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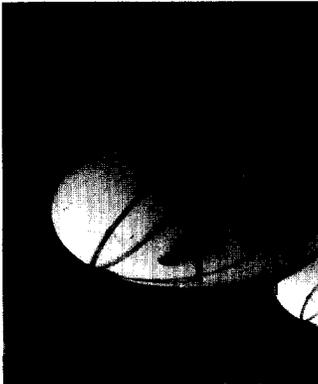
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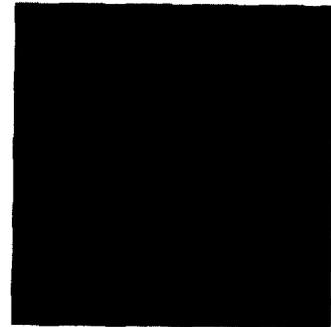
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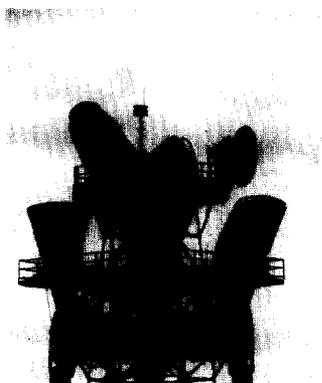
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- Audio bridge.** Electronic device used for conferencing that connects and controls multiple telephone lines, allowing many callers to be connected simultaneously. Audio bridges can be used for both voice and data applications.
- Broadband capacity.** The ability of some communication technologies to use bandwidths expansive enough to transmit voice, data, and video signals simultaneously.
- Cable headend.** Regional electronic control center that receives and retransmits television signals to receiving sites in a cable system.
- Cellular technology.** A wireless communication technology operating at a specific range of microwave frequencies, most often used for mobile, point-to-point telephony.
- Coaxial cable.** Insulated wire cable able to carry multiple broadband signals, commonly used in cable television networks.
- Digital compression.** A technique that allows broader bandwidth information to be "squeezed" into a smaller bandwidth for easier transmission. Special hardware is required at both the sending and receiving points to encode and compress and decode and decompress the signal.
- Direct broadcast satellites (DBS).** This technology allows users to receive high-resolution, compact-disc-quality signals directly from a satellite using a small (18-inch) receiving dish.
- Distance learning.** The delivery of voice, video, and text to a learner, from one location to another, using some form of telecommunications technology.
- Fiber optics.** The use of hair's-width glass wire that manipulates laser light rather than electricity to carry signals. Fiber optic wire has the capacity to carry far more information at less cost than copper wire or coaxial cable. It permits two-way audio, data, and video transmission and has high capacity and speed, easily expandable channel capacity, and a high-quality signal.
- HDTV.** High-definition television. Developing television system that offers higher resolution than standard television and compact disc
- Internet.** The growing international network of computer networks that uses the same protocol (language) for transmitting digital information from one computer to another, allowing users to access on-line information and communicate with other users individually or in groups.
- Interoperability.** The ability of a communications system to operate effectively between platforms, with a variety of hardware and software.
- ISDN.** Integrated Services Digital Network. International standard for dial-up that provide a common architecture for transmission of digital information over a public telephone network. ISDN equipment can transmit voice and compressed video and data over copper wire lines.
- ITFS.** Instructional Television Fixed Service. The specific band of microwave frequencies set aside by the FCC for educational use. ITFS systems use these frequencies to broadcast audio and video signals within a limited range (usually less than 50 miles).
- Local area networks (LANs).** A high-speed data communications system that is completely contained within a single office or campus environment.
- Low-power television (LPTV).** Broadcast technology similar to commercial or public television but limited in broadcast coverage area by its low power signal.
- Microwave technology.** The portion of the electromagnetic spectrum, from approximately 1,000 MHz to 100,000 MHz, capable of focusing concentrated signals over long distances. These frequencies are used for a variety of point-to-point or omnidirectional communications, from terrestrial-based systems such as ITFS to satellite systems.
- Modem.** Electronic device that converts digital computer signals into analog format for data transmission, used to link computers to telephone networks.
- National Education Goals.** Eight goals for education, approved by the nation's governors in 1989 and enacted by the U.S. Congress in 1994.

ment, from school readiness to adult literacy and parent involvement.

