concern is that the development of private communications systems may be siphoning investment from the public network. Many large businesses are investing in their own private communications systems because the high-speed, broadband capabilities that they need are not available from the public network. Some panelists assert that this growth in private networks is attributable to low investment in the public communications infrastructure. Still other panelists agree that the artificially high rates charged to business users by the local telephone companies have forced these users to find alternatives. Regardless, as major corporations develop highly sophisticated communications networks, those dependent on the public network may become disadvantaged. As large businesses flock to alternative communications systems, they take with them the largest share of network traffic. Thus, many fear that the reduction in network traffic will dramatically reduce revenue to the local telephone companies, resulting in diminished network investment. According to Dr. Davidson, building private communications networks at the expense of the public network is like “building . . . great corporate jets without any landing strips.”

Radio Spectrum: Demand High, Availability Low

The radio spectrum—the medium that makes possible wireless communications such as television, cellular telephones, and satellites—is a critical component of the communications infrastructure, essential to the social and economic development of the nation. Spectrum use is also essential to government functions such as national defense, air traffic control, and weather forecasting. However, with many incumbent and potential users competing for a share, the spectrum is becoming an increasingly scarce resource. As technology and economic growth increase demand for the spectrum, U.S. policies must maximize spectrum use by promoting efficient and technologically innovative ways of employing the spectrum while serving users' needs.

Responsibility for spectrum allocation and management is divided between two federal agencies—the Federal Communications Commission (FCC) and NTIA. Although these agencies generally operate independently, they closely coordinate spectrum matters. The FCC is responsible for managing and allocating the spectrum for private-sector use; its process is open to public participation and court review. NTIA is responsible for managing and allocating the spectrum for the government—a large user. NTIA is assisted in this effort by the Interdepartment Radio Advisory Committee (IRAC)—composed of representatives of user agencies and the FCC. This process is not open to public participation. The spectrum is generally allocated in blocks for nationwide use by one or more services, such as television broadcasting or land-mobile radio. Users—for example, a television station—do not pay a fee for the spectrum allocated to them.

The development of new technologies—such as cellular telephones—has increased demand for the spectrum, and at the same time, given rise to problems in the current block-allocation process. Under this process, the spectrum is essentially “free” and thus users have little or no incentive to use less. Therefore, incumbent users who have substantially invested in the equipment to use the spectrum allocated to them see little benefit in spending additional funds to switch to new technologies and equipment that are more spectrum-efficient. As a result, little spectrum is being freed up for use by new technologies and services.

Many panelists favor a less rigid allocation process that would provide recipients flexibility in using the spectrum. Dale Hatfield of Hatfield Associates, Inc. believes that one way to eliminate the rigidity of block allocations is to provide incumbent users the flexibility to use the spectrum in any way that permits them to reap its highest value. Potentially,

frequencies used in one part of the United States for broadcast television could be used for cellular telephones in another part of the country. While most favor this approach, Barry Umanksy of the National Association of Broadcasters prefers the current block-allocation system, stating that it provides certainty for consumers and manufacturers.

"We don't give public safety free gasoline; we don't give public safety free ambulances; and I'm not so sure why we necessarily, as a matter of public principle, have to give it free spectrum."

Panelists also suggest allocating the spectrum through auctions. Auctions permit a more efficient use of the spectrum by introducing economic factors into the process and allowing users to make more rational choices about spectrum use. Some critics of this proposal, however, argue that market-based systems such as auctions could negatively affect public safety and be potentially disadvantageous to small users. Public safety users such as police departments and fire departments might not be able to effectively compete with large, wealthy firms. In response, however, Mr. Hatfield points out that we do not give public safety departments free ambulances or free gasoline, and questions why we should then give them free spectrum. While it may be possible to set aside some spectrum for public safety use, some believe that doing so will perpetuate the inefficiencies inherent in providing free spectrum.

