December 23, 1998

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
12th Street Lobby, TW-A325
Washington, D.C. 20554

RE: Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, CC Docket No. 98-146

Dear Ms. Salas:

To supplement its earlier filing in this docket,[1] and pursuant to Section 1.1204(b)(1) of the Commission's Rules,[2] the Telecommunications Industry Association (TIA) respectfully submits this document for inclusion in the record of the above-captioned proceeding.[3]

An original and two copies are enclosed. If you have any questions concerning this filing please contact the undersigned.

Respectfully Submitted,

Grant E. Seiffert
Vice President, Government Relations

Derek Khlopin
Regulatory Counsel

Matthew J. Flanigan
President

Enclosure

[1] *See* Letter from Matthew Flanigan, TIA President, to the Commission (Oct. 8, 1998).
[2] 47 C.F.R. § 1.1204(b)(1).
[3] *Notice of Inquiry*, FCC 98-17 (released Aug. 7, 1998) (NOI).

THE FUTURE OF BROADBAND: A CASE FOR FCC ACTION TO SPUR DEPLOYMENT OF ADVANCED TELECOMMUNICATIONS CAPABILITY

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I. INTRODUCTION AND SUMMARY

TIA is an association of over 900 suppliers of communications and information technology equipment. TIA is the principal representative of the communications equipment-manufacturing sector of the economy, which generated over $100 billion in spending in 1997. As TIA has indicated,[4] the Commission's decision in this proceeding will have a significant impact on its members. They are engaged in the development and manufacture of the infrastructure and equipment that will support advanced telecommunications capability. TIA members manufacture all forms of wireline, wireless, and data networking equipment.

In this paper, TIA offers its views regarding the definition of "advanced telecommunications capability" under Section 706 of the Telecommunications Act of 1996.[5] This definition calls for a robust capability that will allow users to interactively communicate in the video domain. The statute envisions that the capability must enable the user to both originate and receive information in all its forms, including video. This requires substantial transmission capacity.

To add further clarity to the definition of advanced telecommunications capability, TIA recommends that the Commission draw from the work that has already been done by the Cross-Industry Working Team (XIWT or Working Team). The Working Team, which includes a majority of the leading companies in

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[4] TIA previously filed in this proceeding during the reply comment period. *See* Letter from Matthew Flanigan, TIA President, to the Commission (Oct. 8, 1998).

the fields of computing and communications, developed a series of Class Profiles for communications capability and associated these Profiles with specific applications and types of user equipment. Based upon the work done by XIWT, TIA recommends that the Commission use its Class 3 Profile, as well as certain of the capabilities associated with data rates over 128 kbps in the Class 2 Profile, as an initial definition for advanced telecommunications capability. The Class 3 Profile requires the bi-directional transmission of 1-10 Mbps over a sustained period of time. While not as robust as the Class 3 Profile, TIA nonetheless recommends consideration of the Class 2 Profile, insofar as the capability exceeds 128 kbps, as a preliminary staging Class for fully advanced telecommunications capability. This Class 2 Profile, within its full range of data transfer rates, does not support bi-directional broadband transmission in all cases, but at rates in excess of 128 kbps it represents telecommunications capability clearly staged for higher levels of performance. TIA notes that the continuous introduction of new technologies means that the industry should be deploying systems meeting the next levels of performance in short order.

TIA specifically, and strongly, urges the Commission to avoid drawing a narrow interpretation of the meaning of "advanced telecommunications capability." For instance, the Commission could cause a significant lessening of incentive for the development and deployment of truly advanced telecommunications with a determination now that telecommunications with capabilities of 128 kbps or lower are within statutory standards for advanced telecommunications capabilities. As

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[5] Pub. L. No. 104-104, 110 Stat. 56, *codified at* 47 U.S.C. §§ 151 *et seq.* (1996 Telecommunications Act).

noted above, the statutory requirement of Section 706 calls for robust, two-way transmission, including video, which only can be achieved at transmission rates, both upstream and downstream, in excess of 128 kbps. Technologies of lessor capability, no matter how widely or readily deployed, should not be regarded as adequate for purposes of Section 706.

Rather, the Commission should consider its role as being to encourage "continued research, innovation, risk-taking, and deployment of 'next generation' technologies designed to deliver the fastest, broadest, clearest, and true state-of-the-art communications."[6] In other words, current state-of-the-art technologies should not be regarded by the Commission to be the final resting place for a Section 706 determination, bur rather the mere beginning.

In applying these standards against state-of-the-art local access technologies that are available and which are being deployed today, it appears that, at this point in time, advanced telecommunications capability is not being deployed to all Americans in a reasonable and timely fashion. Digital Subscriber Line (xDSL) in the 1-10 Mbps range can be provided to about 40-60 percent of homes, but further deployment will require upgrading the copper loop. In addition, certain carriers are rolling out versions of xDSL with lesser capabilities (*i.e.* in the lower data transmission ranges of the Class 2 Profile, including what is commonly referred to as "ADSL Lite") and even in those instances they initially are targeting only certain

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[6] *A New Regulatory Framework for Unlocking the Capacity of the Local Loop,* ADC Telecommunications, Inc. Written *Ex Parte* Presentation (filed Sept. 14, 1998).

geographic areas. Cable modems are being deployed, but, as currently configured, they fall short of the necessary capacity on the upstream and downstream to meet a definition for fully advanced telecommunications capability. Fiber-in-the-loop offers some promise, but it is being deployed very slowly. While all of these technologies can be deployed in a fashion which meets the objectives of Section 706, those objectives far exceed the current announced plans of the carriers.

TIA also believes that, to the maximum extent practicable, all competitors should be on equal footing to compete in the new market for advanced telecommunications capability, with no particular category of providers given an advantage or disadvantage by virtue of regulation. Pursuant to the mandate of Section 706, the Commission should, to the maximum extent of its legal authority to do so, take whatever deregulatory and pro-competitive steps it can to promote the deployment of advanced telecommunications capability. TIA therefore strongly recommends that the Commission remove regulatory barriers to investment in advanced telecommunications capability and its supporting infrastructure, and proactively encourage competition in the local loop which would result in greater deployment of advanced services.

