

STATEMENT SUBMITTED

By

**THE INSTITUTE OF ELECTRICAL AND ELECTRONICS
ENGINEERS-UNITED STATES OF AMERICA (IEEE-USA)**

to the

**UNITED STATES SENATE COMMERCE, SCIENCE AND
TRANSPORTATION COMMITTEE**

Hearing

“WHY BROADBAND MATTERS”

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IEEE-USA is delighted to submit this statement to the U. S. Senate Commerce, Science and Transportation Committee. IEEE-USA advances the public good and promotes the careers and public policy interests of the 215,000 engineers, scientists and allied professionals who are U.S. members of the IEEE.

IEEE-USA congratulates Chairman Daniel Inouye and the Senate Commerce Committee for supporting S. 1492, the “Broadband Data Improvement Act,” and supports passage of this important legislation.

Universal access to high-speed broadband data services is as imperative to our nation’s economic prosperity in the 21st century as universal access to electric power and telephone services was in the 20th century. Broadband services enable telecommuting, distance learning, improved medical care, gateways to vast sources of information, and a host of other economic and quality-of-life opportunities. As with electricity and telephone service before it, new Internet applications generate economic and social gains that far exceed the investment in the enabling infrastructure.

The various members of U.S. consumer households of the near future will be needing access to many broadband applications all at the same time. The children do their homework, the breadwinner works part time or full from home, the grandparents keep in touch with their doctors, and some of them seek help from their governments on taxes, social security, Medicare, business, energy, housing, and public safety. The aggregation of these simultaneous applications in the home, together with entertainment, will drive the future demand for broadband.

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Although the United States can legitimately take credit for development of the Internet, we cannot claim that our nation leads in providing access to it. Many countries have recognized the benefits of high-speed broadband data services and have dramatically expanded both the availability and speed of their national networks. Such investments provide competitive advantages that must not be ignored.

We must meet these challenges with new cooperative initiatives between the U.S. Government and the U.S. communications industry. These efforts will require strong national leadership focused on development of new policy and regulatory frameworks to stimulate investment in the enabling infrastructure for extending national access to the Internet; its widespread use; and competition in its facilities, service provision, and content.

IEEE-USA urges the U.S. Congress to create incentives for the provision of universal and affordable high-speed broadband access to new and demanding Internet applications. Such access will bring consumer benefits to education, job opportunities, telemedicine, and access to government resources. Beyond these benefits, such access will stimulate innovation, spur economic activity, and contribute to increased productivity for the nation.

To achieve these benefits IEEE-USA recommends the following actions covered at greater length below:

- Designate universal and affordable access to high-speed broadband networks as a national priority and establish a series of bandwidth goals and target dates for deployment.
- Provide economic incentives for broadband investments and uses that qualify as furthering our national objectives.
- Foster further competition in facilities, service provision, and content through legislation and regulation.

The United States faces challenges for its broadband infrastructure.

Current levels of speed and access fall short of evolving demand.

The Federal Communications Commission's (FCC) prior definition of broadband speed was 200 kilobits per second (kb/s). Recently the FCC replaced this definition with seven broadband tiers starting at 768 kb/s and extending to speeds greater than 100 megabits per second (Mb/s). Five principal technologies currently deliver broadband within these tiers:

- Cellular telephony
- Digital Subscriber Line, offered by telephone companies
- Cable modem, provided by cable companies
- Wireless Fidelity (Wi-Fi) networks
- Optical fiber to the home or the neighborhood
- Satellite.

Availability and data rates vary widely within each of these technologies, so that tabulation of their capabilities here would necessarily be incomplete and subject to change. However, typical

data rates currently increase from about 0.5 Mb/s for the newer cellular telephony systems progressing to 20 Mb/s for optical fiber to the home. Optical fiber so far is available only in limited service areas compared with Japan, South Korea, and France.

As microprocessor and broadband capabilities expand, new computing applications emerge. This is the story of technological progress in all fields. Many studies cite examples, just a few of which follow:

- Convergence of voice, data, and video into bit streams carried on digital networks
- Widespread bidirectional video conferencing, useful in education and business
- High resolution medical images and electronic medical records transferred for diagnosis and consultation.

These new applications can be used on the Internet now, but can experience delays in delivery where the Internet is not robust enough to handle the additional traffic they induce, as well as impact the user experience of any others sharing the same portion of the Internet.

The market is advancing U.S. broadband deployment, but at a pace limited by each individual provider's perceived return on investment.

The result is twofold: we face inadequate provision for coming demand and we lack parity among world-class networks. To encourage faster progress, initiatives beyond ordinary market forces are needed.

Priority action will return rewarding benefits to consumers.

All levels of education are using broadband. Images and videos enrich the primary grades in science, music, art, and current events. High school students research material for their arts and their sciences assignments. Almost every higher educational institution makes its entire curricula available on its web sites, either for fee or for free. For example, the University of Maryland University College enrolls 90,000 students worldwide, mostly in distance learning courses otherwise unavailable to working adults because of location, schedule, and duties.

Telework and telecommuting enable people to join in the workforce who would otherwise be excluded by reason of location, mobility, age, or cost. However, these applications are most effective with ample bandwidth for fast transfers of large files and interactive video. Additionally, the very investment needed to expand the broadband infrastructure will create skilled jobs in U.S. industry in rural areas and across the U.S.

Broadband is improving both the efficiency and effectiveness of health care delivery through rapid access to medical records, detailed medical imagery, video patient diagnosis and monitoring, and even telesurgery for patients unable to get to a qualified surgeon. These applications use bandwidth beyond what is generally available now.

More extensive federal and local government use of broadband facilities and services could provide superior services to its citizens in law enforcement, emergency management, health, housing, and business.