In recent years, the crowding of the spectrum has generated controversy about the government's use of the spectrum. As stated in a recent NTIA report, some have criticized the closed nature of the government's spectrum management process, largely due to closed meetings of the IRAC, which assists NTIA in implementing its spectrum management responsibilities.³ The perceived closed nature of this process raises suspicions on the part of nongovernment users that federal spectrum use is inefficient.

Most panelists agree that the inherent inefficiencies of free spectrum provide little incentive for government agencies to use the spectrum efficiently. As an example, according to a Motorola official, many government agencies have only recently begun using trunking—a technology used for land-mobile radio that provides spectrum efficiency. Given the growing demand for the spectrum and the alleged misuse of the spectrum by government agencies, most of the panelists support reallocating a portion of the government spectrum for private-sector

³U.S. Spectrum Management Policy: Agenda for the Future, NTIA Special Publication 91-23, U.S. Department of Commerce (Washington, D.C., February 1991).

use. Recently, legislation was introduced in both the House of Representatives and the Senate to reallocate 200 megahertz of government spectrum to the private sector.⁴ Reallocating government spectrum, however, will not be without cost. Moving government users to different parts of the spectrum may require different technical standards and equipment.

Increasing scarcity of the spectrum has generated controversy about over-the-air broadcasters' use of the spectrum. Broadcast is a large—and some say a very inefficient—user of the spectrum. As a result, a few panelists suggest that broadcast programming be transmitted over a closed transmission medium such as cable or fiber optics, thus freeing the spectrum for other uses. However, this proposal raises questions about the social value of over-the-air broadcast as a unique component of the communications infrastructure. The broadcast system is universal, and it is free to the consumer. With a penetration rate of 97 percent, many agree that over-the-air broadcast serves important social goals. According to George Vradenburg, formerly of CBS, Inc., broadcast television provides daily news and information to the American public, informing them about what is going on in their own country and the world around them. Transmitting broadcast programming over cable systems, for example, as some have suggested, eliminates the benefits of a free, universal service.

Is the Current Market Structure Still Effective?

In the past most communications services were offered by relatively few firms (e.g., one telephone system and three television networks). Traditionally, the FCC and state public utilities commissions (PUCs)—federal and state authorities with regulatory responsibility for the communications industry—regulated these firms to prevent them from abusing their power. However, technological developments and liberalized market entry have created a much more competitive communications environment. Although these regulated firms continue to dominate their respective markets, unregulated competitive suppliers now exist in nearly every type of service. This competitive environment raises the question: When will competition in these markets be sufficient to allow for deregulation of dominant providers? Further, as technological advances continue to expand and integrate communications services, issues concerning the regulatory jurisdictions of federal and state authorities take on increased significance.

⁴In June 1991, the House Energy and Commerce Committee and the Senate Commerce Committee passed legislation (H.R. 531 and S. 218, 102nd Congress, 1st Session) to reallocate some of the spectrum reserved for government use.

Regulation and Competition: A Delicate Balance

“What does regulation do except make the incumbent inefficient?”

Competition in the long distance telephone market has increased substantially over the last decade. Businesses and individuals can now choose their long distance carriers. Although competition has increased, however, American Telephone and Telegraph Company (AT&T) is still considered a dominant carrier and therefore continues to be subject to rate regulation, while its competitors are not. While the panelists agree that the market is becoming more competitive, some believe that this asymmetrical regulatory environment—regulating AT&T and not its competitors—is necessary, at least for a period of time. According to John Hoffman of US Sprint, the rules have to be different because the position of the carriers is different. Although asymmetrical regulation is not necessary forever, there must be a reasonable transition to a fully competitive market because AT&T, as the dominant carrier, has the market power to price its competitors out of the market. Robert Crandall of the Brookings Institution disagrees, however. He argues that regulation only makes the incumbent—AT&T—inefficient. He does not believe that totally deregulating AT&T will cause it to behave predatorily against its more efficient competitors. Regulation creates further inequities in an increasingly competitive marketplace.

