



[Image Credit](#)

THE GLOBAL INFORMATION INFRASTRUCTURE: AGENDA FOR COOPERATION

Ronald H. Brown, [Secretary of Commerce](#)
Chair, Information Infrastructure Task Force

Larry Irving, Administrator
National Telecommunications and Information Administration
U.S. Department of Commerce
Chair, IITF Telecommunications Policy Committee

Arati Prabhakar, Director
National Institute of Standards and Technology
U.S. Department of Commerce
Chair, IITF Committee on Applications and Technology

Sally Katzen, Administrator
Office of Information and Regulatory Affairs
Office of Management and Budget
Chair, IITF Information Policy Committee

THE GLOBAL INFORMATION INFRASTRUCTURE: AGENDA FOR COOPERATION

Table of Contents

[PREFACE](#)

[I. INTRODUCTION](#)

- [A. Technological Convergence and the New Information Age](#)
- [B. New World Vision through Communications: The GII as a Product of Technological Convergence and Competition](#)
- [C. Cornerstone of the GII: A Community of Global Interest](#)

[II. BUILDING A FOUNDATION FOR THE GII - FIVE BASIC PRINCIPLES](#)

- [A. Encouraging Private Investment](#)
- [B. Promoting Competition](#)
- [C. Providing Open Access](#)
- [D. Creating a Flexible Regulatory Environment](#)
- [E. Ensuring Universal Service](#)

[III. ENCOURAGING THE USE OF THE GII](#)

- [A. Information Policy & Content Issues](#)
- [B. Applications: Delivering the Benefits of the GII](#)

[IV. IMPLEMENTING THE GII](#)

[V. CONCLUSION](#)

[APPENDIX A - SUMMARY OF RECOMMENDATIONS](#)

[APPENDIX B - GII HEARING TESTIMONY](#)

[APPENDIX C - GII KEY CONTACTS](#)

Version 1.0

PREFACE

Let us build a global community in which the people of neighboring countries view each other not as potential enemies, but as potential partners, as members of the same family in the vast, increasingly interconnected human family.

With these words, Vice President Al Gore introduced the U.S. vision for the Global Information Infrastructure (GII) at the first World Telecommunication Development Conference in March 1994.

The Conference, held in Buenos Aires, Argentina, signalled a new undertaking by the International Telecommunication Union (ITU). Vice President Gore called upon every nation to establish an ambitious agenda to build the GII, using the following five principles as the foundation:

- o Encouraging private sector investment;
- o Promoting competition;
- o Providing open access to the network for all information providers and users;
- o Creating a flexible regulatory environment that can keep pace with rapid technological and market changes; and
- o Ensuring universal service.

Leaders from the world telecommunications community incorporated these five principles into the ITU's "Buenos Aires Declaration on Global Telecommunication Development for the 21st Century."

The purpose of this *GII: Agenda for Cooperation* is to amplify these five principles and to identify the steps the United States, in concert with other nations, can take to make the vision of the GII a reality. We hope that it will also serve as the basis for engaging other governments in a consultative, constructive, and cooperative process that will ensure the development of the GII for the mutual benefit of all countries.

In proposing this initiative, we recognize that market forces and technological advances have already begun to expand existing interconnections among our respective nations:

- o Current state-of-the-art fiber optic systems can now transmit the equivalent of 80,000 simultaneous telephone conversations over a single optical fiber and will soon carry 320,000 conversations over a fiber pair;
- o Advances in digital compression have vastly improved the

- performance and capacity of existing networks by allowing more volume, including data and video, to be transmitted;
- o Advances in computer technology will soon offer storage capacity so great that an individual using a hand-held device will be able to carry the informational equivalent of a small library and remotely access many times this amount; and
 - o New digital wireless systems and proposed constellations of telecommunications satellites have the potential to provide telephone and data services to any point on the planet.

A nascent GII already exists. What we seek is a superior GII, one that has higher capacity, is fully interactive, faster, and more versatile. One that is less expensive to use than existing systems, and more accessible to all the people of the world. But our goal is not merely technological advancement - more bandwidth, faster switching, more powerful processing capability, and greater compression and storage capacity. We view technology not as an end in itself but as the means through which the GII can realize its potential to improve the well-being of all people on this planet.

This *Agenda for Cooperation* sets forth the U.S. Government's vision for developing a GII that can yield the benefits described above and more. It identifies specific areas where intergovernmental, as well as government-private sector, cooperative efforts are needed. Also identified are proposals for concrete actions that the United States can take, by itself or with other nations, to accelerate the pace of development of the GII. While we believe the private sector will build, own, and operate the GII, governments have the power to take actions that can either accelerate or retard its development. We believe that a concerted and coordinated international effort can achieve the former and avoid the latter, and we invite other countries to join us in this cooperative venture.

I. INTRODUCTION

A. Technological Convergence and the New Information Age

As we approach the end of the twentieth century, information is a critical force shaping the world's economic system. In the next century, the speed with which information is created, its accessibility, and its myriad uses will cause even more

fundamental changes in each nation's economy.

These changes will be the result of technological convergence of the previously distinct telecommunications, information, and mass media industries. Boundaries that once separated the types of networks used to deliver voice, data, and video services are increasingly blurred. In a digital world, these services can be combined and offered over the same transmission system.

Multiple networks composed of different transmission media, such as fiber optic cable, coaxial cable, satellites, radio, and copper wire, will carry a broad range of telecommunications and information services and information technology applications into homes, businesses, schools, and hospitals. These networks will form the basis of evolving national and global information infrastructures, in turn creating a seamless web uniting the world in the emergent Information Age. The result will be a new information marketplace, providing opportunities and challenges for individuals, industry, and governments.

B. New World Vision through Communications: The GII as a Product of Technological Convergence and Competition.

The Clinton Administration has made the development of an advanced [National Information Infrastructure](#) (NII) and the GII top U.S. priorities. A major goal of the NII is to give our citizens access to a broad range of information and information services. Using innovative telecommunications and information technologies, the NII -- through a partnership of business, labor, academia, consumers, and all levels of government -- will help the United States achieve a broad range of economic and social goals.

Similarly, other governments have come to recognize that the telecommunications, information services, and information technology sectors are not only dynamic growth sectors themselves, but are also engines of development and economic growth throughout the economy. With this realization, governments have sharply focused their public policy debates and initiatives on the capabilities of their underlying information infrastructures. The United States is but one of many countries currently pursuing national initiatives to capture the promise of the "Information Revolution." Our initiative shares with others an important, common objective: to ensure that the full potential benefit of advances in information and telecommunications technologies are realized for all citizens.

The GII is an outgrowth of that perspective, a vehicle for expanding the scope of these benefits on a global scale. By

interconnecting local, national, regional, and global networks, the GII can increase economic growth, create jobs, and improve infrastructures. Taken as a whole, this worldwide "network of networks" will create a global information marketplace, encouraging broad-based social discourse within and among all countries.

The GII will depend upon an ever-expanding range of technology and products, including telephones, fax machines, computers, switches, compact discs, video and audio tape, coaxial cable, wire, satellites, optical fiber transmission lines, microwave networks, televisions, scanners, cameras, and printers -- as well as advances in computing, information, and networking technologies not yet envisioned.

But the GII extends beyond hardware and software; it is also a system of applications, activities, and relationships. There is the information itself, whatever its purpose or form, e.g., video programming, scientific or business databases, images, sound recordings, library archives, or other media. There are also standards, interfaces, and transmission codes that facilitate interoperability between networks and ensure the privacy and security of the information carried over them, as well as the security and reliability of the networks themselves. Most importantly, the GII includes the people involved in the creation and use of information, development of applications and services, construction of the facilities, and training necessary to realize the potential of the GII. These individuals are primarily in the private sector, and include vendors, operators, service providers, and users.

The GII will both stimulate and respond to global demand for new information technologies and services.^{/1/} The GII can offer consumers in each country unprecedented access to information from a variety of sources on a global basis. With appropriate changes in regulatory structure, the GII can also help usher in an environment more responsive to user demands by providing companies opportunities to offer any information or telecommunications product or service to any customer, rendering obsolete past regulatory labels or technological niches.

The business community has become the principal force for the pro-competitive restructuring of telecommunications and information markets. Business users, whose commercial activities are becoming increasingly global, require access to advanced services at higher speeds and capabilities, and at lower costs, to manage their global operations effectively. When the national carriers cannot provide the unified international networks and services that companies need to conduct business and research,

frustrated users develop their own international "private" networks, often leasing private lines from different national carriers. However, these private networks -- even the most sophisticated -- still suffer from the high cost of leased lines in most countries and the difficulties inherent in attempting to create global networks based on a patchwork of services subject to widely varying capabilities and regulation.

The scientific and academic communities also have stringent demands for access to information resources and powerful computing capacity around the world. The international research and academic community was instrumental in developing the Internet, an already global mass of interconnected computer networks. The astonishing growth rate of the Internet network -- over ten per cent *per month* for more than five years -- is just one indication of the growing demand for and supply of digital information.

C. Cornerstone of the GII: A Community of Global Interest

The nations of the world are diverse in size, levels of economic development, political, economic and social structures, and language and culture. We believe, however, that despite these differences a broad community of interest exists among countries to better the lives of the citizens of the world -- *all citizens*. Regardless of a country's overall level of technological development, active participation in the evolving GII can provide the tools to improve the quality of life.

For example, the GII can facilitate health care delivery through telemedicine, linking rural physicians to major medical facilities for off-site consultations on difficult diagnoses. If only a computer and a wireless link are available, they can provide a data base search and on-line questioning of a consulting expert. If fiber optic networks are available, telemedicine services can include remote visual examination. Such services are a boon to rural physicians. Similarly, the GII can quicken response time for disaster relief. It can transform education with computer-based multimedia systems that teach with both sight and sound, greatly increasing retention rates and providing children access to greater educational opportunities. It can provide new tools to assist persons with disabilities. The GII can also make factories more efficient, speed the creation of new and better goods and services, cut the cost of business by improving efficiency, develop new jobs and markets, increase trade, and facilitate flows of information across borders.