If the Commission concludes, as TIA believes it must, that advanced telecommunications capability (as envisioned by Section 706) is not being deployed in a reasonable and timely fashion, the Commission needs to take action that will spur investment in new technologies. TIA agrees with Commissioner Powell's

observation that the "greatest danger for regulators is (their) inability to keep pace with the speed of developments and innovations that the new networks will unleash" and his conclusion that "it is time for all of us to exorcise the regulatory poltergeists that threaten the welfare of the dynamic and vibrant telecommunications world."[7] TIA also points to developments such as Next Generation Internet[8] and Third Generation (3G) Wireless as technology evolutions that are occurring, in part, *because* regulation is not holding them back. TIA urges the Commission to be faithful to the clear language, as well as the spirit, of Section 706. In other words, the Commission should do what is necessary to allow, and in fact encourage, advanced telecommunications capability to emerge, even if it means utilizing modified or novel regulatory and deregulatory mechanisms.

Therefore, TIA suggests that the Commission offer optional relief to all telecommunications providers under Section 706 as follows:

(1) a "social contract" or "mutual agreement," similar to incentive regulation that has been afforded the cable industry (and has also been used with telephone carriers), which would allow a carrier to design a specific plan of regulatory relief that is linked to deployment of advanced telecommunications capability; or

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[7] *Bewitched, Bothered and Bewildered*, Speech of Michael K. Powell, Commissioner, FCC, Before the Federal Communications Bar Association Monthly Luncheon, Washington, DC (Oct. 28, 1998), *available at* http://www.fcc.gov/Speeches/Powell/spmkp817.html.

[8] President Clinton recently signed legislation that will support development of the Next Generation Internet by providing connectivity among universities at more than 1,000 times the speed of today's networks. Vice President Al Gore stated that "by creating a new platform for advanced communications, we will build on today's Internet for the 21st century." *See* COMM. DAILY (Oct. 29, 1998), at 10.

(2) a plan customized to meet the needs of a specific class of carriers.

II. THE COMMISSION'S INQUIRY SHOULD FOCUS ON THE LAST MILE

As have numerous parties participating in this proceeding,[9] TIA agrees with the Commission's assessment (*NOI* ¶3) that expanding the capacity and capability of the "last mile" serving residential subscribers is critical to the achievement of full deployment of advanced telecommunications capability. The competitive dynamics enabled by the Telecommunications Act of 1996 have not reached the residential portion of the market. While business users will no doubt realize the benefit of competition in terms of enhanced capability at reduced cost, residential subscribers, particularly those in high cost areas, are not likely to benefit in the near future. TIA believes that Section 706 clearly was designed to address the deployment of advanced telecommunications capability to residential subscribers because it specifically references "all Americans" in Section 706 (a). Clearly, Congress intended that Section 706 should be used to encourage widespread deployment, not just deployment to high-end users.

In keeping with this focus on the last mile, TIA herein provides a description of various technological alternatives for the deployment of advanced telecommunications capability in the last mile and demonstrates that these technologies can be deployed today. Yet, despite the availability of these technologies, they are not yet being widely deployed, nor are there plans designed to advance meaningful deployment in the future, as envisioned by Congress.

III. THE DEFINITION OF ADVANCED TELECOMMUNICATIONS CAPABILITY

Section 706(c)(1) provides a definition of advanced telecommunications capability. It states:

> **"The term 'advanced telecommunications capability' is defined, without regard to any transmission media or technology, as high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology."**

It is clear from this definition that Congress intended that advanced telecommunications capability must be robust. It envisioned a capability that is interactive (by reference to the words "originate and receive") and full service (by reference to the words "voice, data, graphics, and video"). A capability that can transmit video interactively necessarily is robust because the data transfer rates associated with bi-directional video are substantial.[10]

This definition does not, however, contemplate one way transmission. Again, the statute specifically refers to a capability that enables users to "originate and receive" information. While such interactive transmission need not necessarily be symmetric, it needs to be sufficiently robust to transmit video in both directions. Certain technologies currently being deployed, which nevertheless are state-of-the-

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[9] *See, e.g.,* Level 3 Comments at 8; GTE Comments at 22-23; Teligent Comments at 1; Qwest Comments at 2; MCI/WorldCom Joint Comments at 3; AT&T Comments at 6-7; AOL Comments at 2.

[10] A standard NTSC television signal that is uncompressed uses 100 Mbps of transmission capacity. A compressed signal uses 2 to 10 Mbps. *See Understanding Fiber Optics*, Sec. Ed., Sam's Pub. – Prentice Hall., at 364.

art by today's standards, may not demonstrate the full breadth of broadband transmission capabilities achievable today, although they clearly are staged to provide that capability in the near term. Examples of these technologies include hybrid fiber-coaxial cable and certain versions of asymmetric digital subscriber line (ADSL).

Since there is no legislative history that clarifies the definition of advanced telecommunications capability, the Commission should be guided by industry consensus. The Cross-Industry Working Team (XIWT or Working Team), which is coordinated by the Corporation for National Research Initiatives, has developed an industry consensus on definitions for various classes of service available over the National Information Infrastructure (NII).[11] The purpose of the Working Team's exercise was to establish benchmarks, or Class Profiles, that associate various applications with specific telecommunications capabilities. It is anticipated that these Class Profiles will lead to greater clarity in the marketplace, thereby helping consumers make informed decisions and helping network software developers build to standard transmission capabilities.