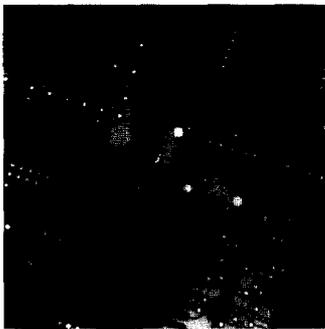
NII National Information Infrastructure. A seamless web of communications networks, including computers, televisions, telephones, and satellites. (From Vice President Gore's comments of September 13, 1994.)

PCS Personal Communication Services. A developing wireless communications technology operating at a specific range of microwave frequency that allows for voice, video, and data.

Telecommunications. The branch of science relating to the transmission of information, including voice, video, and data.

Transponder. Device used on communication satellites to amplify and repeat voice, video, or data signals from a terrestrial uplink site to a terrestrial downlink site.

Veri Small Aperture Terminals (VSAT). Small earth stations with small (4-6-ft diameter) satellite dishes programmed to receive specific frequencies, often used to distribute specific educational services or used by businesses to provide private satellite networks.



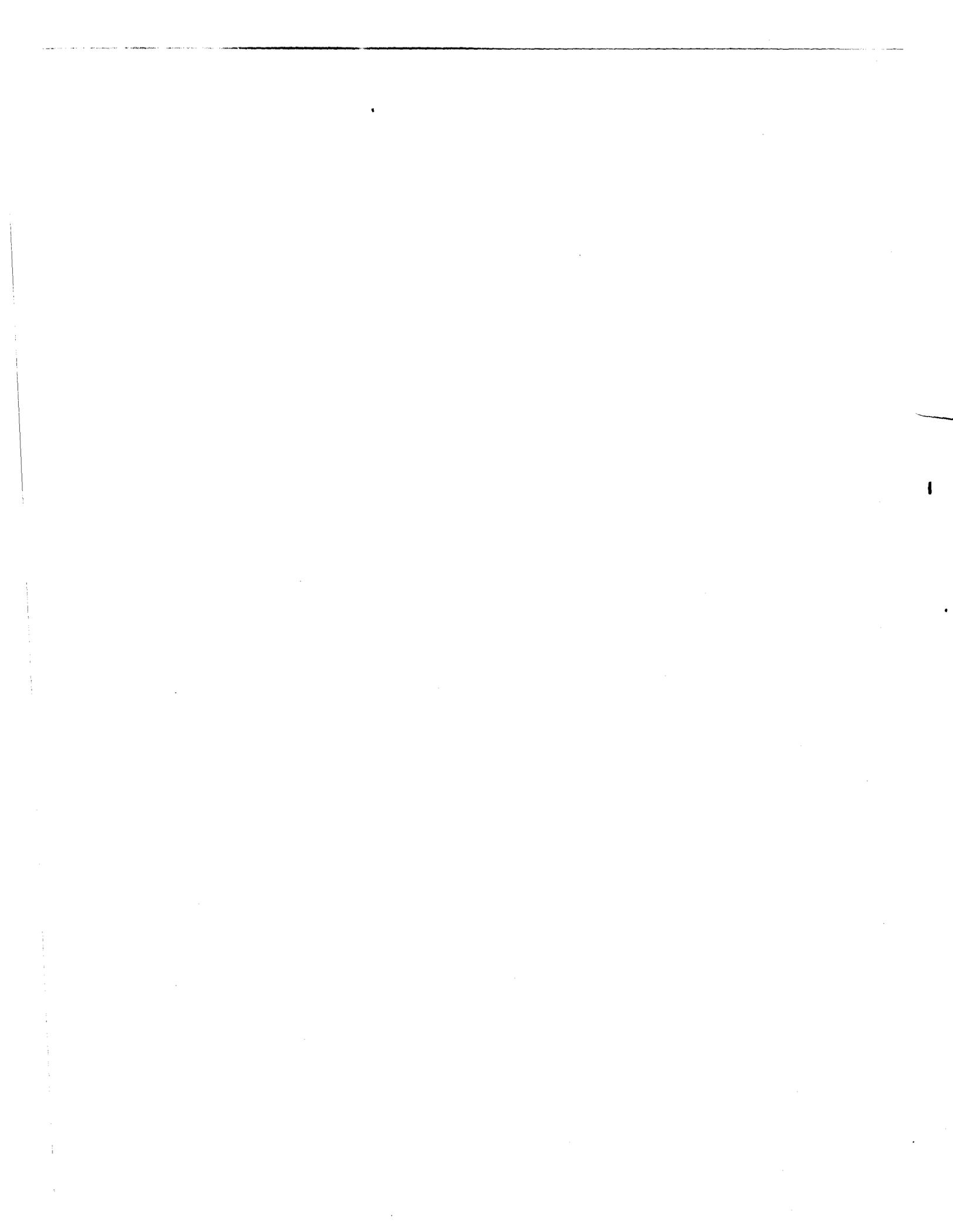


Consumer Federation of America

To: NSBA et. al.
From: Bradley Stillman, Telecommunications Policy Director 
Re: Universal Service Comments
Date: April 10, 1996