That is not all. A well-developed GII can enhance democratic

principles and limit the spread of totalitarian forms of government. Representative democracy is founded on the premise that the best political processes are those in which each citizen has the knowledge to make an informed choice and the power to express his or her view. The GII will allow wider and greater citizen participation in decision-making by providing the additional means for individuals to keep informed, as well as to express their opinions. Through the GII, the world's citizens will have the opportunity to share information and cultural values, fostering a greater sense of global community. By encouraging exchanges of ideas, goods, and services among all countries, the GII can contribute to a framework for lasting peace.

Realizing these benefits will not be easy -- our vision of the GII presents a challenge that cannot be undertaken by a single country, nor overcome by government fiat. Rather, its success will depend in large measure on innovation and investment by the private sector. As the principal source of expertise and capital, the private sector should, in response to marketplace demands, determine what technologies to pursue, set the pace of development, establish the appropriate standards, and develop new services and applications. For their part, governments can facilitate these activities by creating a legal and regulatory environment that supports efficient investment and innovation, and promotes full and fair competition. Governments can also provide leadership by supporting testbeds for new technologies, fostering the transfer of resulting technologies to the private sector, promoting the assimilation and use of applications and technology through government procurement, and developing applications that support government operations and dissemination of government information.

II. BUILDING A FOUNDATION FOR THE GII -- FIVE BASIC PRINCIPLES

The United States believes that five basic principles -- encouraging private investment, promoting competition, providing open access to networks and services for providers and users, creating a flexible regulatory environment to keep pace with technological and market developments, and ensuring universal service -- should serve as the foundation for the development of the GII. In our view, this foundation will facilitate information infrastructure development in individual countries and the interconnection of networks on a global basis. It will also accelerate development of useful applications, and increase sharing of information among people around the world. We believe these principles apply

equally to the telecommunications, information technology, and information services industries. In partnership with the private sector and all users, we believe that governments should take action to *adopt, apply, and advance* these principles at national, regional, and global levels.

A. Encouraging Private Investment

Given the facts that the worldwide market for information technology, products, and services is currently valued at \$853 billion, and that worldwide investment in telecommunications infrastructure alone is expected to exceed \$200 billion by 2004, both developed and developing countries need to find ways to share in this growth and prosperity. Attracting private sector investment is the most effective way for countries to do so -- as well as to improve their networks and services, promote technological innovation, and succeed within the competitive global economy. The reasons extend beyond the purely financial: In addition to providing inflows of capital, private investment also stimulates development of new technologies, equipment, services, new sources of information, and managerial skills*all of which help speed infrastructure growth and improvements, increase efficiency in the provision of services, and permit greater responsiveness to consumer needs.

To attract greater investment from both domestic and foreign sources into their telecommunications sectors, nations are adopting a variety of approaches, ranging from revenue sharing initiatives and joint ventures to direct foreign investment, licensing of privately-owned competitors, build-operate-own or -transfer schemes, and privatization of government-owned public telecommunications operators. Countries as diverse as Chile, India, Jamaica, Japan, Malaysia, New Zealand, the United Kingdom, the United States, and Venezuela have encouraged multiple private companies to provide telecommunications services, drawing in private investment to varying degrees and leading to lower service prices and improved communication.

In other countries where privatization is not currently considered a politically viable option, governments have taken steps to attract foreign investment in the form of joint ventures for the provision of new services, such as cellular telephone and Very Small Aperture Terminal (VSAT)-based overlay networks for business users. Some countries have permitted lease and franchise arrangements that include private expansion of part of the telecommunications infrastructure, often allowing the private equity share in the network operation to build up over time. Although providing fewer benefits than full privatization might, these approaches can also be attractive to private investors, and

they provide quantifiable benefits -- new lines, upgraded switching capabilities, new services and sources of information, and lower costs to consumers.

The need for capital investment is particularly acute in countries with underdeveloped telecommunications infrastructures, where limited government resources often make private financing a necessary complement. To attract private capital, many countries that seek to improve their information infrastructures, which will improve interconnection to the evolving GII, are taking concrete steps to:

- o Create a stable operating environment supported by transparent regulation;
- o Establish fair and open bidding practices for all communications and information infrastructure projects;
- o Recognize the return on capital that potential investors require;
- o Establish sound repatriation policies; and
- o Demonstrate a political commitment to private investment through appropriate modifications in the legal framework.

The information services sector, traditionally privately-owned, has experienced tremendous growth due to the largely open investment and competitive market environments in most countries around the world. In the United States, for example, the largely unregulated information services market is projected to have reached \$135.9 billion in revenues in 1994.[/2/](#) Removing barriers to private investment -- and providing incentives for the creation and dissemination of information services through effective protection of intellectual property rights -- is the best means of sustaining this worldwide growth.

Recommended Action

From the wide range of available options, governments can develop a strategy best suited to their particular needs. At the same time, they must institute the appropriate regulatory, legislative, and market reforms to create the conditions necessary to attract private investment in their telecommunications, information technology, and information services markets. To facilitate this process, the United States will join with other governments to:

- o Identify and seek to remove barriers to private investment, and develop policies and regulations that improve investment incentives in both growing and mature telecommunications and information markets;
- o Ensure that applicable laws, regulations, and other legal

- rules governing the provision of telecommunications and information services and equipment are reasonable, nondiscriminatory, and publicly available;
- o Engage in bilateral, regional, and multilateral discussions to exchange information on the various options that have been successfully pursued to attract private investment, including, but not limited to, privatization, liberalization, and market reforms;
 - o Work with major international lending institutions, such as the World Bank and the regional development banks, and major private financial institutions to determine the best means of attracting both private and public capital, and establish workshops to train officials in the different liberalization approaches; and
 - o Encourage international lending institutions to recognize the ways in which funded social projects, such as the delivery of education and health care services, can be advanced through improved information infrastructures.

B. Promoting Competition

Nationally and internationally, the information technology and information services markets have flourished in the past decade. The highly competitive computer equipment, software and networking industries are among the most dynamic in global markets, providing users with steadily increasing computing power and functionality and stimulating further demand for more advanced, integrated capabilities. Similarly, the information services industry has expanded as barriers to cross-border trade and investment have been removed. In many countries there are few or no restraints on the services provided. In other markets there are varying, but fairly light, degrees of regulation. As a result, the world market for information services is expected to grow from \$275 billion in 1993 to \$465 billion in 1998, a growth rate of 11 percent annually. [/3/](#)

One important exception has been a tendency in a few countries to erect barriers to foreign competition in entertainment programming services. There is no body of evidence that limiting foreign competition has been successful in achieving the desired effect of stimulating local entertainment programming industries. The effects of such measures in retarding the development of private investment in infrastructure also deserves greater attention.

In contrast to the liberal market and regulatory environment for information technology and information services, the pace and scope of liberalization and privatization in the telecommunication sector is varied, ranging from competition in

particular market segments to full liberalization. For example, there has been a discernable trend over the past decade toward increased competition in the provision of both value-added services and telecommunications terminal equipment. Some countries have liberalized further, taking steps to open their long distance, local fixed telephony, cellular, communications satellite, cable, and broadcast markets.

Evidence of positive results from such increased competition is mounting: Networks have steadily incorporated innovative technologies, producing greater efficiencies; both residential and business users enjoy lower prices and greater choices in equipment and services; service providers are more responsive to user needs; and lower costs of service have stimulated increased network usage.

However, in the largest and most profitable market segments -- basic public voice telephone services and the underlying network infrastructure -- both competition and foreign investment have been restricted. Maintaining barriers against potential new entrants in these markets will inhibit infrastructure deployment. Moreover, these barriers will retard the introduction of new information and telecommunications services that require competitive access to underlying networks in order to flourish.

Competition in basic telecommunications services has been growing, however, in a number of key markets around the globe. In countries such as Australia, Canada, Chile, Japan, New Zealand, Sweden, the United Kingdom, and the United States, the introduction of alternative service providers and networks, which often deploy advanced technologies at lower costs, has reduced bottleneck control by the dominant facilities-based providers. These results have spurred other countries to reconsider their policies. The member countries of the European Union (EU), for example, have agreed to introduce competition in the provision of basic telecommunications services and infrastructure by 1998. The EU considers these steps to be critical to advancing the goals of their action plan to create a European Information Society.

Increasingly, countries with national monopoly operators have begun to question whether they can compete effectively in the dynamic international telecommunications market. Difficulties in raising capital and in meeting users' demands for low cost, sophisticated network capabilities and services are forcing a reconsideration of the monopoly approach to telecommunications. A recent Organization for Economic Cooperation and Development (OECD) study comparing the relative cost of providing international service among OECD members found that the performance of countries with competitive international markets

was superior to the average of all OECD members. Furthermore, the OECD study revealed that the quality of service had improved simultaneously with the implementation of competition. [/4/](#)

Competition within the communications satellite market has also burgeoned. The intergovernmental International Telecommunications Satellite (Intelsat) and International Mobile Satellite (Inmarsat) organizations now face competition from several separate satellite systems, including Astra, Columbia, AsiaSat, Orion, and PanAmSat. Due in part to competitive pressures from these separate satellite systems and from alternative technologies, serious consideration is being given to restructuring both Intelsat and Inmarsat. Each of these organizations is engaged in an internal effort to review a range of options for reorganization, from reform of the cooperative model, to corporatization, to full privatization.

As governments liberalize particular market segments, regulators, operators, and new market entrants must grapple with evolving definitions of the boundary between those networks and services reserved to the monopoly operator and those open to competition. During the transition from monopolistic to competitive telecommunications markets, incumbent operators still play a dominant role as network infrastructure providers. Incumbent operators not only control underlying facilities and services that new entrants often need to deliver their services, but frequently compete directly with these new service providers in particular market segments. In these circumstances, effective competition cannot emerge and flourish unless incumbents are subject to competitive safeguards while they maintain market power over critical bottleneck facilities and services.

Competitive safeguards serve two main purposes. Some are intended to eliminate or reduce barriers to entry for new service providers that are seeking to challenge the incumbent operator. Other safeguards serve to ensure that incumbent firms with market power do not employ anticompetitive means to prevent or hinder the development of truly competitive markets. Market entry opportunities are effective only if the incumbent service provider is required to compete fairly. For this reason, some administrations have required incumbent carriers to permit resale of their networks and services. Resale provides an important source of competition in markets in which telecommunications infrastructure costs are high. Similarly, market entrants that choose to provide facilities-based services in competition with the incumbent service provider typically will need to interconnect their facilities with a dominant service provider's network. In a pro-competitive environment, the terms and condition of interconnection would be reflected in published

rates that include nondiscriminatory cost-based access charges and technological "equal access" to bottleneck facilities.