While the trend has been toward increased competition in the long distance market, its introduction into the local telephone market has been more limited. Although the Bell operating companies continue to dominate the local market, some firms—Teleport, Inc. and Metropolitan Fiber Systems—provide competitive communications services to businesses, which represent the largest and most profitable share of network traffic. These alternative service providers generally connect businesses directly to their long distance carriers, bypassing the local phone company. Although these firms compete with the Bell operating companies for business customers, Robert Atkinson of Teleport Communications Group states that there isn't any effective competition in local services because alternative service providers do not have the same interconnection to the local exchange. Therefore, the Bell operating companies' control of the local exchange frustrates competition and provides inherent advantages to local telephone companies. According to Mr. Atkinson, this is very similar to the situation that existed prior to divestiture where the Bell operating companies provided AT&T with superior interconnection to the local network compared to its competitors. The ultimate result was divestiture.

Dr. Crandall states that the Bell operating companies' incentive to behave anticompetitively—for example, by not allowing competitors equal interconnection—derives largely from their status as regulated

firms.⁵ Typically, state PUCs structure local rates so that urban rates subsidize rural, and business rates subsidize residential. Marta Greytok of the Texas Public Utilities Commission asserts that such subsidies are necessary to provide telephone service to many rural customers and promote universal service. For this reason, state regulators have traditionally been concerned about competition in the local telephone exchange, fearing that competition will undermine these subsidies and thereby threaten universal service. In spite of state regulators' concerns, however, competition—such as that offered by alternative service providers—has begun to develop in the local market. As a result, telephone companies are finding it difficult to compete with unregulated providers who are free to offer more attractive rates to the business community. In the telephone industry's favor, Dr. Crandall argues that it is not necessary "to provide huge subsidies from a group defined as 'urban businessmen' . . . to a group called 'rural residential subscribers' in order to maintain universal service." Several panelists assert that while there may be a need to subsidize certain users, the current rate structure subsidizes many ratepayers who have the ability to pay. As a result, some panelists propose the use of targeted subsidies to those truly in need. According to Dr. Crandall, competition should be viewed as a mechanism by which prices are pushed toward cost and by which costs are pushed down through the adoption of new technologies and more efficient techniques. Therefore, before effective competition can be introduced into local services, local rates must be restructured.

Although competition has increased in local services, the consent decree that led to the breakup of the Bell system, known as the Modified Final Judgment (MFJ),⁶ currently prohibits the Bell operating companies—which represent the largest providers of local services—from engaging in competitive communications services such as long distance and information services⁷ and the manufacture of communications equipment. The introduction of competition, however, has raised concerns as to

⁵Robert W. Crandall, *After the Breakup: U.S. Telecommunications in a More Competitive Era*, The Brookings Institution (Washington, D.C., 1991).

⁶*United States v. AT&T*, 552 F.Supp. 131 (D.D.C. 1982), *aff'd*, 460 U.S. 1001, 103 S. Ct. 1240 (1983). See also *United States v. Western Electric Co.*, 569 F. Supp. 990 (D.D.C. 1983) and *United States v. Western Electric Co.*, 569 F. Supp. 1057 (D.D.C. 1983), *aff'd* 464 U.S. 1013, 104 S. Ct. 542 (1983). The MFJ is subject to triennial review.

⁷U.S. District Court Judge Harold Greene recently agreed to allow regional Bell operating companies to provide information services to homes and businesses over the telephone lines. Judge Greene simultaneously stayed the order, however, to permit all appeals to be heard.

whether these restrictions should be continued. According to Dr. Crandall, as long as the Bell companies have a bottleneck on local connections, they may use this bottleneck to frustrate competition if they are permitted to offer any services other than local access-exchange services. This is due, largely, to their regulated status. With regulation, the Bell operating companies may attempt to “fool the regulators” by shifting costs from the competitive market to the unregulated market, thereby raising regulated rates and subsidizing its thrust into a competitive market.⁸ Because of this potential for cross-subsidization, Leland Johnson of RAND Corporation suggests replacing rate-of-return regulation with price caps.⁹ Unlike rate-of-return regulation that allows the telephone companies to raise rates in response to a change in costs, price caps permit local telephone companies to raise or lower prices in accordance with inflation and productivity factors. Price-cap regulation is believed to be preferable to rate-of-return regulation because it severs the relationship between rates and costs, and encourages investment by rewarding the telephone company for improved efficiencies.¹⁰ Even with price-cap regulation, however, Dr. Johnson believes that competitive services should be separated from regulated services to prevent cross-subsidization. Some states have already implemented price caps, and the FCC has adopted price caps for AT&T.