The Working Team used the example of the computing industry's initiative to "jump start" the multimedia personal computer (PC) to demonstrate the value of establishing Class Profiles linking applications with telecommunications capabilities. In the multimedia case, a specification was developed as a template for PCs that are capable of running multimedia applications. The template describes

certain memory, processing power, audio visual, and other input-output capabilities. This approach removed market uncertainty by giving consumers greater confidence when purchasing a PC that a device that meets the multimedia specification will be able to run most multimedia applications. Removing this uncertainty also instills confidence in multimedia software developers that the sale of their software will not be hindered by technical limitations of the PCs that consumers are purchasing.

The Working Team has the benefit of wide industry consensus. A list of the members is provided as Appendix A. The Working Team includes most of the computing and communications firms that have a substantial interest in the rapid deployment of advanced telecommunications capability.

The Working Team agreed on five different Class Profiles that link applications to specific data transfer rates. Table 1 provides a useful summary of the Class Profiles.

Table 1. Applications and Related Communications by Class

Class 1	**Application**	**Basic web browsing and e-mail**
	Data Transfer Rate	**10Kb/s-100Kb/s**
	Information Appliance	**Internet terminal using home TV as monitor, analog modem, integrated browser and e-mail application software, wireless remote control/pointer, wireless keyboard**
	Communications Services	**Standard analog telephone line and dialup access to Internet Service Provider**
Class 2	**Application**	**Talking head video conferencing**

[11] *See* Corp. for National Research Initiatives Written *Ex Parte* Presentation (filed Oct. 26, 1998).

	Data Transfer Rate	**100Kb/s-1Mb/s**
	Information Appliance	**Basic personal computer and video monitor with H.261 video codec, basic rate ISDN interface card**
	Communications Services	**Basic Rate ISDN dial-up connection**
Class 3	**Application**	**Geographic information acquisition, manipulation and analysis**
	Data Transfer Rate	**1Mb/s-10Mb/s**
	Information Appliance	**High end desktop personal computer with high-resolution video display, 3D graphics display adapter, 64MB of memory, 4GB hard drive, CDROM, cable modem/ADSL modem**
	Communications Service	**Broadband network access through telco or cable company**
Class 4	**Application**	**On-campus networked multimedia distance education**
	Data Transfer Rate	**10Mb/s-100Mb/s**
	Information Appliance	**High performance computer workstation with high-resolution video display, 3D graphics accelerator, real-time MPEG II coder, 128MB memory, 10GB hard drive, DVD, ethernet interface**
	Communications Service	**Switched ethernet over ATM campus network**
Class 5	**Application**	**Networked medical imaging including local and remote image acquisition, image interpretation/consulting and image archiving**
	Data Transfer Rate	**100Mb/s-1Gb/s**
	Information Appliance	**High performance multiprocessor server with 1Gb memory, 100GB RAID file system, dual video displays including large screen high resolution video display, graphics accelerators, ATM interface**
	Communications Service	**Switched 155 Mb/s ATM**

Source: Class Profiles for the Current and Emerging NII, Cross-Industry Working Team, Corporation for National Research Initiatives

In light of the fact that the statutory definition of advanced telecommunications capability envisions users both sending and receiving high quality video, both the Class 4 Profile and the Class 5 Profile certainly meet the definition of "advanced telecommunication capability." A data rate of at least 10 Mbps on the downstream and on the upstream unquestionably would support high-quality interactive video.

The Class 4 Profile and the Class 5 Profile thus are important long-term goals for the industry and the Commission. However, such a conclusion does not

mean that Section 706 can only be used to encourage the deployment of systems capable of transmitting at 10 Mbps and above. Because Section 706(a) states that the Commission "shall encourage the deployment" of advanced telecommunications capability, the Commission clearly can use the authority to foster the deployment of lesser capabilities as a stepping stone to 10 Mbps capability in the future. TIA suggests that the Class 2 Profile, at data transmission rates in excess of 128 kbps, is an appropriate minimum near-term deployment target. Thus, the Commission initially should encourage the ubiquitous deployment of systems that support a data transfer rate in excess of 128 kbps on the downstream and the upstream.

TIA can appreciate concerns raised by some parties over creating fixed requirements in the defining of advanced telecommunications capability.[12] TIA agrees that Congress intended that the meaning of such term should remain flexible. To create market certainty, however, some minimum level of service should be adopted in defining advanced telecommunications capability. TIA is suggesting that a data transmission speed exceeding 128 kbps, both downstream and upstream, is an appropriate starting point for establishing this level of service under Section 706, although the Commission should use its authority to encourage the deployment of systems that support capabilities at the Class 3, 4 and 5 Profiles. TIA does not mean to suggest that this benchmark should remain static. Rather, it should change over time as new technologies enter the marketplace. Congress anticipated the evolution

[12] *See, e.g.*, Nortel Comments at 7; Sprint Comments at 1-2; Intermedia Comments at 1-6; BellSouth Comments at 11-12.

of the definition by building into Section 706 the requirement that the Commission undertake regular reviews.[13]

This is not to suggest that the Commission should encourage only the deployment of technologies that fall within any specific definition of advanced telecommunications capability established in this proceeding. Many communications technologies available today, and in various stages of development, provide critical resources and capabilities to businesses and residential consumers. Some of these technologies represent dramatic increases in the capacity of communications systems. The Commission, of course, should continue to encourage the deployment of all technologies. TIA believes, however, that in this particular Inquiry, and under the language of Section 706, the definition of advanced telecommunications capability should have some form of performance measurement. Failure to provide any benchmark would render Section 706 meaningless. This provision was intended by Congress to accelerate deployment of advanced telecommunications capability. Surely it is the Commission's responsibility to define specifically what that capability is.