Incumbent carriers may also be required to "unbundle" network facilities and services so that telecommunications and information service providers can order only those elements of the dominant provider's network they need to provide a service. Finally, establishment of a transparent regulatory scheme open to all interested parties, and administered by a regulatory authority independent of the incumbent service provider, helps ensure that rules governing competition are fair and that private investment is given a reasonable degree of security.

While the political challenges posed by attempting to restructure the telecommunications market are significant, the increased opportunities provided by introducing competition far outweigh the potential difficulties of pro-competitive market reform. Further, the interconnection of competitive national information infrastructures can increase the pace of development of the GII. The more competitive an information and telecommunications market, the more productive will be its interaction with other markets participating in the development of the GII.

Recommended Action

The most effective means of promoting a GII that delivers advanced products and services to all countries is through increased competition at local, national, regional, and global levels. To that end, the United States will join with other governments to:

- o Assess, through information exchanges and existing multilateral organizations, the positive experiences of different countries in introducing competition and progressively liberalizing their telecommunications, information technology, and information services markets;
- o Work constructively to remove barriers to competition in telecommunications, information technology, and information services markets;
- o Include timetables for increased competition in basic telecommunications infrastructure and services in national information infrastructure development plans, and, as an interim step, increase the pace of liberalization through the expansion of resale;
- o Encourage new entrants by adopting competitive safeguards to protect against anticompetitive behavior by firms with market power, including measures designed to prevent discrimination and cross-subsidization;

- o Implement specific regulations to facilitate competitive entry in the telecommunications sector, including the following essential elements: 1) interconnection among competing network and service providers; 2) "unbundling" of bottleneck facilities of dominant network providers; 3) transparency of regulations and charges; and 4) nondiscrimination among network facilities operators and between facilities operators and potential users, including resellers;
- o Ensure that government-sponsored technical training activities incorporate programs specifically related to the development of pro-competitive markets and regulations (including such issues as competitive safeguards and interconnection);
- o Pursue a successful conclusion to the General Agreement on Trade in Services (GATS) discussions on basic telecommunications to obtain the opening of markets for basic telecommunications services through facilities-based competition and the resale of services on existing networks on nondiscriminatory terms and conditions; and
- o Consider the full range of options for promoting competition in Intelsat and Inmarsat, including: 1) pursuing changes designed to increase the operational efficiency of Intelsat and Inmarsat, retaining their fundamental intergovernmental character, but substantially reducing the scope of the current intergovernmental agreements by removing provisions that convey unfair advantage and inhibit efficient functioning; 2) transforming the organizations into private corporations; and 3) transforming the organizations into multiple private service providers that compete with one another, as well as with others. In selecting among these options, the goal must be to enhance competition and not diminish it.

C. Providing Open Access

Achieving the goal of a global information market will require government action to ensure that all information service providers have access to facilities, networks, and network services on a nondiscriminatory and low cost basis. By ensuring open access to facilities and networks, and thus promoting competition, governments can dramatically increase the availability of information services to all consumers.

Maximizing consumer choice among diverse sources of information should be the primary objective. As the information needs among consumers will vary, both within and among nations, attempts to predict the information resource requirements of citizens should

be avoided. Rather, governments should foster market and regulatory climates conducive to the broadest possible access to and distribution of information. As countries accelerate the development of their respective information infrastructures, more and more consumers will seek access to networks and services that cross national and international boundaries. Improving consumer access to diverse sources of information has direct social and economic benefits. The ability to generate, exchange, and use information, technology, and ideas is central to economic growth and development, increased competitiveness in a range of industries, and to the improvement of the quality of life.

An essential technical element of the open access concept is interoperability, *i.e.*, the ability to connect applications, services, and/or network components so that they can be used together to accomplish tasks. As the GII will be based on many different existing and emerging components at local, national, and global levels, it is imperative that these components be interoperable. The key to interoperability is the development of global standards. We believe such standards should be voluntary and developed through a process that is largely market-driven and that takes into account the views of both the large and well established and the smaller, newer market players.

Three principal international standards organizations involved in the development of information technology and telecommunications standards are the International Organization for Standards (ISO), the International Electrotechnical Commission (IEC), and the International Telecommunication Union (ITU). The ISO and IEC develop information technology standards through the ISO/IEC Joint Technical Committee 1, while the ITU concentrates on telecommunications standards. Further, there has long been coordination and collaboration between the ISO/IEC Joint Technical Committee 1 and the ITU, which has helped minimize the duplication of standards development work and the possibility of conflicting information technology and telecommunication standards.

The vast majority of countries adhere to the processes of developing international standards and the resulting recommendations from all three organizations. In the U.S., and increasingly in other countries, the private sector plays an essential role in these international standards development processes by providing the technical expertise and resources to develop standards at national and international levels.

It may also be constructive to consider encouraging greater collaboration and cooperation both domestically and internationally among the different standards bodies, including

less formal organizations. In recent years in the United States, a significant number of new standards consortia, whose principal focus is in the standards implementing arena, have been established outside of the traditional national standards development organizations. These new consortia have often sped up the widespread adoption of internationally generated standards, and their memberships have included small and medium-sized companies.

Given the convergence of technologies and the rapid changes in national and international market structures, the development and acceptance of voluntary, international standards are critical to the development of the GII. The international standards organizations and their memberships must redouble their efforts to ensure that standards are developed that assist the rapid delivery of information. Moreover, the pace of the work in international bodies must continue to increase to better reflect marketplace needs for technological development, so as not to impede the realization of the GII. In the absence of timely development and implementation of standards on a global basis, the benefits of improved interoperability will be delayed.

Recommended Action

In partnership with the private sector, governments can take action to improve access to facilities and networks, and promote the availability of a wide range of diverse services and information, including strong support for the development of international standards that promote interoperability. To achieve these goals, the United States will join with other governments to:

- o Develop appropriate policies that encourage increased access by citizens to diverse sources of information;
- o Provide unrestricted and equitable access to networks for providers and consumers of services and content, based on sound commercial practices;
- o Hold regular bilateral and multilateral dialogues on ways of increasing the flow of information across borders to facilitate greater access to content by consumers;
- o Encourage an open, voluntary standards-setting process that does not denigrate intellectual property rights and which includes the participation of a broad group of interests, including the private sector, consumers, and, as appropriate, government agencies;
- o Work through regional and international bodies to increase the pace of consensus-based, voluntary, and transparent standards development and adoption, and to promote the broad dissemination of standards-related information;

- o Work together and with national, regional, and international standards bodies to identify priority areas for increased coordination among different private national and international bodies in support of interoperability of networks and services on the GII.

D. Creating a Flexible Regulatory Environment

Policymakers worldwide face a daunting challenge: Creating an appropriate regulatory regime that minimizes regulation and fosters competition through transparent rules and processes and is sufficiently flexible to be responsive to changing technologies and markets. As the pace of technological innovation quickens, this will become increasingly difficult and yet increasingly necessary.

With the U.S. experience as our guide, we offer the following observations about the characteristics of telecommunications legislation that are necessary to respond to changes in this dynamic sector. The optimal regulatory and legislative frameworks will:

- o Identify the goals and objectives of the law, including the promotion of competition;
- o Be sufficiently flexible to permit the introduction of new services and technologies without requiring amendments to the legislation;
- o Delegate broad powers to a regulatory authority independent of a national operator and charge that independent authority with keeping abreast of technological and market developments;
- o Establish a transparent and open process whereby the public and interested parties are informed and can participate in rulemaking and adjudicatory proceedings; and
- o Aim towards open market access based on nondiscrimination principles.

We recognize that regulatory reform can take many paths. Some countries have established a regulatory entity responsible for both formulating and implementing telecommunications and mass media policy, as well as overseeing the activities of these sectors. Others have relied on the separation of operational and regulatory functions of the government-owned and/or franchised national operator, with government bodies assuming responsibility for regulatory decisions. Still others rely more heavily on national competition law and policy for oversight.

Regardless of the regulatory model that countries adopt, regulations should clarify the respective rights and obligations

of incumbent operators and new entrants. New market entrants need assurances that incumbent operators will not be allowed to use their dominant market positions to hinder the evolution of successful competition. Similarly, public and transparent regulatory processes create stable commercial environments, which are necessary to attract private investment. As such, rules and regulations should clearly indicate:

- o The scope of permissible competition, *e.g.*, the particular market segments open to new entrants;
- o The means by which new entrants can gain market access, *e.g.*, private investment, licensing requirements, and cross-border services;
- o The nondiscriminatory terms and conditions of interconnection to an incumbent operator's network and of supplying information services over the network; and
- o The procedures by which new entrants and users can bring complaints and obtain redress from the regulator, *e.g.*, enforcement mechanisms.

Additionally, it is critical that a pro-competitive regulatory regime ensure:

- o The establishment of other structural or nonstructural safeguards to protect against the anticompetitive exploitation of market power by the incumbent service provider to the detriment of the new entrants;
- o The appropriate balancing of public service obligations among operators/carriers;
- o Charging and pricing policies that are based on the costs of providing service; and
- o The efficient, effective, and pro-competitive management of scarce resources, especially the radio frequency spectrum.

In light of the increasing demands on the radio spectrum for the introduction of new wireless communications systems and services, the last point merits particular emphasis. Among these new technologies, none better embodies the need for an open regulatory model embracing competition and careful management of the spectrum than the nascent hand-held mobile satellite services. If these services are to achieve their global potential, cooperation among national spectrum regulators will be required, as will a willingness to permit multiple market entrants to ensure that new satellite services do not become the exclusive property of a sole provider.

Governments should avoid burdensome regulation that stifles innovation and new service offerings. Governments must guard against the expansion of regulation into market segments that

have not traditionally been subject to regulations and that have functioned extremely well on an unregulated basis. The examples of Australia, Canada, and the United States in computer and business information services are illustrative. They are among the leading nations in personal computer penetration rates among consumers. Not coincidentally, they also provide an open, dynamic, and almost totally unregulated market for information technology and services. Equally important, while some government regulation is necessary as a marketplace transitions from a monopoly to a competitive structure, once competition is achieved, continued regulation can be unnecessary or even counterproductive in promoting efficiency, innovation, and customer responsiveness. In short, governments must be prepared, and must invest their regulatory agencies with the authority, to adjust regulatory structures as the demands of the marketplace and technology require.