The mass media market has also changed dramatically with the introduction of cable. Broadcast—a single channel service—once dominated the mass media market. While regulations were established to offset the monopoly power of the networks and to promote diversity of information in the marketplace, broadcast is now competing in a multi-channel world. Not only do broadcast stations compete with other broadcast stations in a particular market, they also compete with 30- or 40-channel cable systems. Furthermore, cable networks can retransmit broadcast signals without reimbursement to the broadcast stations, while collecting subscriber fees. According to Thomas Herwitz of Fox Television Stations, Inc., cable operators have total control over all programming that goes into cable houses because they maintain the gateway, yet they are regulated much differently. Only broadcast continues to be subject to federal regulation.

⁸After the Breakup: U.S. Telecommunications in a More Competitive Era.

⁹Price caps limit telephone rate increases to the rate of inflation minus a productivity growth factor.

¹⁰Leland L. Johnson, Price Caps in Telecommunications Regulatory Reform, RAND Corporation (Santa Monica, CA, January 1989).

Federal and State Jurisdictional Issues

The Communications Act of 1934 divided telecommunications regulation, giving jurisdiction over interstate telephone communications to the FCC and intrastate communications to the states. The communications infrastructure, however, is an integrated system and it is difficult to distinguish between interstate and intrastate communications services. Henry Geller of the Markle Foundation asserts that this federal/state dichotomy could frustrate the implementation of a national communications policy. Some of the obstacles to implementing a national policy can be seen in the judicial response to the FCC's Computer III inquiry. In the Computer III decisions, the FCC reversed its earlier practice of requiring the Bell operating companies to establish separate subsidiaries to provide enhanced services, and replaced it with cost allocation controls and other safeguards designed to prevent anticompetitive behavior. The FCC also preempted almost all state regulation of the sale of enhanced services by communications common carriers and established network access requirements leading to an open network architecture to ensure that the Bell operating companies would provide their competitors the same type of network access provided for their own enhanced services. In a recent court case, however, the Ninth Circuit Court of Appeals found that the FCC lacked adequate support for the reversal of its structural separation policy and had failed to justify the necessity for its preemption of state regulation of intrastate enhanced services. The court vacated the FCC's Computer III orders and returned them to the FCC for further proceedings.¹¹

Some of the panelists believe that federal leadership is essential for a strong national communications industry, and therefore support federal preemption of state regulations. According to Mr. Geller, the federal government should be permitted to preempt the states where state regulations have effects beyond the state border that interfere with full effectuation of a federal policy. Even though some panelists support federal preemption in some cases, they recognize the important role that states play as laboratories for communications policy. For example, a number of states took the lead on regulatory reform, including the adoption of price caps.

Observations

Communications is clearly critical to the social and economic well-being of our nation. However, current marketplace dynamics are rapidly changing, stimulated by the convergence of communications and computing, the proliferation of new technologies and services, and the

¹¹People of the State of California v. F.C.C., 905 F.2d 1217 (9th Cir.) 1990.

movement toward an increasingly global economy. These developments have given rise to concern about the adequacy of the United States' communications policy framework, creating for policymakers both challenges and opportunities.