TIA also urges the Commission to take particular measures to encourage Class 3 Profile capability and above because Section 706's focus on deployment to elementary and secondary school classrooms means that schools must have meaningful bandwidth access for educational activities. Additionally, this high level

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[13] Section 706 states in pertinent part that "(t)he Commission shall, within 30 months . . . and regularly thereafter initiate a notice of inquiry . . . "

of capability will help to ensure that persons with disabilities are not left out of the information revolution. For example, the Commission should encourage capabilities that will support full two-way video in order to allow sign language users to communicate as if they are standing next to each other.[14]

[14] *See* Press Statement of Chairman Kennard on FCC's Actions to Promote Deployment of Advanced Telecommunications Services by All Providers (Aug. 6, 1998), *available at* http://www.fcc.gov/Speeches/Kennard/Statements/stwek860.html.

IV. THE DEFINITION OF "REASONABLE AND TIMELY" DEPLOYMENT **TO ALL AMERICANS**

Section 706(b) requires the Commission to "determine whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion." In making this determination, the Commission must develop some objective metrics for assessing:

(1) whether the capability is being deployed to "all Americans," and

(2) whether deployment is "reasonable and timely."

Determining whether advanced telecommunications capability "is being deployed to all Americans" is somewhat straightforward. The use of the phrase "all Americans" indicates that deployment must occur for both high-end/business users as well as residential subscribers. The level of deployment can be measured by examining current marketplace activity. Nationwide, at the end of 1998, DSL services have approximately 25 thousand subscribers.[15] Cable modem services have approximately 700 thousand subscribers as of all U.S. homes with cable television service, 17 percent are passed by two-way plant.[16] Considering that in a country of 250 million people, telephone penetration is 94 percent and 65 percent of residences subscribe to cable television service (which passes 95 percent of homes),[17] by any objective standard, it is clear that advanced telecommunications capability is not being deployed in a reasonable and timely

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[15] Sources: *The 1999 MultiMedia Telecommunications Market Review and Forecast*, Multimedia Telecommunications Association; The Yankee Group.

[16] Sources: *The 1999 MultiMedia Telecommunications Market Review and Forecast*, Multimedia Telecommunications Association; The Yankee Group.

fashion. Such a determination requires the Commission under Section 706(b) to take action to accelerate deployment.

In light of the direction given it by Congress, the Commission should put great weight on the availability of equipment needed to provide advanced telecommunications capability. That is, in the event the Commission determines that technology exists which supports advanced telecommunications capability, and that the equipment which can provide such services is developed or is in development, then the Commission has the basis for determining that advanced telecommunications capability is available. A determination of the availability of equipment should be based on a rather straightforward assessment of whether vendors are able to offer equipment, or will be able to offer equipment in the foreseeable future, which can provide advanced telecommunications capability. Under this definition, equipment in the research phase of the innovation process may not qualify as "available," although an advanced stage of development, nearing deployment, may be. To meet this proposed standard for assessing availability, equipment vendors must be in a state of readiness to take orders.

It can be inferred from the legislative history of Section 706 that Congress assumed deployment of advanced telecommunications capability is untimely if the equipment to provide such capability is available, but nonetheless is not being deployed, or is being deployed slowly. Congress empowered the Commission with several tools, including forbearance of certain regulations, fast-tracking applications under Part 68 of the Commission's Rules, and adoption of measures that promote competition, to ensure

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[17] Source: The Yankee Group.

that advanced telecommunications capability is deployed to all Americans in a timely fashion. One such tool may be forbearance from enforcing some legacy regulation of local exchange carriers (LECs) that seek to provide advanced telecommunications services. Another tool would be to fast-track review and approval of technologies and equipment under Part 68.[18] Yet another tool may be an increase in efforts to enforce the rights of CLECs to gain access to the local loop in order to provide advanced services. TIA urges the Commission to exercise its authority in the most creative manner possible to ensure that the goal of the statute, to increase the availability of advanced telecommunications capability to all Americans, is realized.

V. ADVANCED TELECOMMUNICATIONS CAPABILITY IS NOT BEING DEPLOYED TO ALL AMERICANS IN A REASONABLE AND TIMELY FASHION

Given the definitions of the terms outlined in Sections III and IV, and considering the low number of subscribers to advanced services, it is clear that the Commission must conclude that advanced telecommunications capability is not being deployed to all Americans in a reasonable and timely fashion. Such a negative determination requires the Commission, under Section 706(b), to take action to accelerate deployment.

Many claims have been made by various parties to this proceeding that advanced telecommunications capability is being deployed in a reasonable and timely fashion.[19]

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[18] Because Part 68 of the Commission's Rules does not necessarily address fully all newly available technology, such as DSL, the Commission should grant waivers and establish as quickly as possible rules for loop engineering. *See, e.g.*, Northern Telecom Files Petition for Waiver – Public Comment Invited, Public Notice, DA 98-2503, File No. NSD-98-135 (Dec. 7, 1998).

[19] *See, e.g.*, Qwest Comments at 4; Level 3 Comments at 2; MediaOne Comments at 2; Cablevision Systems Comments at 5.

TIA believes that, while well meaning, these claims do not meet the legal standard in Section 706 described in Section III and IV above. They fall short in three important respects:

(1) the bandwidth or bit rates associated with the systems being deployed are, at this point, insufficient to meet the definition of advanced telecommunications capability;

(2) the systems are unlikely to be deployed to "all Americans" as required in Section 706(b); and

(3) the systems are not being deployed in a "reasonable and timely" fashion as required under Section 706(b).

An examination of various technologies that are being deployed to provide advanced services reveals the weaknesses of these systems relative to the requirements of the statute. This analysis is not intended to criticize these technologies. Nor is it intended to provide a complete review of all technology options.[20] Rather, it focuses on three technologies that currently are being deployed to provide advanced telecommunications services.

[20] For example, TIA fully supports the deployment of broadband terrestrial and satellite wireless facilities. *See, e.g.*, Winstar Comments, Teligent Comments, Teledesic Comments. TIA believes that wireless technologies offer business and residential consumers another choice for communications solutions. TIA believes that wireless broadband infrastructure ultimately will provide advanced telecommunications capability. *See also* PCIA Comments, CTIA Comments.