Just as national regulatory environments need to be responsive to emerging market and technological developments, so too must the overarching international environment continually adapt to new developments. The successful efforts of governments and industry to improve global interconnectivity and liberalize international telecommunications demonstrate the value of working together in various international fora to promote progressive and flexible national regulations. These efforts must continue.

Recommended Action

Although national regulatory environments necessarily reflect the specific social, economic, and political needs of each individual country, the essentially global nature of the markets for telecommunications, information technologies, and information services require that national regulations be responsive to global developments. The United States will join with other governments to:

- o Re-examine and adapt regulations and legislation to accommodate market and technological developments at national and global levels in support of the five GII principles;
- o Create, through regulatory and/or legislative reform, a pro-competitive, technology-neutral regulatory environment to maximize consumer choice, to provide fair access to networks, and to stimulate infrastructure development, the introduction of new services, and the wider dissemination of information;
- o Exchange views and information on national regulatory and legislative initiatives and seek to identify common challenges and options for developing flexible and

transparent regulations in support of the development of the GII;

- o Work collectively in regional and international organizations to convene meetings devoted specifically to encouraging the adoption of regulatory policies that will promote the GII; and
- o Encourage creation of independent national regulatory authorities for telecommunications separate from the operator that shall promote the interest of consumers and ensure effective and efficient competition. Such authorities should have sufficient powers to carry out their missions and should operate with transparent decisionmaking processes that are open to all interested parties.

E. Ensuring Universal Service

The goal of providing access and affordable service to all members of society is fundamental to the development of the GII. The definition of universal service, however, necessarily varies from country to country -- ranging from the provision of high quality telephone service to every home and business in most industrialized countries to access to a public telephone in many developing countries.

The ability to provide universal service on a national basis depends upon a number of factors, including the level of infrastructure development, the reach and technological capabilities of national networks, and the cost of access to the network and services. Other factors to be considered include the availability and use of advanced methods of network planning and maintenance, and explicit performance and service quality goals.

The definition of universal service is also being expanded by the advent of digital technologies. In many countries, including the United States, policymakers face increasing pressure to expand universal service beyond "plain old telephone service" to include a broader array of new telecommunications and information services. In fact, universal service has always been an evolutionary concept, expanding as the capabilities of the network and the types of service demanded by the great majority of users have increased. For example, in the United States fifty years ago, a party-line was deemed sufficient for universal service purposes; now an individual line for each subscriber is generally viewed as a component of universal service, together with such features as direct dialing for long distance calls and 911 emergency service.

In both developed and less developed countries, wireless technologies can help meet the needs for both basic and more

advanced services. For example, by augmenting terrestrial-based facilities with satellite facilities and services, national networks can maximize their potential. The point-to-multipoint and mobile communications capabilities of satellites, which are global in reach, permit the extension of services to even the most remote regions.

Moreover, in helping meet universal service goals, one option for governments to consider is the establishment of community "access points." For example, institutions such as schools, libraries, or hospitals could be equipped with basic and advanced information and communications technologies for use by members of the public. Such community access points would facilitate the efficient provision of broader public access to a core set of services.

Although several countries have raised concerns that competition diverts revenues from the public operator and undermines its ability to provide universal service, experience shows that access to the telephone has been improved in the most liberal national markets. In the United Kingdom, for example, many customers are ordering a telephone for the first time largely because increased competition -- cable television companies are now offering telephone service -- has made it more affordable. In the United States, concerns were raised a decade ago that increased competition in the provision of long distance services, which had traditionally subsidized basic local rates, would threaten universal service. These concerns abated as competition spurred innovation and price reductions, which in turn have expanded universal service. Further, studies by the OECD indicate that telephone penetration has not been eroded in any member country that has introduced infrastructure competition. The OECD concluded, "Universal service has not been impaired by market liberalization; [rather] facilities competition can be applied to complement and enhance universal service." [/5/](#) Indeed, many now argue that full and open facilities-based competition, by reducing prices, is the most effective way to promote universal service.

As together we strive to expand the worldwide telecommunications infrastructure and build the GII, we must all keep the goal of universal service constantly in mind. With significant decreases in the costs of information transmission and processing, the creation of the Information Society has the potential to improve the quality of life of all citizens. Recognizing that information leads to empowerment, the nations of the world must work together to ensure that as many citizens as possible in all societies have access to the resources of the Information Age.

Recommended Action

Although the provision of universal service varies from country to country, the goal of providing all people with greater access to both basic and advanced services is a crucial element of the GII. The United States will join with other governments to:

- o Consider, at the local and national levels, the benefits afforded by the introduction of competition and private investment in meeting and expanding universal service;
- o Exchange information at the bilateral and multilateral level to address the range of available options to meet universal service goals; and
- o Consider, at the national and international levels, ways to promote universal access as a means of providing service to currently underserved and geographically remote areas.

III. ENCOURAGING THE USE OF THE GII

While we believe that the adoption, application, and advancement of the five core principles are necessary to create an environment in which the GII can realize its full potential, such actions alone are insufficient to guarantee it. Regardless of the sophistication of the technology or services being offered, users must be assured that they can allow the GII entry into their homes, offices, and lives to access and share information safely and without forfeiting any of their rights. Governments, companies, and public-interest groups, by working together on information policy and content issues, must address these concerns.

An equally important task for governments and private sectors is to demonstrate the potential benefits of the GII to citizens. It is only when people see tangible results of applications that they will begin to appreciate how it can be used to improve their lives. This appreciation is the key to stimulating demand for the services and content of the GII, which in turn will provide the impetus to remove institutional and regulatory barriers to its full utilization.

A. Information Policy & Content Issues

Developing an effective information policy will provide governments with perhaps their greatest challenge. The central objectives of information policy include ensuring that: 1) the privacy of individuals and organizations using the GII is protected; 2) the security and reliability of the networks and

the information that passes over them are preserved; and 3) the intellectual property rights of those who create the information, education, and entertainment content are protected. To assure the growth of an information infrastructure accessible and accountable to the citizens of the world, governments must develop and implement these objectives in close partnerships with each other and with representatives from business, labor, academia, and the public.

1. Privacy Protection

By bringing news and information to people on a global basis, and thereby allowing them to communicate more freely with each other, communications technologies serve a democratizing function. These same technologies also permit both governments and the private sector to transmit, process, and store vast amounts of information about individuals. While these capabilities are increasingly essential for governments to function effectively and for businesses to operate efficiently, questions continue to grow about an individual's right to privacy and the accompanying responsibilities of holders and transmitters of this information to safeguard this right.

In many nations, the past two decades have seen the primary gatherers and users of personal data shift from government entities to private sector firms. In the 1970's and 1980's, businesses were quick to exploit the explosive growth in low cost, high performance computers, adapting this technology to a wide range of economic, financial, and marketing applications. As electronic commerce spread during the 1980's, there was growing recognition that the electronic transfer of data across national boundaries required an international consensus on individual privacy protection.

In 1980, the OECD developed and adopted a set of voluntary privacy guidelines that were accepted by its 24 member countries. In 1981, the Council of Europe, whose membership consists of the European Union Member States and other European countries, adopted "fair information practices" similar to those of the OECD to regulate the collection, storage, and automated processing of personal data, and transborder data flow. Both the OECD and Council of Europe privacy guidelines, which generally recognize that the free flow of information is critical to transborder economic activity, provide a framework for domestic legislation that has been used by both member and non-member nations. They also recognize diverse means of protecting information privacy, including self-regulation and industry codes of conduct. The North American Free Trade Agreement (NAFTA) and the General Agreement on Trade in Services (GATS) Annex on Telecommunications

also contain provisions that recognize national privacy protection regulations.

The United States and other countries around the world are re-examining existing privacy policies to ensure that they apply comprehensively to the transfer of personal data over global networks. A balanced privacy policy -- preserving the individual's right to privacy while maintaining the free flow of information across national borders -- is important to the development of global networks and services. Working together, nations should ensure that the transport of personal data adequately takes into account the following agreed-upon international privacy principles:

- o Personal data should be collected only for specified, legitimate purposes;
- o The dissemination, sharing, and reuse of information should be compatible with the purposes for which it was originally collected;
- o Personal data should be accurate, relevant, and up-to-date;
- o Individuals should be informed how personal data will be used and should be allowed to examine and correct this information; and
- o Transmission of personal data should not be unduly restricted or subject to burdensome authorization procedures.

Recommended Action

In order to foster consumer confidence in the GII and to encourage the growth of interconnected global networks, users must feel that they are afforded adequate privacy protection. To this end, the United States will join with other governments to:

- o Identify key privacy issues that need to be addressed in relation to the development of national and global information infrastructures;
- o Work with both the public and private sectors to achieve consensus on a set of fair information principles for the collection, transfer, storage, and subsequent use of data over national and global information infrastructures;
- o Ensure that privacy protection does not unduly impede the free flow of information across national borders;
- o Share information on new privacy protection policy developments and on new technologies and standards for privacy protection; and
- o Encourage the use of voluntary guidelines developed by international bodies, such as the OECD, as the best means of ensuring the protection of privacy on an international basis.

2. Security and Reliability

A network as vast and complex as the GII will pose difficult security challenges for all nations. The same modern technology that makes communication faster and easier also makes communications systems vulnerable to ever greater security risks. These risks are not new -- most are well-known among security managers. What is new is that these risks are much more widespread, are potentially much more serious, and affect a population of users who do not have the information or training to deal with them.

The anonymous and impersonal nature of computer crime, for example, makes this problem particularly unsettling, for legal systems depend upon their ability to identify the malfeasors. Yet serious violation of privacy or property rights can be accomplished by destruction or alteration of information by anonymous individuals in remote locations, with not a fingerprint in sight. The technical challenges of protecting the privacy and integrity of information stored in computer systems are even greater than those that apply to information transmitted by telephone. And as was true with the telephone, legal as well as technological solutions are needed.