Upon review of your Initial Comments in the Universal Service Docket before the Federal-State Joint Board, (FCC Docket 96-93; CC Docket 96-45) CFA is pleased to endorse the principles outlined in your Comments. We believe the approach advocated by your coalition is in line both with Congressional intent and the public interest.

As you know, we believe it is extremely important for institutional users, such as schools and libraries, to have meaningful access to the information superhighway and all of its resources. Although not a substitute for services to the home, they are an integral part of the overall policy goals. The bottom line is that CFA firmly believes these institutional users are an important link in the chain of universal service.



The National Information Infrastructure: Requirements For Education and Training



Executive Summary

*Prepared by the National Coordinating Committee on
Technology in Education and Training (NCC-TET)*

March 25, 1994

Introduction

The National Coordinating Committee for Technology in Education and Training (NCC-TET) has developed the requirements discussed below to ensure that the National Information Infrastructure (NII) provides expanded opportunities for education and training. National organizations representing education, training, government, defense, business, arts and cultural institutions, and libraries have contributed to the development of these requirements. They are intended as guidelines to be used by the Administration, Congress, state agencies, national and state organizations, and other education and training stakeholders to help shape future policy and legislation.

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Comments

The Committee invites comments and suggestions as to how these requirements might be achieved through independent and collective activities of public and private education and training stakeholders—locally, in states, and nationally.

Please mail suggestions to:

NCC-TET, P. O. Box 4437, Alexandria, VA 22303

or send via electronic mail to:

NCC-TET-COMMENTS@EDUCOM.EDU

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Disclaimer: This position paper has been prepared and is being distributed in order to facilitate understanding of education and training requirements that must be addressed in the development of America's National Information Infrastructure. It represents a consensus of opinions held by representatives of national professional education, training, and trade associations participating in the NCC-TET collaboration and does not necessarily imply endorsement by organizational participants in the Committee process or government personnel who attended meetings of the Committee.

Access Requirements

1. **Ensure that all Americans have affordable access to the NII.** An interim goal of providing at least one connection to every school building and educational site in the nation can be achieved almost immediately. The goal of connecting every home and classroom to the NII should be set for the year 2000. Populations (e.g., rural and poor populations) which have traditionally been underserved must have special attention with respect to network access and information resources relevant to their needs.
2. **Ensure that the NII is accessible in a variety of learning environments.** The applications on the NII should extend into homes and workplaces as well as schools, institutions of higher education, libraries, and arts and cultural institutions. The vision of the NII is one in which learning occurs in a variety of environments throughout the course of one's life. The principle of "learning on demand" should guide the design of all federally funded NII-related education and training programs.
3. **Develop a variety of sustained public and private partnerships and funding mechanisms to support education and training uses of the NII.** Educational access to a broadband NII must be subsidized in some fashion. This could entail a change in universal service arrangements. "Universal service" must be redefined so that all schools have affordable access to broadband telecommunications services. State and federal funding is appropriate for education and training applications of the NII in a number of areas—planning grants, applications research and development, information clearinghouse activities for model programs, technical assistance programs, and training-related activities. Both state and federal governments should consider forms of tax relief for producers to create software and programs and for telecommunications providers to supply access, services, and equipment. Other alternative funding sources include creating telecommunications purchasing cooperatives among schools, government, and universities; renting rather than auctioning off the rights for new allocations of the electromagnetic spectrum to telecommunications companies; and using check-off boxes on telephone bills by which rate payers can make donations to educational telecommunications projects.
4. **Make public and private information resources available to schools, institutions of higher education, training institutions, libraries, and arts and cultural institutions.** The NII should include the information resources developed and maintained by both public and private sources.

Education and Training Application Requirements

5. **Coordinate NII-related education and training activities conducted by federal departments and agencies.** Many federal departments and agencies participate in grant programs and other activities that support multidisciplinary uses of telecommunications. Adequate means should be established for federal agencies and departments to share information and coordinate planning, implementation, and evaluation of applications of the NII for the education and training communities. Existing federal programs should be reshaped to prepare for radically new kinds of technology-based education and training environments.

