

**HIGHER GROUND: RECONCEPTUALIZING THE DEBATE OVER
DEPLOYING ADVANCED TELECOMMUNICATIONS CAPABILITY UNDER
SECTION 706 OF THE TELECOMMUNICATIONS ACT OF 1996**

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1. EXECUTIVE SUMMARY	1
1.1. Key Recommendations	2
1.2. The Method of Inquiry	3
1.3. Defining Advanced Telecommunications Capability	3
1.4. Is Advanced Telecommunications Capability Being Deployed in a Reasonable and Timely Fashion?	4
1.5. Is Advanced Telecommunications Capability Being Deployed to All Americans?.....	4
1.6. The FCC Should Take Immediate Steps to Ensure Timely Deployment of Truly Advanced Telecommunications Capability That Meets Congress' Vision	7
2. THE DEBATE OVER SECTION 706 NEEDS TO BE ENTIRELY RECONCEPTUALIZED	10
3. CONSTRUCTING A METHOD OF INQUIRY: THE STEPS THAT THE COMMISSION SHOULD TAKE TO PERFORM THE INQUIRY THAT CONGRESS DIRECTED	10
3.1. What Does Section 706 Mean? What Does it Instruct Policymakers To Do?.....	11
3.1.1. The Words of the Statute	11
3.1.2. The Status of Section 706 Matters Before the FCC.....	12
3.1.3. The Importance of a Working Definition of Advanced Telecommunications Capability	15
3.2. Is Advanced Telecommunications Capability Being Deployed In A Reasonable And Timely Fashion?.....	21
3.3. Is Advanced Telecommunications Capability That Meets Congress' Goals Being Deployed To All Americans?.....	23
3.3.1. Digital Subscriber Line	24
3.3.2. Cable Modems.....	26
3.3.3. Fiber Optics	28
3.3.4. Wireless Technologies	30
3.3.4.1. Direct Broadcast Satellite	30
3.3.4.2. Multichannel Multipoint Distribution Service (MMDS)	31
3.3.4.3. Local Multipoint Distribution Service (LMDS).....	31
4. WHAT SHOULD POLICYMAKERS DO TO SPREAD THE BENEFITS OF ADVANCED TELECOMMUNICATIONS CAPABILITY TO ALL AMERICANS?	31

1. EXECUTIVE SUMMARY

Section 706 of the Telecommunications Act of 1996 directs the Federal Communications Commission to take stewardship of a technology and economic development issue that is central to the economic success and competitiveness of the United States for the coming century: timely deployment of advanced telecommunications capability¹.

The Federal Communications Commission has done an enormous amount of work to elevate awareness of what is at stake in the debate over Section 706. But now that debate

¹ This paper is based on and borrows and draws from work prepared for the Policy Committee of the Telecommunications Industry Association during its study and consideration of the docket in the Section 706 Notice of Inquiry. This paper was written in the course of consulting work with Corning.

needs to be entirely reconceptualized. So far, the discussion has been dominated by what kinds of regulatory relief or incentives could be unleashed in order to hasten more ubiquitous deployment of currently available advanced services over existing facilities. This approach overlooks the distinction between advanced services and advanced capability. Section 706 is concerned with the deployment of advanced telecommunications *capability*, which relates to how to deploy the next generation of infrastructure that will support advanced services.²

Allowing the debate to remain within its current frame of reference, focusing on services rather than capability, also risks giving up too much too soon for too little. The best value for the public will result if regulators keep their eyes on the horizon and devise a creative and forward-looking plan that encourages all providers to stretch towards a higher bar if they desire to compete for customers in a deregulated space. That higher bar should be defined with reference to the text of the statute and should be informed by industry professionals' consensus describing which sorts of services advanced telecommunications capability should be able to support and what is attainable.

1.1. Key Recommendations

This paper makes three fundamental recommendations.

- 1. Advanced telecommunications capability that meets the definition and intent of Section 706 is not being deployed in a reasonable and timely fashion, and the Commission should so declare.**
- 2. The Commission should articulate a standard that will obtain for the public dramatic increases in speed and quality of transmission, not the smaller improvements that have become the focus of the debate. In this way, the Commission should raise the debate to higher ground.**
- 3. At the same time as it moves the debate to higher ground, the Commission should strive to make a clearing in the woods -- to invent a deregulated space in which all providers from all industry segments can compete to offer advanced telecommunications capability to the public. Its approach should be to encourage providers from all industry segments to come forward with plans to accelerate deployment of advanced telecommunications capability, and to identify incentives and deregulatory changes that the Commission could effect to aid such deployment.**

² The FCC itself supports this distinction, as acknowledged in its notice of inquiry: "We distinguish between advanced telecommunications capability and services derived from it ("advanced services"), as in the distinction between infrastructure and applications, or between facilities and services offered to end users. We ask that commenters observe this distinction." Notice of 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 98-146 (released August 7, 1998) (hereinafter "Section 706 NOI"), at para. 13, n.8.