Security includes the integrity, confidentiality, and reliability of the networks and of the information they carry. If users do not believe that an information infrastructure is a trustworthy, reliable system, they will be reluctant to use it, thereby diminishing its value. To gain maximum benefit from global networks, users must be confident that the messages they receive are authentic, that sensitive information is available only for authorized use, and that unauthorized users cannot access, alter, or destroy information.

In addition to protecting the security of information that is transported over the GII, governments and industry must guarantee the reliability of the network itself. In the event of breakage or service interruption, network operators must work quickly and cooperatively to repair damage and provide backup systems to minimize the duration of any such interruptions. To have a truly global infrastructure, greater emphasis must be placed on resolving reliability concerns, including such issues as network performance, network connections and interoperability, the development of new technology, and regional and demographic differences in reliability.

Recommended Action

To promote the development of a secure and reliable GII, the United States will join with other countries to:

- o Work collectively to increase the reliability and security of national and international information infrastructures;
- o Initiate a broad international dialogue among users, providers, and all other participants in the GII on issues related to protecting the confidentiality and integrity of information transmitted and stored on global networks;
- o Exchange information and encourage further cooperation within regional and international organizations such as the ITU and the OECD on measures to ensure network security and reliability, including the sharing of outage information;
- o Share information regarding the best means available to advance security goals while not impeding progress on other GII principles, such as the promotion of competition and open access; and
- o Exchange information about, and accelerate efforts to develop new technologies needed to improve the security of the GII (e.g. encryption, digital signatures, and firewalls.)

3. Intellectual Property Protection

Protection of intellectual property rights is essential to the development of a successful GII. In order to promote creativity and provide the broadest possible access to the world's media and information sectors under viable commercial conditions, countries will need to protect the creative content of the GII -- text, images, computer programs, databases, video and sound recordings, as well as multimedia products.

Providing for adequate and effective protection of intellectual property in the digital environment requires complex legal and technical solutions. Some of these solutions may be viewed as controversial by some users of the system. However, the cost to society of inadequate intellectual property protection far outweighs these concerns. Inadequate protection of intellectual property discourages the creation of copyrighted works, creates barriers to innovation, stifles the use of new applications, and diminishes foreign investment. It jeopardizes the work of researchers, creative artists, and a wide variety of entrepreneurs.

It goes without saying that if creative works are not adequately protected, their creators will be reluctant to permit them to be distributed over the GII. For this reason, rightsholders must not be compelled to license rights to their works. Instead, GII

participants should cooperate to find legal, market-based alternatives to compulsory licensing. Reliable and efficient means of transferring intellectual property rights must also be assured. They might, for example, adopt various licensing arrangements, such as on-line and off-line licensing, direct licensing, and voluntary collective licensing. More sensitive issues, however, may have to be addressed on an individual basis. For example, licensing of rights may be done on a per-use, per-work, or other basis. Licensing of rights for multimedia works, which involve a number of copyrights - not all of them with obvious attributions - could be facilitated by special licensing arrangements.

Recommended Actions

The GII cannot achieve its promise if authors, producers, and other content creators are not guaranteed adequate protection of their intellectual property rights. To achieve this protection, the United States will join with other governments to:

- o Cooperate in national, bilateral, regional and international fora (such as the World Intellectual Property Organization) to achieve high levels of intellectual property and technical protection in order to guarantee to rightsholders the technical and legal means to control the use of their property over the GII;
- o Ensure that voluntary licensing regimes provide rightsholders and potential users of copyrighted works maximum flexibility in negotiating the conditions governing the use of copyrighted works, eliminate compulsory licensing, and guard against the imposition of standards that would impede the free-flow of information;
- o Provide effective enforcement against the unauthorized use of a copyrighted work (infringement), including severe legal penalties and vigilant monitoring. Enforcement is particularly critical as technological innovations jeopardize the existing ability of rights holders to protect their works;
- o Encourage the development and use of technological capabilities and safeguards, such as software envelopes, headers, assurances of authenticity, and encryption methods to complement existing copyright management techniques and prevent infringement at all levels. Cooperative efforts to develop testbeds, define standards, and construct infrastructure components for these safeguards should be encouraged, as should measures to prevent or render illegal the use of devices to overcome these safeguards; and
- o Work in collaboration with intellectual property-based industries towards greater efforts to educate others about

the importance of intellectual property protection.

B. Applications: Delivering the Benefits of the GII

Given that the value of the GII will be determined by how people benefit from it, governments must cultivate active participation by consumers and businesses in the application of new technologies. By working together in creative partnerships, the public and private sectors can apply information and telecommunications technology to a variety of critical and complex issues: improving productivity and economic growth in an increasingly competitive and interdependent global economy; providing adequate health care; ensuring the development of workforce skills through education and training; providing equitable access to information through public institutions, such as libraries; enhancing leisure-time activities; protecting natural resources and the environment; and ensuring the delivery of government services and information.

Many governments are already examining ways to promote the development of the information infrastructure and to demonstrate, through pilot projects and testbeds, the myriad benefits of new technologies. In the United States, the National Information Infrastructure (NII) initiative includes a Federal matching grant program that provides support for planning and demonstration projects initiated by state and local governments and non-profit entities in such fields as health care and education.^{/6/} The U.S. NII initiative also includes a number of other federally supported applications in the areas of environmental monitoring, digital libraries, international transportation and trade, and the electronic dissemination of government information.^{/7/}

The reach of applications being developed around the world can be expanded internationally through collaborative projects among commercial entities, academic institutions, and private, voluntary, and multilateral organizations. International applications have the unique potential to permit countries not only to bring diverse global resources to bear upon local problems and needs, but also to find solutions to needs that transcend national boundaries, such as environmental monitoring and global trade and commerce.

These applications can transform the possibilities of the GII into realities for citizens around the world. What follows is an illustrative, but not exhaustive, list of examples that demonstrate the value of expanding collaborative efforts in the development of international applications:

- o Distance learning projects can make available a wealth of

- educational resources to improve local educational and training capabilities, offering cost-saving, effective alternatives to overseas studies;
- o Computer networks linking medical school libraries and remote sites can improve the delivery of health care services, particularly to rural communities, by expanding access to demographic, epidemiological, and medical reference materials. In Zambia, district hospitals are being linked for clinical consultation, distance learning, health literature dissemination, and epidemiological data exchange. African medical libraries are linking up with libraries overseas for research and document delivery services;
 - o Satellite and radio-based systems that collect and disseminate health statistics can be used to identify underserved segments of the population and to target those areas for expanded delivery of family health services;
 - o Remote sensing can be used to identify and protect important ecological systems. The Administration is promoting an international partnership, known as Global Learning and Observation to Benefit the Environment (GLOBE), that will allow children all over the world to collect and share environmental data. Students will work with teachers and environmental scientists to expand knowledge about weather, air and water chemistry and quality, biodiversity, and other "vital signs" of the Earth. The combined data will be transformed into striking "pictures" of the entire planet, allowing each student to see how their school's observation is an important part of the global environment;
 - o Computer and satellite networks can provide monitoring and, in some cases, early warning of natural disasters, allowing for better coordination of humanitarian assistance efforts between host and donor countries, speeding the delivery of aid and assistance. In the South Pacific, the PEACESAT satellite network has been used to coordinate emergency assistance after typhoons and earthquakes, and to summon medical teams during outbreaks of cholera and dengue fever;
 - o Computerized market price data for agricultural and horticultural products can provide new agribusiness opportunities and can facilitate direct links between exporters and clients;
 - o Access to international markets, particularly for small and medium sized businesses, can be created by providing electronic access to information such as transportation schedules and costs, insurance and customs data. The United Nations Conference on Trade and Development (UNCTAD) trade points system uses electronic data interchange and other technologies to establish a network of trade points around the globe. In Algeria, for example, the introduction of a computer-mediated trade point has stimulated an increase in

- the number of companies involved in international trade from twenty to 2,500;
- o Electronic data interchange technologies, which can reduce the administrative cost of international trade transactions by as much as twenty per cent, can help companies increase productivity by streamlining manufacturing and service delivery. Through industry-led consortia such as CommerceNet, companies can explore collaborative engineering, on-line catalogs of products and services, and mechanisms for electronic payments;
 - o Scientists can continue to explore the use of "collaboratories," tools and virtual environments that allow scientists to work together without regard to space or time. Scientists need the ability to share data and the tools for data analysis, visualization, and modeling, to control remote instruments, and to communicate with their colleagues;
 - o Using the World Wide Web, individuals and institutions all over the globe have begun to create distributed "virtual libraries" on specific subjects. As these opportunities continue to grow, tools for information discovery and retrieval and protection of intellectual property rights will become increasingly important.

In our view, public-private sponsorship of GII pilot projects and testbeds is worthwhile. It will help identify and address a number of technical, policy, and regulatory barriers to the realization of the GII. These include issues of privacy, security, interoperability, and intellectual property protection, as well as artificially high prices for telecommunications services and outdated rules and regulations designed for paper-based transactions. A strategy that concentrates on "learning by doing" is far more likely to resolve these barriers.

The roles played by governments, the private sector, academic institutions, and non-profit organizations will vary depending on the nature of the application. In some cases, such as global electronic commerce and entertainment services, the private sector should take the lead, while in other areas, such as international public health, cooperation between public health agencies, hospitals, clinics, and universities would be appropriate. Whatever the application, governments must recognize that while they can play an important catalytic role in fostering international collaboration, they should not attempt "top-down" management of this process. The Administration hopes and expects that many of the best ideas for global cooperation will bubble up from the grassroots with little or no government involvement.

Successful applications will set in motion a continuous cycle of

demand that will encourage future development of the GII. Demonstrating the power of the GII to successfully address pressing problems will stimulate consumer demand for a variety of products and services at affordable prices. This demand will provide the necessary incentive for the private sector to broaden the reach and expand the capabilities of the GII, enhancing its ability to deliver benefits to people and again increasing demand. As a "network of networks" linking people and information, the GII can leverage the collaborative potential of existing efforts and provide real solutions to existing and emerging global issues.