A. Digital Subscriber Line

Digital Subscriber Line (xDSL) is a family of technologies that utilize electronics to enhance the information carrying capacity of the existing copper loop without interfering with the voice signals. Figure 1 (attached) shows how xDSL is configured. The bit rate capacity of a xDSL system depends upon the length of the copper loop and other factors.

Table 1 below reflects the downstream and upstream capacity of two varieties of xDSL, asymmetric DSL (ADSL) and very high-speed DSL (VDSL). As is readily apparent, xDSL capacity can be rather robust if the loop length is short.

Table 1

	Downstream Bit Rate	**Upstream Bit Rate**
ADSL (18,000 ft loop) Length	1.5-9 Mbps[21]	16-640 Kbps[22]
VDSL (3,000 ft loop) Length	26-52 Mbps	1.5 Mbps

[21] Bell Atlantic's recent introduction of ADSL actually includes a lowest-priced offering for a speed of 640 kbps. *Bell Atlantic Introduces ADSL Offerings*, INTERNET WEEK (Oct. 13, 1998). Additionally, the Ameritech offering promises speeds ranging *up to* 1.5 Mbps, meaning that such speed is the maximum which, of course, cannot be guaranteed. *Ameritech Offers Dedicated Internet Access Service*, Press Release (Mar. 4, 1998), *available at* http://www.ameritech.com/media/releases/release-1177.html.

[22] A modified version of ADSL utilizing splitterless technology (often referred to as G.Lite, the name given the applicable ITU subcommittee) affords approximate maximum speeds of 1.0-1.5 Mbps downstream and 384-512 kbps upstream. The purported advantage of G.Lite technology is that carriers do not need to send a technician to the home for installation. COMM. DAILY, Oct. 29, 1998, at 7.

Source: IEEE Communications

The LECs have made numerous announcements of plans to deploy xDSL, mostly in the form of ADSL. US West was the first to unveil its plans with the announcement that it intended to serve 40 cities across 14 states by the first half of 1998.[23] Recently, it announced that is making the service available to an additional half-million customers.[24] SBC's Pacific Bell announced last May its plans to deploy ADSL in more than 200 California communities.[25] Bell Atlantic announced its Infospeed DSL service, while Ameritech is planning a 70% deployment by the year 2000.[26] CLECs such as Covad Communications Company and NorthPoint Communications have also been deploying xDSL in a variety of cities.[27]

Although xDSL technology is being deployed, its deployment does not necessarily provide the basis for a positive determination that advanced telecommunications capability is being deployed to <u>all</u> Americans for two reasons.

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[23] *U.S. West Brings Lightning Fast New Internet Access to Homes in 40 Cities by June 1998: Nation's 1st Regionwide Deployment of High-Power ADSL Internet and Data Networking*, Press Release (Jan 29,1998), *available at* http://www.uswest.com/com/insideusnews/012998.html.

[24] COMM. DAILY, Oct. 29, 1998, at 6.

[25] *SBC Communications Announces Broad ADSL Deployment Across California*, Press Release (May 27,1998), *available at* http://www.sbc.com/News/Article.html?query_type=artilcle&query=19980527-02.

[26] *Availability of Bell Atlantic Infospeed DSL, available at* http://www.bell-atl.com/adsl/more_info/availability.html; *Ameritech Offers Dedicated Internet Access Service*, Press Release (Mar. 4, 1998), *available at* http://www.ameritech.com/media/releases/release-1177.html.

[27] *See, e.g., Data Speeds Up – Covad Uses Existing Phone Network for Faster DSL Access*, INFORMATIONWEEK, Networking Section (Aug. 17, 1998), *available at* http://www.techweb.com/directlink.cgi?IWK19980817S0038; *The NorthPoint Communications Network Continues Nationwide Expansion*, Press Release (July 13, 1998), *available at* http://www.northpointcom.com/html/home.html; *Netcom Announces Digital Subscriber Line ("DSL") Internet Strategy and Q3 1998 Launch Plan*, Press Release (Aug.24, 1998), *available at* http://www.icgnetcom.com/news/releases/1998/8-24.htm; *Concentric Network Launches HighSpeed DSL Internet Services in Southern California, Becoming Largest DSL-Based*

First, the versions of ADSL that are being deployed by many ILECs and CLECs do not necessarily fully meet the definition of "advanced telecommunications capability." As indicated in Table 1 above, certain versions of ADSL provide transmission at speeds as low as 16 kbps upstream over an 18,000-foot loop.[28] This level of capability fails to meet the criteria for advanced capability in the Class 2 or 3 Profiles (*i.e.*, in excess of 128 kbps bi-directionally) or for a Class 4 Profile service (*i.e.*, 10-100 Mbps bi-directionally), as described in Section III above. Some versions of xDSL, like ADSL with short loops, VDSL, and HDSL, may conform to the definition, but deployment of these versions has been slower. A fair statement regarding the lower capability versions of ADSL is that they are stepping stones to greater capability in the future. Deployment of these technologies therefore essentially is an interim step and should be recognized as such. Their promise is the upgrade potential to full broadband, bi-directional service, and the Commission should vigorously encourage the full realization of that promise as quickly as feasible.

Secondly, xDSL has certain technical limitations that make it difficult to deploy to "all Americans." Four factors limit the performance of xDSL over the existing copper plant:

(1) length of the copper loop (i.e., transmission speeds are inversely proportional to loop length);

(2) the condition of the loop (*i.e.*, the existence of bridge taps and loading coils);

Internet Services Network in the State, Press Release (July 20, 1998), *available at* http://ww.concentric.net/ press_center/ 1998/cal_dsl.html.

[28] Ameritech, for example, estimates that over 20 percent of its loops are greater than 18,000 feet from a central office, meaning that the technological cannot work over those lines. Ameritech Comments at 7.