NCC-TET

6. **Develop and disseminate NII guidelines for education and training applications.** The federal government has a legitimate and important role in the promulgation of national standards. Instructional standards would ensure that education and training applications of the NII help us attain the National Education Goals. To promote a teaching profession experienced in the effective use of technology, national teacher certification standards and credentialing requirements should be expanded to include applications of educational technology. Standards should be developed with the ongoing advice of key stakeholders in the education and training communities.
7. **Identify and disseminate effective education and training applications of the NII.** Effective educational technology and telecommunications applications should be developed, identified, and disseminated.
8. **Integrate applications of NII and related technologies into education reform plans.** A core component of the Goals 2000 initiative is that all states will develop comprehensive educational plans in support of the attainment of the National Education Goals. The NII (as it develops) and related technologies can be key supports for education reform and therefore be incorporated into education reform initiatives at the national, state, and local levels.
9. **Develop quality education and training applications for the NII.** The development of quality software and video programming is critical to the successful implementation of the NII for education and training contexts. Software developers and video producers should have financial incentives available such as tax incentives, low interest loans, and seed money to encourage development of products for the education and training markets.
10. **Conduct research on the education and training applications of current and emerging technologies.** Educators need access to research findings for guidance in the selection of educational software, and further research is needed to guide the development of new software and to determine the ability of existing technologies to meet the challenges found in education and training environments. Grants should be given for the study of what works under what circumstances for specific populations. Research findings should be made available to all educators over the network.
11. **Promote training, professional development, and technical assistance for educators as an integral part of the development of the NII.** Teacher training and development must be provided not only for equipment and software operation, but for teaching strategies that incorporate the use of a variety of technologies. Funding for both the training of educators and the development of training materials should be provided.
12. **Support ongoing evaluation of the effectiveness and impact of the NII to inform policy makers and educators.** Ongoing evaluation should inform stakeholders about access, adherence to standards, levels of use, and impact on teaching and learning. The continual improvement of education and training applications on the NII depends upon such evaluation.

Technical Requirements

13. **Emphasize interactive, broadband transmission of voice, video, and data for education and training.** The need for a broadband NII also needs to be promoted as a critical need for education and training. Broadband systems will be necessary to permit the use of interactive video in education. Interactive video will open new dimensions in the learning process that are not possible with voice and data transmission alone.
14. **Provide seamless interconnection among all relevant information networks and services.** Online services and electronic forums used by educators exist on a variety of electronic networks. Existing resources could be leveraged much more effectively if education and training networks were interconnected and instructional programming were available across networks. The NII must become a seamless network of networks that links learners to information and communication. The barriers caused by incompatible technologies and isolated networks must be eliminated.
15. **Guide the development of voluntary standards that promote interoperability.** Standards that promote interoperability allow devices to connect with one another and permit software and hardware to be used in and exchanged across a variety of telecommunications and hardware environments. Ultimately, this will lower hardware and software costs, create a robust market for education-related products, support equity of access, and eliminate one of the major barriers to the use of networking technologies.
16. **Ensure that the NII is easy to use.** User interfaces for education and training applications must be designed to be easy to use and as consistent as possible across computer platforms, individual databases, and information services. If the NII is to become truly universal and indispensable, it must be as easy to use as most household appliances.
17. **Develop comprehensive directories of information resources and "navigation" systems for locating these resources.** A truly easy system of searching and accessing information on the network must be developed. Until this happens, the NII must have people available to serve as network guides.
18. **Support user collaboration.** Since a premium will be placed on collaboration in the training and educational organizations of the future, the infrastructure's ability to support collaboration among users is a vital requirement. People-to-people communication is open-ended, consists of a wide variety of data types, and takes place in multiple contexts. Beyond its ability to manage these requirements, the NII should have convenient means for retrieving and storing records of network sessions and configuring groups of users for collaborative activity.
19. **Create adequate measures to protect the security of resources on the network.** The NII should have security systems adequate to protect the privacy of individuals, the confidentiality of documents, and intellectual property rights. The rights of privacy and confidentiality are cornerstones of our society. The NII will carry information that is sensitive to individuals and organizations. Government, business, and education must work together to guarantee the security of this information. The protection of intellectual property rights should be accomplished in a manner which safeguards the exclusive rights of right holders, provides the latter with appropriate and timely compensation, and allows protected information to flow over the network.

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