Recommended Action

International applications are the best way to demonstrate the potential power of the GII to affect lives all over the world. The United States will join with other countries to:

- o Support, along with the private sector, the initiation of pilot projects and testbeds that demonstrate the benefits of the GII, in areas such as electronic commerce, health care, digital libraries, environmental monitoring, and life-long learning, with opportunities for participation by both developed and developing countries;
- o Cooperate in the facilitation of electronic information exchanges in support of global trade and commerce;
- o Facilitate the sharing of information in the public domain with other countries on government-funded and private sector applications projects to promote a broader understanding of the diversity of technology that can be applied to meet various public needs;
- o Encourage the assignment of a higher priority for innovative applications of information technology, which will encourage increased use of the GII;
- o Encourage private sector-led efforts to develop application-level standards (e.g. data interchange formats, application program interfaces) to ensure interoperability at the application level; and
- o Work constructively to assess and eliminate the barriers to the development and deployment of GII applications. [/8/](#)

IV. IMPLEMENTING THE GII

The various approaches governments have taken in response to the technological convergence of telecommunications and information industries have resulted in the development of asymmetric markets

and regulatory environments around the world. These asymmetries often impede the cross-border transfer of services and information among business users, entertainment providers, and consumers. The United States believes that these differences can be overcome, in part through the work of market forces and technological developments, but also in part through collective agreement among all countries to adopt, advance, and apply the core principles of the GII. By working through existing international and regional organizations, and engaging in bilateral efforts, government and industry can remove obstacles blocking the effective development of the GII.

Multilateral organizations will play a vital role in this effort. In particular, the International Telecommunication Union (ITU), the Organization for Economic Cooperation and Development (OECD), the International Organization for Standardization (ISO), and the World Intellectual Property Organization (WIPO) are uniquely able to contribute practical solutions to problems affecting the development of the GII.

As the preeminent international organization dealing with telecommunications issues, the United Nations' ITU was the first multilateral forum in which the GII was discussed. With its broad membership of 185 developed and developing countries, the consensus-based ITU serves as a global forum for technical discussions ranging from voluntary standards development and frequency allocation activities to network development. Accomplishments already achieved under ITU auspices in technical telecommunications and development issues suggest that the ITU can play a significant role in the GII development process.

The OECD, an international think tank which undertakes economic research on various aspects of its members' economies and policy concerns, has been constructively addressing telecommunications and information policy issues for several years. Its policy and statistical analyses have contributed to a broader understanding of the economic benefits of liberalization in the information and telecommunications sectors.

Organizations such as the ISO and the WIPO, which deal with specific cross-sectoral issues, can serve as important fora to discuss and advance issues of open access and information policy. For example, any changes made to bilateral or regional intellectual property regimes may ultimately become issues in the WIPO.

In addition, both Intelsat and Inmarsat, the treaty-based satellite communications organizations that have played a significant role in advancing global telecommunications, are now

contemplating options for restructuring. Because of these organizations' broad international memberships, they could serve as useful fora for review of commercialization alternatives.

The General Agreement on Tariffs and Trade (GATT) is a multilateral agreement setting out the rules and principles by which countries trade, primarily in the area of goods. The Uruguay Round of GATT negotiations led to the establishment of the World Trade Organization (WTO), which deals with services, investment, and intellectual property -- areas that substantively affect telecommunications trade. The General Agreement on Trade in Services (GATS), under the new WTO, includes an Annex on "access to and use of" the telecommunications networks of WTO members, and includes substantive commitments from a number of parties on value-added telecommunications services. More generally, the GATS "access to and use of" telecommunications annex applies to all services for which countries have scheduled market access commitments. Now that it is in effect for the U.S. and most of its major trading partners, the GATS can substantially reinforce the principles of the GII. In addition, there are on-going negotiations, to be concluded by April 1996, to liberalize basic telecommunications services through the Negotiating Group on Basic Telecommunications.

Regional organizations also have important roles in achieving regional consensus on issues pertaining to telecommunications and information markets. Organizations such as the Inter-American Telecommunication Commission (CITEL) of the Organization of American States (OAS), the Asia Pacific Economic Cooperation (APEC), the Southern Africa Transportation and Communications Commission (SATCC) and the European Conference on Postal and Telecommunications Administration (CEPT), among others, frequently serve as fora for the exchange of valuable information and as test sites for implementation of the most expedient and beneficial policies. These bodies also serve as effective vehicles for improving and enhancing network development and technical cooperation among participants on a regional basis.

Finally, plurilateral and bilateral dialogues can be arranged among and between nations to focus on particular issues. In addition to the deliberations in regional and international organizations, these discussions can become building blocks for cooperation as together we seek to construct a truly global GII. For example, the G-7 Ministerial Conference scheduled for February 1995 is one of several such opportunities for focused, high-level discussion of the Global Information Infrastructure.

As important as these international governmental organizations

are, perhaps even more important are the numerous formal and informal groups within the private sector. These groups, which range from international trade organizations to professional associations to advocacy groups to industry-led standard-setting bodies, provide communication channels between the people who will actually build and use the GII. Such private sector groups facilitate the international teaming and strategic alliances that will ensure the development of a truly seamless "network of networks," rather than a patchwork of incompatible systems and services.

V. CONCLUSION

As Vice President Gore noted in Buenos Aires, it is possible to create a global information network that transmits messages and images with the speed of light from the largest city to the smallest village. Through the interconnection of disparate but interoperable networks, these information highways will allow us to communicate as a global community -- giving individuals, businesses, and economies greater access to each other and to a wider range of information. Equally important, the GII will offer governments an unprecedented opportunity to equalize global disparity in telecommunications and maximize the economic and social benefits of the Information Age for their citizens.

Harnessing the global potential of information and communications technologies to this end will require collaboration among the industries that will build, operate, provide, and use services and information available over the evolving national networks. It will also require cooperative efforts among countries, working together bilaterally, regionally, and through multilateral organizations, to facilitate the interconnection of their respective networks and the sharing of information among nations.

In our interdependent world, technological and regulatory choices made in one country can affect those made in neighboring countries, creating a multiplier effect for the GII's development. To help guide this development, the Administration proposes five core principles -- private investment, competition, open access, a flexible regulatory environment, and universal service. These principles, we believe, along with effective information policies, will provide a foundation upon which the GII can be built.

The overarching goal of the *Agenda for Cooperation* is to foster

the cooperation that will be needed to spur the transformation of a thousand discrete networks into a connected, interoperable global information infrastructure. As all nations take steps to develop and upgrade national information infrastructures, we invite you to join with us in ensuring that the benefits of the GII will be available throughout the world.

ENDNOTES

1. In general throughout this report, references to "information services" are meant to be broad and to include all services, content, and applications to be provided over the networks of the GII. However, for specific statistics cited from other sources, the definitions from those sources apply.

[\(Back to text\)](#)

2. International Trade Administration, U.S. Department of Commerce, *U.S. Industrial Outlook 1994*, at 25-1, January 1994.

[\(Back\)](#)

3. U.S. Department of Commerce, International Trade Administration, Office of Service Industries, 1994.

[\(Back\)](#)

4. *The Benefits of Telecommunications Infrastructure Competition*, (DSTI/ICCP,TISP(93)/Rev1), p.23, February 1994.

[\(Back\)](#)

5. *Ibid*, p.3.

[\(Back\)](#)

6. Administered by the National Telecommunications and Information Administration, the basic objective of the Telecommunications and Information Infrastructure Assistance Program ([TIIAP](#)) is to provide clear and visible demonstrations to people at the local level of the advantages that can be accrued in their daily lives as a result of having access to a modern, interactive information infrastructure.

[\(Back\)](#)

7. Additional information on how information infrastructure applications can benefit people can be found in two reports from the U.S. Information Infrastructure Task Force's Committee on Applications and Technology: "Putting the Information Infrastructure to Work," National Institute of Standards and Technology Special Publication 857, Gaithersburg, MD., 1994; and "The Information Infrastructure: Reaching Society's Goals," National Institute of Standards and Technology Special Publication 868, Gaithersburg, MD., 1994.

[\(Back\)](#)

8. A report of the Conference on Breaking the Barriers to the National Information Infrastructure can be obtained from the Council on Competitiveness in Washington, D.C. The conference was co-sponsored by the Council and the Clinton Administration's Information Infrastructure Task Force.

[\(Back\)](#)

APPENDIX A - SUMMARY OF RECOMMENDATIONS

II. BUILDING A FOUNDATION FOR THE GII -- FIVE BASIC PRINCIPLES

A. Encouraging Private Investment

From the wide range of available options, governments can develop a strategy best suited to their particular needs. At the same time, they must institute the appropriate regulatory, legislative, and market reforms to create the conditions necessary to attract private investment in their telecommunications, information technology, and information services markets. To facilitate this process, the United States will join with other governments to:

- o Identify and seek to remove barriers to private investment, and develop policies and regulations that improve investment incentives in both growing and mature telecommunications and information markets;
- o Ensure that applicable laws, regulations, and other legal rules governing the provision of telecommunications and information services and equipment are reasonable, nondiscriminatory, and publicly available;
- o Engage in bilateral, regional, and multilateral discussions to exchange information on the various options that have been successfully pursued to attract private investment, including, but not limited to, privatization, liberalization, and market reforms;
- o Work with major international lending institutions, such as the World Bank and the regional development banks, and major private financial institutions to determine the best means of attracting both private and public capital, and establish workshops to train officials in the different liberalization approaches; and
- o Encourage international lending institutions to recognize the ways in which funded social projects, such as the delivery of education and health care services, can be advanced through improved information infrastructures.