1.2. The Method of Inquiry

The language of the statute can be parsed into a series of essential questions that must be answered in order to perform the inquiry mandated by Section 706.

1. What does advanced telecommunications capability mean?
2. Is advanced telecommunications capability being deployed in a reasonable and timely fashion?
3. Is advanced telecommunications capability being deployed to all Americans?
4. What, if anything, should regulators do to accelerate the deployment of advanced capability?

If the answer to *either* question 2 or question 3 is in the negative, Section 706 requires the FCC to take the further steps suggested in question 4. Section 706 directs the FCC, in the event of a negative determination, to "take immediate action to accelerate deployment of [advanced telecommunications] capability"³

1.3. Defining Advanced Telecommunications Capability

In defining this higher bar, the definitional issue of what constitutes advanced telecommunications capability is of paramount importance. It is the key question from which all the other work that Congress delegated to the FCC flows.

In deciding what constitutes advanced telecommunications capability, the FCC should be guided by the following principles:

1. The standard or bar should be high enough to provide an incentive to all service providers to innovate and make new investment in new infrastructure. This higher bar should demand a significant improvement in the transmission speed of what the FCC should think of as the "first mile", not the "last mile", on the path from the user to the network of networks.⁴ This significant improvement should reflect a goal that is beyond what is already being deployed.
2. The definition should operate in a manner that is neutral with respect to all service providers. It should not be slanted toward any class of service providers in the sense that one may more readily achieve it than others.
3. The definition should embrace a capability that supports robust, broadband high-speed transmission of voice, data and video.

³ Pub.L. 104-104, Title VII, § 706, Feb. 8, 1996, 110 Stat. 153, reproduced in the notes under 47 U.S.C. § 157.

⁴ See Living Room LAN, Steve G. Steinberg, *Wired* 6.08 (Aug. 1998) suggesting that it is a misconception to think of the link between the customer premise and the network as the last mile rather than the first mile.

The words of the statute can be given real world content by examining what industry professionals regard as a sufficiently robust measure to meet the definition. Accordingly, the Commission should study the work of the Cross-Industry Working Team on Class Profiles for the Emerging NII, and embrace Class 3 as the goal for encouraging deployment of advanced telecommunications capability, with Class 4 as the long-term goal⁵.

1.4. Is Advanced Telecommunications Capability Being Deployed in a Reasonable and Timely Fashion?

The FCC's Notice of Inquiry frames this part of the inquiry by asking whether Section 706 intends the FCC to look to an objective schedule of deployment.⁶ The legislative history of Section 706 suggests otherwise. It instructs that the inquiry "shall include an assessment by the FCC of the availability, at reasonable cost, of equipment needed to deliver advanced broadband capability,"⁷ suggesting an examination of relative cost and availability.

Thus, the FCC's inquiry on this prong of its Section 706 mission should examine:

1. whether the equipment needed to deploy advanced telecommunications capability is currently available in the marketplace for carriers to purchase and install, and
2. whether that equipment is priced at a reasonable cost.

The FCC could logically end its inquiry here and begin to take the remedial steps that Section 706 requires. Any reasonable inquiry on these points will yield the discovery that reasonably priced equipment to deploy advanced telecommunications capability that can support the Class 3 Profile is currently available in the marketplace, but it is not being deployed in a reasonable and timely fashion. Instead, most carriers, constrained by their legacy architecture, are investing in marginally faster capabilities that do not meet the Class 3 standard. The FCC's negative answer to the question of whether properly defined advanced telecommunications capability is being deployed in a reasonable and timely fashion would be enough to require it to act. But for the sake of a complete inquiry, the method should include the final question that the statute frames, which is whether advanced capability is being deployed to all Americans.

1.5. Is Advanced Telecommunications Capability Being Deployed to All Americans?

In deciding whether advanced telecommunications capability that meets the Act's goals and intent is being deployed to all Americans in a reasonable and timely manner, the FCC should be guided by the following principles:

⁵ Class 3 services include robust transmission of voice, data and video and support applications that will connect customers in their homes with the network in ways that will make distance transparent. Class profiles are discussed at page 16 *et seq.*

⁶ Section 706 NOI, *supra* note 2, at para. 59.