(3) and the number of twisted pairs in the same binder group (*i.e.*, transmission rate is inversely proportional to the number of twisted wire pairs in the same binder group because of electromagnetic interference).[29]

Because of these limitations, any version of xDSL which might meet the definition of advanced telecommunications capability can be deployed to only 40-60 percent of the residences without a major investment to upgrade the local loop,[30] an investment which few ILECs appear willing to make under the current regulatory environment. It has been estimated that while more than 60 million households will go on-line by 2002, fewer than one in 30 will use xDSL.[31] This structural impediment should be addressed in these proceedings, and methods devised to remove or modify any existing regulations that contribute to it.

While xDSL undoubtedly will provide much needed bandwidth for some users in the near future, the Commission should keep in mind that Section 706, as well as the Telecommunications Act of 1996 as a whole, is forward-looking and seeks to foster investment in new and constantly improving infrastructure. Thus xDSL technologies that do not now achieve the desired level of capability still should be encouraged as the next step to full deployment of broadband facilities that will.

B. Cable Modems

[29] *See Advanced Services MO&O and NPRM*, CC Docket No. 98-11, FCC 98-188 (released Aug. 7, 1998), at ¶ 29 n.46.
[30] Derived from Bellcore Loop Survey.
[31] Source: Forrester Research (1998).

Another technology that can be deployed to provide advanced telecommunications capability is cable modems. Cable modems can be utilized in cable systems that have been upgraded to the hybrid fiber-coaxial cable architecture. Figure 2 (attached) provides a description of how a cable system with a cable modem is configured.

Typically, a cable system uses digital modulation and compression techniques to provide digital service using 200 MHz of capacity. Generally, 6 MHz of this capacity (the same size channel that currently carries one video program) is dedicated to cable modem service. Depending on the modulation technique used, 6 MHz of capacity theoretically may be able to transmit 10 to 36 Mbps.[32] Because, however, cable modems share bandwidth, their transmission speeds per user typically will range anywhere from 500 kbps or less to 30 Mbps downstream and from 500 kilobits or less to10 Mbps upstream, depending upon how many users are on the system at the same time, as well as the functionality of the user's computer.[33] The maximum transmission speeds assume the use of 6 MHz of capacity and the 256 Quadrative Amplitude Modulation (QAM) technique.

Cable modems may be deployed widely over time. The low-end capability provided by cable modems, however, does not necessarily meet the definition of fully advanced telecommunications capability for two reasons.

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[32] *Cable Data Modem Performance Evaluation: A primer for Non-Technical Readers*, Cable Television Laboratories, Inc. (1996), *available at* http://www.cablelabs.com/Publications.html.

[33] *See, e.g., Cable Modem Frequently Asked Questions*, Cable Datacom News, *available at* http://www.cabledatacomnews.com/cmic2.htm; *Cable Data Modems: A primer for Non-Technical*

First, the cable modems currently being deployed by the cable television industry oftentimes do not have sufficient guaranteed upstream capacity to meet the definition of advanced telecommunications capability. Cable modems are a shared architecture and thus provide a range of downstream and upstream capacities depending upon how many customers use system simultaneously. As noted above, the downstream and upstream capability (particularly the latter) can fall into a low kilobit range, even short of the 128 kbps associated with an advanced Class 2 Profile service.

Cable modems nevertheless can be engineered to have sufficient capacity to meet the definition for advanced telecommunications capability. The architecture is very flexible. Capacity can be adjusted by dedicating more 6 MHz channels to the cable modem service. At this time, however, the cable industry does not appear to be making this expanded capability available to customers.

Second, advanced services offered by cable operators may be outside the scope of Section 706 to the extent that the Commission defines advanced telecommunications capability as a "telecommunications service."[34] The Commission has held that under the 1996 Telecommunications Act, any service with a communications component must be either a telecommunications service or information service, but not both.[35] If the Commission decides that advanced telecommunications capability is a "telecommunications service," such a service likely would be regulated as a common

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Readers, Cable Television Laboratories, Inc. (1996), *available at* http://www.cablelabs.com/Publications.html.

[34] *See* NCTA Comments at 21.

carrier service under Title II. Cable operators, however, are specifically exempt from regulation as common carriers to the extent they provide cable service.[36] Moreover, the term "cable service" was expanded in the 1996 Telecommunications Act to include interactive services.[37] Under this expanded definition, cable operator provision of an information service with an internet access component, through a cable modem or set-top box, more appropriately may be classified as a cable service beyond common carrier regulation and Section 706 authority.

C. Fiber Optics

Another technology that could be used to provide advanced telecommunications capability is fiber optics. Figure 3 (attached) demonstrates how fiber could be deployed.

As is the case with the other technologies, the closer that the fiber gets to the home, the greater the transmission capacity of the system. Table 2 below reflects this reality.

Table 2

Architecture	**Bit Rate**

[35] *See Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, Report to Congress, FCC No. 98-67, at ¶¶ 21-48 (released Apr. 10, 1998).
[36] 47 U.S.C. § 541(c).
[37] *See* 47 U.S.C. § 522(6).

Fiber to the Home (FITH)	> 100 Mbps, bi-directionally
Fiber to the Curb (FTTC)	> 50 Mbps, bi-directionally
Fiber to the Node (FTTN)	26-52 Mbps downstream 1.5 Mbps upstream

Fiber technology provides a basic infrastructure for the deployment of advanced telecommunications capability. At least one commenter, BellSouth, notes that it is deploying fiber to the curb and fiber to the home for new residential developments and some economic replacements.[38] But, it also notes that it will take "many years" for a large portion of Bell South's network to be converted to an all fiber network at the current pace.[39] Other ILECs and CLECs are also deploying fiber in the local access portion of the network, but the aggregate level of deployment is still small.

The deployment of fiber solutions also does not provide the basis for a decision that fully advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion. Such systems can provide sufficient broadband capacity to meet the Class 3 Profile (*i.e.*, 1-10 Mbps bi-directionally), but they currently do not meet the other measurements in Section 706.