B. Promoting Competition

The most effective means of promoting a GII that delivers advanced products and services to all countries is through increased competition at local, national, regional, and global levels. To that end, the United States will join with other

governments to:

- o Assess, through information exchanges and existing multilateral organizations, the positive experiences of different countries in introducing competition and progressively liberalizing their telecommunications, information technology, and information services markets;
- o Work constructively to remove barriers to competition in telecommunications, information technology, and information services markets;
- o Include timetables for increased competition in basic telecommunications infrastructure and services in national information infrastructure development plans, and, as an interim step, increase the pace of liberalization through the expansion of resale;
- o Encourage new entrants by adopting competitive safeguards to protect against anticompetitive behavior by firms with market power, including measures designed to prevent discrimination and cross-subsidization;
- o Implement specific regulations to facilitate competitive entry in the telecommunications sector, including the following essential elements: 1) interconnection among competing network and service providers; 2) "unbundling" of bottleneck facilities of dominant network providers; 3) transparency of regulations and charges; and 4) nondiscrimination among network facilities operators and between facilities operators and potential users, including resellers;
- o Ensure that government-sponsored technical training activities incorporate programs specifically related to the development of pro-competitive markets and regulations (including such issues as competitive safeguards and interconnection);
- o Pursue a successful conclusion to the General Agreement on Trade in Services (GATS) discussions on basic telecommunications to obtain the opening of markets for basic telecommunications services through facilities-based competition and the resale of services on existing networks on nondiscriminatory terms and conditions; and
- o Consider the full range of options for promoting competition in Intelsat and Inmarsat, including: 1) pursuing changes designed to increase the operational efficiency of Intelsat and Inmarsat, retaining their fundamental intergovernmental character, but substantially reducing the scope of the current intergovernmental agreements by removing provisions that convey unfair advantage and inhibit efficient functioning; 2) transforming the organizations into private corporations; and 3) transforming the organizations into multiple private service providers that compete with one

another, as well as with others. In selecting among these options, the goal must be to enhance competition and not diminish it.

C. Providing Open Access

In partnership with the private sector, governments can take action to improve access to facilities and networks, and promote the availability of a wide range of diverse services and information, including supporting the development of international standards that promote interoperability. To achieve these goals, the United States will join with other governments to:

- o Develop appropriate policies that encourage increased access by citizens to diverse sources of information;
- o Provide unrestricted and equitable access to networks for providers and consumers of services and content, based on sound commercial practices;
- o Hold regular bilateral and multilateral dialogues on ways of increasing the flow of information across borders to facilitate greater access to content by consumers;
- o Encourage an open, voluntary standards-setting process that does not denigrate intellectual property rights and which includes the participation of a broad group of interests, including the private sector, consumers, and, as appropriate, government agencies;
- o Work through regional and international bodies to increase the pace of consensus-based, voluntary, and transparent standards development and adoption, and to promote the broad dissemination of standards-related information;
- o Work together and with national, regional, and international standards bodies to identify priority areas for increased coordination among different private national and international bodies in support of interoperability of networks and services on the GII.

D. Creating a Flexible Regulatory Environment

Although national regulatory environments necessarily reflect the specific social, economic, and political needs of each individual country, the essentially global nature of the markets for telecommunications, information technologies, and information services require that national regulations be responsive to global developments. The United States will join with other governments to:

- o Re-examine and adapt regulations and legislation to accommodate market and technological developments at

national and global levels in support of the five GII principles;

- o Create, through regulatory and/or legislative reform, a pro-competitive, technology-neutral regulatory environment to maximize consumer choice, to provide fair access to networks, and to stimulate infrastructure development, the introduction of new services, and the wider dissemination of information;
- o Exchange views and information on national regulatory and legislative initiatives and seek to identify common challenges and options for developing flexible and transparent regulations in support of the development of the GII;
- o Work collectively in regional and international organizations to convene meetings devoted specifically to encouraging the adoption of regulatory policies that will promote the GII; and
- o Encourage creation of independent national regulatory authorities for telecommunications separate from the operator that shall promote the interest of consumers and ensure effective and efficient competition. Such authorities should have sufficient powers to carry out their missions and should operate with transparent decisionmaking processes that are open to all interested parties.

E. Ensuring Universal Service

Although the provision of universal service varies from country to country, the goal of providing all people with greater access to both basic and advanced services is a crucial element of the GII. The United States will join with other governments to:

- o Consider, at the local and national levels, the benefits afforded by the introduction of competition and private investment in meeting and expanding universal service;
- o Exchange information at the bilateral and multilateral level to address the range of available options to meet universal service goals; and
- o Consider, at the national and international levels, ways to promote universal access as a means of providing service to currently underserved and geographically remote areas.

III. ENCOURAGING THE USE OF THE GII

A. Information Policy & Content Issues

1. Privacy Protection

In order to foster consumer confidence in the GII and to

encourage the growth of interconnected global networks, users must feel that they are afforded adequate privacy protection. To this end, the United States will join with other governments to:

- o Identify key privacy issues that need to be addressed in relation to the development of national and global information infrastructures;
- o Work with both the public and private sectors to achieve consensus on a set of fair information principles for the collection, transfer, storage, and subsequent use of data over national and global information infrastructures;
- o Ensure that privacy protection does not unduly impede the free flow of information across national borders;
- o Share information on new privacy protection policy developments and on new technologies and standards for privacy protection; and
- o Encourage the use of voluntary guidelines developed by international bodies, such as the OECD, as the best means of ensuring the protection of privacy on an international basis.

2. Security and Reliability

To promote the development of a secure and reliable GII, the United States will join with other countries to:

- o Work collectively to increase the reliability and security of national and international information infrastructures;
- o Initiate a broad international dialogue among users, providers, and all other participants in the GII on issues related to protecting the confidentiality and integrity of information transmitted and stored on global networks;
- o Exchange information and encourage further cooperation within regional and international organizations such as the ITU and the OECD on measures to ensure network security and reliability, including the sharing of outage information;
- o Share information regarding the best means available to advance security goals while not impeding progress on other GII principles, such as the promotion of competition and open access; and
- o Exchange information about, and accelerate efforts to develop new technologies needed to improve the security of the GII (e.g. encryption, digital signatures, and firewalls.)

3. Intellectual Property Protection

The GII cannot achieve its promise if authors, producers, and other content creators are not guaranteed adequate protection of

their intellectual property rights. To achieve this protection, the United States will join with other governments to:

- o Cooperate in national, bilateral, regional and international fora (such as the World Intellectual Property Organization) to achieve high levels of intellectual property and technical protection in order to guarantee to rightsholders the technical and legal means to control the use of their property over the GII;
- o Ensure that voluntary licensing regimes provide rightsholders and potential users of copyrighted works maximum flexibility in negotiating the conditions governing the use of copyrighted works, eliminate compulsory licensing, and guard against the imposition of standards that would impede the free-flow of information;
- o Provide effective enforcement against the unauthorized use of a copyrighted work (infringement), including severe legal penalties and vigilant monitoring. Enforcement is particularly critical as technological innovations jeopardize the existing ability of rights holders to protect their works;
- o Encourage the development and use of technological capabilities and safeguards, such as software envelopes, headers, assurances of authenticity, and encryption methods to complement existing copyright management techniques and prevent infringement at all levels. Cooperative efforts to develop testbeds, define standards, and construct infrastructure components for these safeguards should be encouraged, as should measures to prevent or render illegal the use of devices to overcome these safeguards; and
- o Work in collaboration with intellectual property-based industries towards greater efforts to educate others about the importance of intellectual property protection.

B. Applications: Delivering the Benefits of the GII

International applications are the best way to demonstrate the potential power that the GII has to affect lives all over the world. The United States will join with other countries to:

- o Support, along with the private sector, the initiation of pilot projects and testbeds that demonstrate the benefits of the GII, in areas such as electronic commerce, health care, digital libraries, environmental monitoring, and life-long learning, with opportunities for participation by both developed and developing countries;
- o Cooperate in the facilitation of electronic information exchanges in support of global trade and commerce;
- o Facilitate the sharing of information in the public domain

- with other countries on government-funded and private sector applications projects to promote a broader understanding of the diversity of technology that can be applied to meet various public needs;
- o Encourage the assignment of a higher priority for innovative applications of information technology, which will encourage increased use of the GII;
 - o Encourage private sector-led efforts to develop application-level standards (e.g. data interchange formats, application program interfaces) to ensure interoperability at the application level; and
 - o Work constructively to assess and eliminate the barriers to the development and deployment of GII applications.

APPENDIX B - GII HEARING TESTIMONY

The International Telecommunications Working Group of the Information Infrastructure Task Force's Telecommunications Policy Committee gratefully acknowledges the contribution of all those individuals and organizations who offered testimony, either oral or written, at the public hearings on the emerging Global Information Infrastructure, held in Washington, D.C., on July 27 and 28, 1994. The views and information shared during the hearing process were invaluable, and helped shape the *Global Information Infrastructure: Agenda for Cooperation*.

Airtouch International
Alliance to Promote Software Innovation
American Committee for Interoperable Systems
American Electronics Association
American Express Company
American Mobile Satellite Corporation
American National Standards Institute
American Petroleum Institute
Association of American Publishers
AT&T
British Telecom
Business Software Alliance
Cable and Wireless North America, Inc.
Center for Strategic and International Studies
Coalition for Networked Information
Committee T1 Telecommunications
Computer and Business Equipment Manufacturers Association
COMSAT Corporation
James D. Earl
Electronic Data Systems

Ericsson Corporation
Eurobit
European-American Chamber of Commerce
Government of the United Kingdom
IDB Communications Group, Inc.
Information Industry Association
Information Technology Association of America
International Intellectual Property Alliance
Internet Society
Iridium
Japan Electronic Industry Development Association
MCI
Brian Moir
Motion Picture Association of America
Motorola
NBC
NYNEX Corporation
ORION
PanAmSat
Qualcomm, Inc.
Recording Industry Association of America
Skadden, Arps, Slate, Meagher & Flom
Sun Microsystems, Inc.
Sutherland, Asbill & Brennan (on behalf of Capital Cities/ABC,
CBS, NBC and TBS)
Telecommunications Industry Association
Teledesic Corporation
U.S. Council for International Business
U.S. Chamber of Commerce
Viatel, Inc.