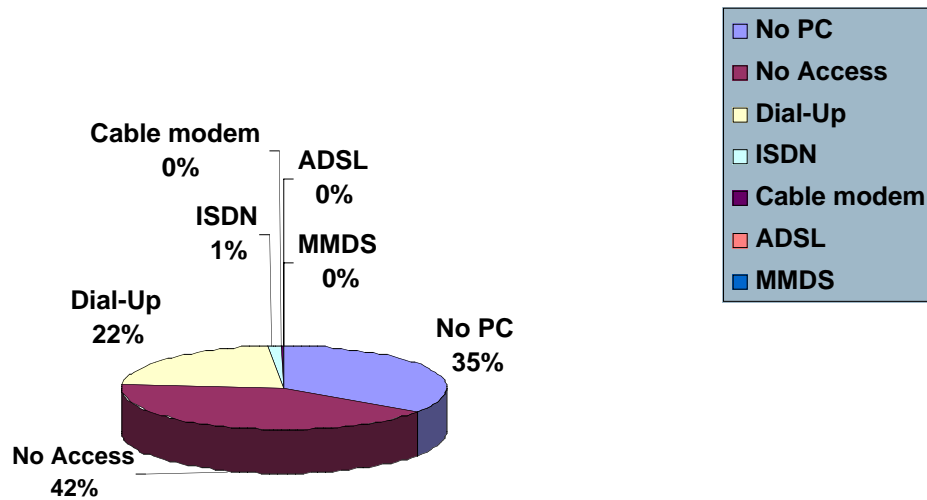
⁷ S. REP. NO. 23, 104th Cong., 2nd Sess. at 50.

1. The Congress set out an ambitious goal: deployment to *all* Americans. This necessitates measurement of residential deployment. Even large-scale deployment to businesses, were it occurring, would not be sufficient to satisfy the deployment goal. Even if this residential deployment goal is understood as *merely* requiring deployment or availability on the same scale as that of plain old telephone service (POTS), this sets the goal at deployment to 94 percent of households, or, effectively, availability of the capability to nearly 100 percent of households even if the service is not taken by the household. Either is an ambitious, approaching utopian, goal, but there are not many ways to construe the words "all Americans" to mean something less.
2. The FCC may acknowledge the end-user benefits of services that offer access to the network of networks at higher speeds than are now available on analog telephone lines. The FCC should not, however, endorse any party's notion that such deployment satisfies the goals of Section 706, which is the deployment of advanced telecommunications capability to all Americans in a reasonable and timely manner.

As the chart below indicates, under no stretch of the imagination is advanced telecommunications capability capable of supporting the Class 3 Service Profile being deployed to residential customers in the U.S. It is impossible for the FCC to make an affirmative determination under Section 706 on the basis of deployment of ADSL and cable modems to fewer than 500,000 residences. A negative answer to this question, alone or in combination with its negative determination on the question of whether advanced telecommunications capability is being deployed in a reasonable and timely manner, requires the FCC to act.

The reason for being concerned about this is evident from the following charts. The first chart demonstrates that there is considerable room for growth in the area of getting U.S. households on line.

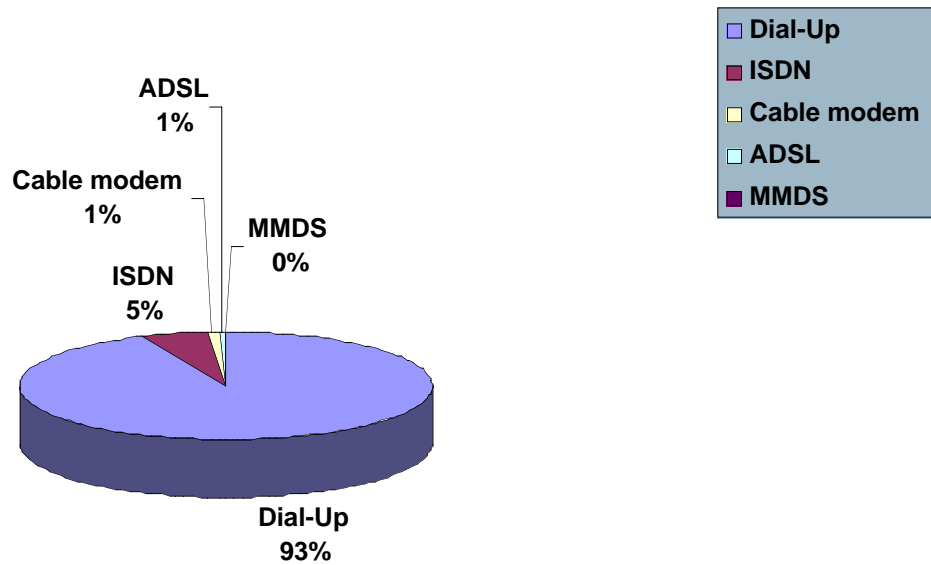
Chart 1
US Households - Are They On Line?



Source: Carmel Group, July 1998. Note: "Zero" signifies less than one percent.