Most importantly, fiber solutions are not being deployed in a "reasonable and timely" fashion. First, as demonstrated by BellSouth's deployment, fiber systems are

[38] BellSouth Comments at 15.
[39] *Id*.

available, and their cost is reasonable, by virtue of the business case that BellSouth obviously has made for such deployment. However, even though these fiber solutions are available, they are not being deployed in any significant volume (with the exception of BellSouth). The untimely deployment is demonstrated by the long time period that would be required to achieve full deployment. TIA estimates that advanced telecommunications capability, based on fiber deployment, is not likely to be deployed to "all Americans" until some time in the decade of 2030. This calculation is based on reasonable assumptions of 2.2 percent line growth, 1.5 percent rehabilitation growth, and the substitution of fiber for copper in all new builds and rehabilitations, the mode of deployment currently being used by BellSouth.

VI. REGULATORY BARRIERS AND INADEQUATE ACCESS FOR COMPETITIVE PROVIDERS APPEAR TO BE DELAYING THE DEPLOYMENT OF ADVANCED TELECOMMUNICATIONS CAPABILITY

Deployment of fully advanced telecommunications capability is not occurring at the rate envisioned by Congress, specifically in a reasonable and timely fashion, even while the equipment for such deployment is available. The reality today is that lesser-capability technologies are being introduced into the market, and even these offerings are not being deployed ubiquitously.[40] As a result, the Commission must assess what needs to be done to encourage deployment.

As discussed above, TIA encourages the Commission to take all action within its legal authority to encourage the development of advanced telecommunications services. To the maximum extent possible consistent with the public interest, the Commission should adopt rules or policies that minimize regulation to only those areas essential for limited government oversight and the promotion of competition. The Commission should keep in mind that this Inquiry should focus on encouraging the provision of advanced telecommunications services to consumers, not on the zero sum regulatory war between incumbents and new entrants.

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[40] *See* ADC Comments at 12-13.

VII. AFTER REACHING THE INEVITABLE CONCLUSION THAT DEPLOYMENT OF ADVANCED TELECOMMUNICATIONS CAPABILITY IS NOT OCCURRING IN A REASONABLE AND TIMELY FASHION, THE COMMISSION MUST TAKE ACTION TO SPUR INVESTMENT

TIA understands that the Commission in this proceeding must make two decisions. First, the Commission must decide whether or not advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion as required under Section 706(b). If a negative determination is made, the Commission must decide in a second step what action to take.

The ultimate goal of Section 706 is to foster investment in advanced telecommunications capability to ensure that it is being deployed in a reasonable and timely fashion. TIA, and the overall record in this proceeding, has shown that such investment is not occurring at the level envisioned by Congress. The inevitable conclusion that the Commission must reach in its report is that advanced telecommunications capability is not being deployed to all Americans in a reasonable and timely fashion.

This conclusion means that the Commission must take the next step, which is to "take immediate action" to accelerate the deployment of advanced telecommunications capability as required under Section 706(b). In order to encourage such deployment, Section 706 gives the Commission specific direction to use regulatory forbearance and other deregulatory measures and to employ measures that promote competition. The Commission needs to determine the exact

deregulatory and pro-competitive measures that it will adopt to spur investment in advanced telecommunications capability.

In making this decision, TIA suggests that the Commission pursue a dual-track approach:

First, the Commission should invite parties to come forward and offer specific deregulatory and pro-competitive proposals that will afford them an opportunity to increase their investment in technologies that meet the requirements of Section 706. One possibility is proposals that have been negotiated and agreed to by representatives of various industry segments. Other proposals could take the form of "mutual agreements" or "social contracts" similar to those used by some states and the Commission itself[41] to accelerate deployment of infrastructure. The Government would agree to some measure of regulatory relief or increased access in exchange for a commitment to deploy advanced telecommunications capability at a certain pace. Any carrier or cable operator could file for such relief. TIA notes that the Commission previously has stated, with respect to the cable incentive plans, that "in the 1996 Telecommunications Act, Congress sought to encourage the rapid deployment of advanced communications services and technologies for the benefits

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[41] For example, for the cable industry, the Commission has an Incentive Plan, under which operators are given pricing flexibility and profit incentives to introduce new services and operate efficiently, while customers benefit from greater assurances of reasonable, stable rates for existing services. *See* In the Matter of Implementation of Sections of the Cable Television Consumer Protection and Competition Act of 1992: Rate Regulation and Adoption of a Uniform Accounting System for Provision of Regulated Cable Service, MM Docket No. 93-215 and CS Docket No. 94-28, *Report and Order and Further Notice of Proposed Rulemaking*, 9 FCC Rcd 4527, 4676-4680 (1994). *See also* In the Matter of Social Contract for Comcast Cable Communications, Inc., *Order* FCC 97-375 (rel. Oct. 10, 1997) (*Comcast Social Contract Order*).

of all Americans. These are the goals that the Commission's upgrade incentive policy was designed to fulfill."[42]

Second, TIA suggests that the Commission develop tailored solutions for each class of carrier to encourage the provision of advanced telecommunications capability. Each carrier class comes to this Section 706 Inquiry from a different regulatory legacy. Some entities are regulated under Title II, others under Title III, and still others under Title VI. This reality makes the development of a common approach under Section 706 difficult. For example, the cable television industry has not requested regulatory relief under Section 706, while some ILECs have made detailed deregulatory proposals and CLECs have asked for increased access to essential facilities. The existence of these varying proposals derives from the degree of regulation the industries currently face.

Cable modem service is not heavily regulated and regulation of such service should not increase, whether under the guise of Section 706 or otherwise. To that end, the Commission should reject the proposal advocated by America Online (AOL), among others, that would require cable providers to provide broadband access to unaffiliated Internet Service Providers.[43] On the other hand, the ILEC industry has argued that it faces substantial regulation that is impeding its ability to invest in advanced telecommunications capability. While CLECs and other new carriers are not burdened with legacy regulation, they face other obstacles to the deployment of advanced telecommunications capability. The Commission should

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[42] *Comcast Social Contract Order* at ¶ 3.

continue to ensure that those competing carriers that need access to the essential facilities of the local loop are able to obtain it.