This rapidly changing environment requires fundamental changes to the way communications policy is developed and implemented. Because of converging technologies, it is no longer possible for policymakers to address individual technologies and modes of communication separately. Communications technologies are inextricably related, such that actions in one industry or technology reverberate in others. Rather, the communications infrastructure should be viewed as a set of interrelated technologies that moves and distributes information. Similarly, as global markets continue to expand, it is no longer possible to separate domestic and international decisions affecting communications. Domestic decisions affecting communications technologies have ramifications far beyond our national borders, just as domestic policies of foreign nations affect the growth and development of our communications industry.

In the same way that lines between different technologies and between domestic and international issues are blurring, it is also becoming more difficult to distinguish between federal and state jurisdictions. As a consequence, federal and state authorities need to develop mutual goals for the infrastructure—an infrastructure that has become so critical to U.S. competitiveness and economic development. While states often serve as laboratories for change and are sometimes in the best position to respond to unique communications problems within their own borders, a clear communications vision and overall policy for this country can probably be best developed at the federal level. In developing such a policy, decisionmakers should not focus on specific technologies (such as fiber optics) but, rather, on goals for the use of the communications infrastructure. What is needed to make the United States more competitive? How will the information be used by individuals? With defined goals, industry can best determine the appropriate technologies that will enable them to be met.

Policymakers and regulators can aid industry in this process by identifying and eliminating artificial impediments that could frustrate industry's efforts to invest in the public infrastructure and serve users' needs. After all, while many private firms can invest in their own communications networks, it is the public network that ultimately underlies

all networks and links us to the rest of the world. Policymakers and regulators must balance this need for technological innovation and investment in the public infrastructure with social goals, such as universal service and free access to important sources of information.

Conference Panelists

Panel 1:

Communications Infrastructure

Carl F. Cargill
Senior Staff Consultant to the Manager of Corporate Standards
Digital Equipment Corporation

Irwin Dorros
Executive Vice President, Technical Services
Bellcore

Stanley S. Hubbard
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Vincent Mosco
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Carleton University

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Subcommittee on Science, Technology, and Space
Senate Committee on Commerce, Science, and Transportation

Kenneth L. Phillips
Chairman
Committee of Corporate Telecommunications Users

John J. Sie
Senior Vice President
Tele-Communications, Inc.

Jan H. Suwinski
Executive Vice President, Opto-Electronics Group
Corning, Inc.

George Vradenburg III
former Senior Vice President, General Counsel, and Secretary
CBS, Inc.

Panel 2:

Communications Policy,
Economic Development,
and Global Competition

Kenneth W. Bleakley
Senior Deputy Coordinator and Director of the Bureau for
International Communications and Information Policy
Department of State

Diane J. Cornell
Legal Assistant for Telecommunications
Federal Communications Commission

William H. Davidson
Professor
University of Southern California

Kent B. Foster
President of Telephone Operations
GTE

Henry Geller
Communications Fellow
Markle Foundation

Leland L. Johnson
Senior Economist
RAND Corporation

Charles M. Oliver
Senior Policy Adviser
National Telecommunications and Information Administration

Panel 3:

Spectrum Management

Dale N. Hatfield
President
Hatfield Associates, Inc.

Leonard S. Kolsky
Vice President and Director, Regulatory Affairs for
Government Relations
Motorola, Inc.

Morgan E. O'Brien
Chairman of the Board, General Counsel, and Director
Fleet Call, Inc.

Richard D. Parlow
Associate Administrator, Office of Spectrum Management
National Telecommunications and Information Administration

Thomas P. Stanley
Chief, Office of Engineering and Technology
Federal Communications Commission

Barry D. Umansky
Deputy General Counsel
National Association of Broadcasters

Panel 4:

Market Structure and
Competition

Robert C. Atkinson
Senior Vice President, Regulatory and External Affairs
Teleport Communications Group

Robert W. Crandall
Senior Fellow
Brookings Institution

**Appendix I
Conference Panelists**

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Telecommunications Affairs Manager
GE Information Services

Marta Greytok
Commissioner
Texas Public Utilities Commission

Thomas R. Herwitz
Vice President and General Manager
Fox Television Stations, Inc.

John R. Hoffman
Senior Vice President for External Affairs
US Sprint

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