APPENDIX C

GLOBAL INFORMATION INFRASTRUCTURE

KEY CONTACTS

Ronald H. Brown, Secretary of Commerce
Chair, Information Infrastructure Task Force
Department of Commerce
14th and Pennsylvania Avenue, NW
Washington, D.C. 20230
Phone: 202/482-3934
Fax: 202/482-4576
Internet: nii@ntia.doc.gov

David J. Barram, Deputy Secretary of Commerce
Department of Commerce
14th and Pennsylvania Avenue, NW
Washington, D.C. 20230
Phone: 202/482-4625
Fax: 202/482-3610
Internet: dbarram@doc.gov

Larry Irving, Assistant Secretary for Communications and
Information
Administrator, National Telecommunications and Information
Administration
Chair, IITF Telecommunications Policy Committee
Department of Commerce
14th and Pennsylvania Avenue, NW - Room 4898
Washington, D.C. 20230
Phone: 202/482-1840
Fax: 202/482-1635
Internet: li@ntia.doc.gov

Arati Prabhakar, Director
National Institute of Standards and Technology
Chair, IITF Committee on Applications and Technology
Department of Commerce
Administrative Building 101, Room A1134
Gaithersburg, Maryland 20899
Phone: 301/975-2300
Fax: 301/869-8972
Internet: ap-iitf@nist.gov

Sally Katzen, Administrator
Office of Information and Regulatory Affairs
Office of Management and Budget
Chair, IITF Information Policy Committee
Old Executive Office Building, Room 350
Washington, D.C. 20530
Phone: 202/395-4852
Fax: 202/395-3047
Internet: ipc@al.eop.gov

Don Abelson, Assistant United States
Trade Representative
for Services Investment & Intellectual Property

United States Trade Representative
Room 301
600 17th Street, NW
Washington, D.C. 20506
Phone: 202/395-6864
Fax: 202/395-3891

Richard Beard, Senior Deputy U.S. Coordinator
International Communications & Information Policy
Department of State
Room 4826
2201 C Street, NW
Washington, D.C. 20520-5818
Phone: 202/647-5832
Fax: 202/647-5957

Dianne Cornell, Chief
Telecommunications Division
International Bureau
Federal Communications Commission
2000 M Street, NW - Suite 800
Washington, D.C. 20554
Phone: 202/418-1470
Fax: 202/418-2824
Internet: dcornell@fcc.gov

Peter Cowhey, Chief
Multilateral & Development Branch
Telecommunications Division, International Bureau
Federal Communications Commission
2000 M Street, NW - Suite 800
Washington, D.C. 20554
Phone: 202/418-1470
Fax: 202/418-2824
Internet: pcowhey@fcc.gov

Carol C. Darr, Associate Administrator
Office of International Affairs
National Telecommunications & Information Administration
Department of Commerce
Room 4720
14th and Pennsylvania Avenue, NW
Washington, D.C. 20230
Phone: 202/482-1304
Fax: 202/482-1865
Internet: cdarr@ntia.doc.gov

Michele C. Farquhar, Chief of Staff
Director, Office of Policy Coordination Management
National Telecommunications & Information Administration
Department of Commerce
14th and Pennsylvania Avenue, NW - Room 4892
Washington, D.C. 20230
Phone: 202/482-1835
Fax: 202/482-0979
Internet: mfarquhar@ntia.doc.gov

Michael Fitch, Deputy U.S. Coordinator
International Communications & Information Policy
Department of State
Room 4826
2201 C Street, NW
Washington, D.C. 20520-5818
Phone: 202/647-5832
Fax: 202/647-5957

Cita Furlani, Director
Office of Enterprise Integration
National Institute of Standards and Technology
Department of Commerce
Building 415, Room 102
Gaithersburg, Maryland 20899
Phone: 301/975-4529
Fax: 301/948-7242
Internet: cat_exec@nist.gov

John Gilsenan, Director for Telecommunications Policy for Canada
International Communications & Information Policy
Department of State
Room 2529
EB/CIP
2201 C Street, NW
Washington, D.C. 20520-5818
Phone: 202/647-2592
Fax: 202/647-7407

Jack Gleason, Division Director
Office of International Affairs
Department of Commerce
14th and Pennsylvania Avenue, NW - Room 4720
Washington, D.C. 20230
Phone: 202/482-1866
Fax: 202/482-1865
Internet: jgleason@ntia.doc.gov

Scott Blake Harris, Chief
International Bureau
Federal Communications Commission
Suite 800
2000 M Street, NW
Washington, D.C. 20554
Phone: 202/418-0420
Fax: 202/418-2818
Internet: sbharris@fcc.gov

Reed Hundt, Chairman
Federal Communications Commission
1919 M Street, NW
Room 814
Washington, D.C. 20554
Phone: 202/418-1000
Fax: 202/418-2801
Internet: ftp@fcc.gov

Thomas Kalil, Director
Science and Technology
National Economic Council
Room 233
Old Executive Office Building
Washington, D.C. 20500
Phone: 202/456-2802
Fax: 202/456-2223
Internet: tkalil@arpa.mil

Michael Kirk, Deputy Assistant Secretary of Commerce
Deputy Commissioner of Patents & Trademarks
U.S. Patent and Trademark Office
Office of Legislation
Box 4
Washington, D.C. 20231
Phone: 703/305-9300
Fax: 703/305-8885

Joanne Kumekawa, Special Assistant for International Affairs
Office of the Assistant Secretary
National Telecommunications & Information Administration
Department of Commerce
14th and Pennsylvania Avenue, NW - Room 4898
Washington, D.C. 20230
Phone: 202/482-1551
Fax: 202/482-1635

Internet: jkumekawa@ntia.doc.gov

Richard P. Larm, Attorney
Foreign Commerce Section
Antitrust Division
U.S. Department of Justice
Room 3264
10th and Pennsylvania Avenue, NW
Washington, D.C. 20530
Phone: 202/514-4687
Fax: 202/514-4508

Bruce Lehman, Assistant Secretary of Commerce
Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Department of Commerce
Washington, D.C. 20231
Phone: 703/305-8600
Fax: 703/305-8664

David Lytel, Information Infrastructure Specialist
Office of Science & Technology Policy
Room 423
Old Executive Office Building
Washington, D.C. 20500
Phone: 202/456-6037
Fax: 202/456-6023
Internet: dlytel@ostp.eop.gov

Vonya McCann, U.S. Coordinator
International Communications & Information Policy
Department of State
Room 4826
2201 C Street, NW
Washington, D.C. 20520
Phone: 202/647-5212
Fax: 202/647-5957

Bruce McConnell, Chief
Information Policy Branch
Office of Information and Regulatory Affairs
Office of Management and Budget
Room 10236
New Executive Office Building
Washington, D.C. 20503
Phone: 202/395-3785

Fax: 202/395-5167
Internet: bruce.mcconnell@eop.sprint.com

Denise Michel, Senior Policy Adviser
Office of the Secretary
Department of Commerce
14th & Pennsylvania Avenue, NW - Room 5835
Washington, D.C. 20230
Phone: 202/482-4127
Fax: 202/482-4191
Internet: dmichel@doc.gov

Michael Nelson, Special Assistant
Information Technology
Office of Science & Technology Policy
Old Executive Office Building, Room 423
Washington, D.C. 20500
Phone: 202/456-6039
Fax: 202/456-6023
Internet: mnelson@ostp.eop.gov

Richard Parlow, Associate Administrator
Office of Spectrum Management
National Telecommunications & Information Administration
Department of Commerce
14th and Constitution Avenue, NW - Room 4099A
Washington, D.C. 20230
Phone: 202/482-1850
Fax: 202/482-4396
Internet: rparlow@ntia.doc.gov

Charles Rush, Chief Scientist
National Telecommunications & Information Administration
Department of Commerce
14th and Constitution Avenue, NW - Room 4898
Washington, D.C. 20230
Phone: 202/482-1551
Fax: 202/482-1635
Internet: crush@ntia.doc.gov

Jonathan Sallet, Assistant to the Secretary
Director, Office of Policy and Strategic Planning
Department of Commerce
Room 5835
14th & Pennsylvania Avenue, NW
Washington, D.C. 20230
Phone: 202/482-4127

Fax: 202/482-4191
Internet: jsallet@doc.gov]

Suzanne Radell Settle, Senior Policy Adviser
Office of International Affairs
National Telecommunications & Information Administration
Department of Commerce
Room 4701
14th and Constitution Avenue, NW
Washington, D.C. 20230
Phone: 202/482-1854
Fax: 202/482-1865
Internet: ssettle@ntia.doc.gov

Greg C. Simon, Domestic Policy Advisor to the Vice President
Office of the Vice President
Old Executive Office Building
17th & Pennsylvania Avenue, NW
Washington, D.C. 20501
Phone: 202/456-6222
Fax: 202/456-6231
Internet: gsimon@arpa.mil

Roger Stechshulte, Director
Office of Telecommunications
Department of Commerce
Room 1009
14th and Constitution Avenue, NW
Washington, D.C. 20230
Phone: 202/482-4466
Fax: 202/482-5834

Thomas Sugrue, Deputy Assistant Secretary
National Telecommunications & Information Administration
Department of Commerce
14th and Constitution Avenue, NW - Room 4898
Washington, D.C. 20230
Phone: 202/482-1830
Fax: 202/482-1635
Internet: tsugrue@ntia.doc.gov

Daniel K. Tarullo, Assistant Secretary for Economic and Business
Affairs
Department of State
Room 6828
2201 C Street, NW
Washington, D.C. 20520-5818
Phone: 202/647-7971

Fax: 202/647-5713

ACKNOWLEDGEMENTS

Assistant Secretary for Telecommunications and Information
Administrator, National Telecommunications and Information
Administration

Chair, IITF Telecommunications Policy Committee
Larry Irving

Associate Administrator, NTIA, Office of International Affairs
Chair, TPC International Telecommunication Working Group
Carol C. Darr

PROJECT TEAM

Suzanne Radell Settle
Bruce Barnett

PROJECT CONTRIBUTORS

Office of International Affairs

Sharon Bywater
Michael Crowe
Nancy Eskenazi
Greg Francis
Jack Gleason
Larry Palmer
Helen Shaw
Diane Steinour
Tom Wasilewski

Inter-Agency Contributors

Don Abelson, Office of United States Trade Representative
Jonathan Baker, Council of Economic Advisors
Mary Good, Department of Commerce, TA
Scott Blake Harris, Federal Communications Commission
Tom Kalil, National Economic Council
Bruce Lehman, Department of Commerce, PTO
Vonya McCann, Department of State, CIP
Bruce McConnell, Office of Management and Budget
Mike Nelson, Office of Science & Technology Policy
Jonathan Sallet, Department of Commerce
Greg Simon, Office of the Vice President

We wish to thank Jean Grier, Eugenia Barton, Randall Cook, Tony

Mocenigo, and Chris Wise-Mohr who reviewed earlier drafts of this report, and the key contacts listed above for their suggestions and input. We also thank Peter Max for providing the cover design and Arthur J. Altenburg for the typesetting and layout of the report.