When developing carrier class solutions for accelerating the deployment of advanced telecommunications capability, the Commission should keep in mind that the goal of Section 706 is to encourage investment in infrastructure. Section 706(a) states that "the Commission . . . shall encourage the deployment . . . of advanced telecommunications capability." No other objective is stated in the statute. As a result, the primary consideration in the Commission's development of a specific solution under Section 706 is the impact that it will have on deployment of advanced telecommunications capability.

This necessarily means that when Commission action sought by one party conflicts with the initiatives sought by another, the Commission must give great weight to the relative commitment made by each party to the deployment of advanced telecommunications capability in deciding which initiative to pursue. This is a very important principle because many of the proposals of various parties often conflict.

TIA is confident that the removal of some regulatory restrictions would accelerate the deployment of advanced telecommunications capability by ILECs. In the meantime, CLECs and other providers wishing to offer advanced telecommunications capability should be able to gain meaningful and effective

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[43] *See* AOL Comments at 4.

access to essential facilities (*i.e.*, copper loops) from the ILEC.[44] This would put the CLECs and ILECs in essentially the same position, facing the same economic choices, in deciding whether to deploy advanced telecommunications capability. Such a policy promotes infrastructure development, both by the ILECs and by competing providers.

VIII. CONCLUSION

The Commission needs to consider thoroughly its role in fostering the deployment of advanced telecommunications capability. While the Commission speaks of the development of the Internet as a model of how advanced telecommunications capability and service offerings can expand, to make this a reality, the Commission must assess what deregulatory and pro-competitive actions are necessary. For example, certain regulations governing the bottleneck local telephone exchange may be out of place with regard to advanced telecommunications capability. Through this Section 706 proceeding, the Commission can and should move substantially toward a goal of reducing the role of regulation in the development of an advanced telecommunications market by seeking deregulatory and pro-competitive solutions.

TIA reiterates its belief that the Commission will derive the following conclusions from the record in this proceeding: (1) demand exists for advanced telecommunications capability; (2) equipment is available to deploy such

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[44] *See* 47 U.S.C. § 251(c)-(d).

technology; (3) deployment is not occurring in a reasonable and timely fashion; (4) regulation is having a negative impact on deployment; (5) the Commission needs to take action to encourage deployment. As a result of these conclusions, the Commission can then move to the next step of taking "immediate action" to encourage the level of investment necessary to enable advanced telecommunications capability to be made available to all Americans in a reasonable and timely fashion.

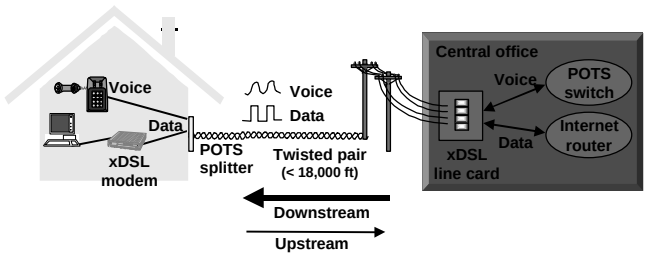
In taking this next step, the Commission should invite parties to offer specific and pro-competitive proposals that will afford them an opportunity to deploy technologies with advanced telecommunications capability. For example, TIA suggests that the Commission could offer optional relief under Section 706 to all telecommunications providers as follows:

(1) a "mutual agreement" similar to incentive regulation used with the cable industry to allow a carrier to design a specific plan of regulatory relief that is linked to deployment of advanced telecommunications capability; or

(2) a plan customized to meet the needs of a specific class of carriers.

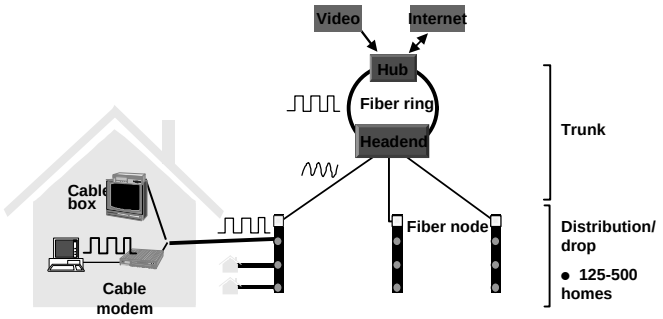
Slide 1

Figure 1
Digital subscriber loop (xDSL):



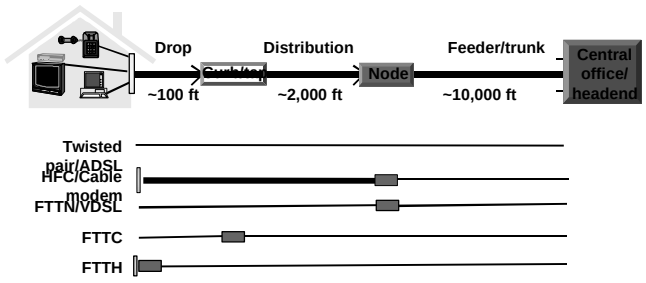
Slide 2

Figure 2
Hybrid fiber coax (HFC)/cable modems



Slide 3

Figure 3
Fiber-in-the-loop (FITL)



Appendix A

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Fujisu
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Hewlett-Packard
Houston Associates
Hughes Network Systems
IBM
Intel
InterTrust
Lucent Technologies
MCI Communications
Motorola
NIST
NEC
New York Times
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I, Jon S. Beamer, hereby certify that on this 23rd day of December, 1998, copies of the foregoing filing from the Telecommunications Industry Association were delivered to the following:

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