Telemedicine

Increasing health care costs and an aging population are placing significant strains upon the U.S. health care system. Small pilot studies have shown that meeting seniors' needs for independence and autonomy, coupled with expanded use of home health technologies, mitigate against these circumstances and provide improved health outcomes. Difficulty with reimbursement policies, governmental approval processes, and absence of efficient deployment strategies have hampered adopting such technologies.

These technologies can reduce or eliminate the need for personal services in the home and can also improve treatment in hospitals and nursing care facilities in rural areas and other environments. IEEE-USA believes that using electronic technologies to assist and monitor elderly, disabled, and chronically ill individuals in the home can improve quality of life, improve health outcomes, and help control health care costs.

IEEE-USA urges Congress and policy-makers, in both the public and the private sector, to take the actions needed to expand uses for electronic devices, assistive and monitoring software, and home health communication technologies to provide home health care to those in need. Further, we support developing guidelines for reimbursement of these technologies -- both for developers and users.

Universal access will return rewarding results in other fields as well.

As networks connect larger numbers of people, disproportionately positive economic and social benefits accrue to society because the possible interactions grow faster than the number of subscribers.

Economically, broadband networks have been shown to spur growth through productivity, new and augmented markets, expanded work force, innovative products and services, and research. This occurs by speeding the diffusion of ideas and procedures throughout individuals and organizations, so that the direct benefits diffuse throughout the society as a whole. In rural areas, facilities ownership by enterprises and communities is providing expanded capability in sparsely populated markets, thus enhancing local economic opportunity and richness of life. Faster and more available wireless access can expand mobile commerce and create new multimedia applications such as mobile video telephony. The broadband infrastructure can enable energy efficiency as well as substitute for other resources, such as use of the transportation infrastructure, medical examination and advice, and paper-based records.

National security and public safety can be enhanced by a robust Internet. The Internet's fundamental design provides redundancy in case of isolated failures; however, best practices for critical infrastructure protection must be employed to ensure improved robustness and survivability from both natural and man-made disasters.

Socially, such networks have been shown to enrich the quality of life, and to diminish the disparity in access between rich and poor, urban and rural, and ethnic groups.

Globally, high-performance networks will enable the United States to match or exceed services and applications available to the citizens or trading partners of other nations, with consequent competitive advantages.

Government has options for constructive action.

Designate deployment of high-speed broadband networks as a national priority and establish a series of bandwidth goals and target dates for deployment.

- The President and Congress have a chance to provide vision and leadership by giving priority status to high-speed broadband deployment and access. Such leadership will close the widely publicized gap in penetration, access, and price between the United States and countries like Japan, South Korea, and Europe.
- Initially, we advocate the achievement of 20 Mb/s bidirectional speed with 90 percent availability throughout the nation within five years. The wide penetration of such speeds will achieve most of the expected benefits and accommodate numerous simultaneous applications per household or small business. Of course, greater speeds can be had by those with greater needs.
- We further advocate the achievement of 100 Mb/s bidirectional speed with availability to all businesses and households within 10 years. The technology necessary to meet this goal is scalable to almost any future need at inexpensive upgrade costs.
- Create a national annual census of broadband availability and usage to monitor progress toward the goals, identify competitive opportunities, and reveal underserved areas.

Provide economic and other incentives for broadband investment and use.

- The government should reaffirm and extend tax incentives to private sector broadband investment. These include expensing of certain investments, accelerated depreciation, R&D tax credit, matching grants, and guaranteed loans for broadband deployment in underserved areas including use of the Universal Service Fund.
- Other incentives would include deductions for certain broadband subscriber expenses that further education and health care.
- Additionally, to stimulate use and demand, provide programs to increase digital literacy.

Foster competition in facilities, services, and content.

- Competition among providers and technologies can be relied on to provide wider deployment, higher speeds, and lower prices just as it has in other countries. The following actions will foster such competition:
 - Rescind legislative and regulatory restrictions on deployment of end-user owned wired and wireless networks by municipalities and other communities wherever these provide capability in the absence of adequate, cost-effective, or timely commercial services.
 - Encourage negotiation between service providers and facilities providers for access to the physical infrastructure, so as to realize the benefits of innovation, content diversity, end-user choice, and competition.
 - Recommend network benchmark tests for broadband performance and continually redefine them as usage and technology evolve. Different broadband technologies have more than raw speed differences. For the competitive marketplace to work in selecting broadband alternatives there must be information on the alternatives. Thus users can select the performance best for their particular needs.

Additional initiatives will also encourage broadband investment and use.

- The FCC should designate ample licensed and unlicensed spectrum bands, including unused portions of television bands, for high-speed wireless networks, ultimately aiming at access for all. This action will expand mobile and nomadic services and augment access to the wired infrastructure.
- Appropriate government agencies should step up their network acquisitions to stimulate demand.
- The National Science Foundation, other funding agencies, and industry should assure research levels for hardware, software, applications, and standards that are sufficient to spur continuing technological development, as Japan and the European Union are doing.

The above considerations support the following conclusions:

The capabilities and benefits of widespread, advanced broadband networks are achievable by visionary national policies and leadership, enabling cooperative government and industry initiatives. Such networks are necessary for attaining and sustaining U.S. technological and competitive advantage in the global economy. Once in place, such networks reduce bandwidth constraints, thus opening a new era of innovation for knowledge-based goods and services.


About IEEE-USA

This statement represents the considered judgment of a group of U.S. IEEE members with expertise in the subject field. The positions taken by IEEE-USA do not necessarily reflect the views of IEEE or its other organizational units.

We appreciate the opportunity to present this statement. If you have questions or for more information, go to <http://www.ieeeusa.org> or please contact:

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Respectfully submitted,



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