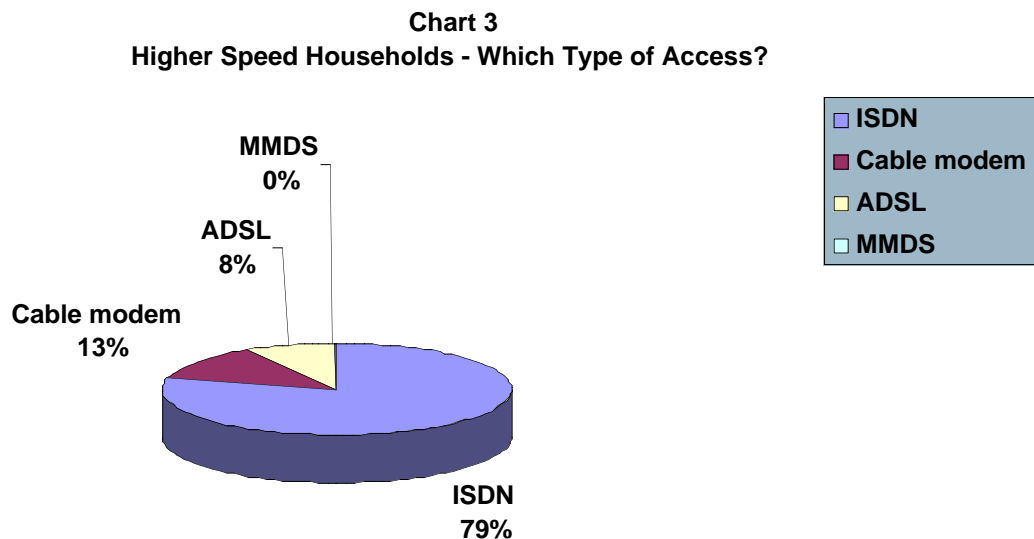
The second chart shows that among households that are on line, most such households rely upon dial-up access

Chart 2
U.S. Households On Line - How Do They Get There?



Source: Carmel Group, July 1998. Note: "Zero" signifies less than one percent.

The third chart shows that among those U.S. households that are on line and use a higher speed technology for access, ISDN predominates, with deployment of cable modems and ADSL following. MMDS deployment is less than one percent.



Source: Carmel Group, July 1998. Note: "Zero" signifies less than one percent.

1.6. The FCC Should Take Immediate Steps to Ensure Timely Deployment of Truly Advanced Telecommunications Capability That Meets Congress' Vision

Once the FCC has answered either the question of "is advanced telecommunications capability being deployed to all Americans?" or "is advanced telecommunications capability being deployed in a reasonable and timely fashion?" in the negative, Section 706 offers it no option as to whether to take remedial steps. But it does afford the Commission considerable discretion over which remedial steps to take. It can execute its mission under Section 706 by "removing barriers to infrastructure investment and by promoting competition in the telecommunications market".

So far, the debate has been dominated by proposals to remove regulations that parties assert are limiting investment incentives toward build-out of xDSL technologies. In addition, the debate has become a battleground over new regulatory proposals to unbundle the cable plant, which cable operators argue will curb incentives to invest in cable plant upgrades to provide cable modem service.

The Commission should lead the debate to higher ground by insisting on deployment of truly advanced telecommunications capability -- that which is sufficient to support the services in the Class 3 Profile -- and organizing creative incentives to encourage providers to invest in and deploy such capability. The Commission should proceed on two tracks:

1. On the first track, the FCC should invite industry parties to propose specific ways in which regulations can be amended, waived or streamlined to facilitate investment in truly advanced telecommunications capability. The context for discussing such proposals could be the model that some states have used to negotiate a transition from rate of return regulation to price cap regulation.⁸ The government would commit to such regulatory changes in exchange for a commitment to deploy advanced telecommunications capability on an agreed upon schedule, reflecting an accelerated pace. Any potential provider of service -- common carrier, cable operator, wireless (terrestrial or satellite) provider -- could approach the FCC with such a proposal.
2. On the second track, the FCC could develop such plans for classes or groups of providers, with the participation of such providers along the model of a negotiated rulemaking, with which the FCC has considerable experience. Each class of providers currently operates under a separate legacy of regulation. Some entities operate under Title II, some under Title III, and others under Title VI. A uniform solution under Section 706 is difficult given these disparate starting points under legacy regulation. These different starting points also mean that the various potential providers of advanced telecommunications capability are in the position of needing different kinds of relief and incentives in order to accelerate deployment of advanced telecommunications capability. The goal ultimately is to get all providers to the same place at the same time, but that means allowing them to travel different paths because they all start from a different point.

The result of this approach would be to encourage providers to meet a higher bar in deploying advanced telecommunications capability by proffering creative, non-standard plans for getting there. No provider would be excused from obligations imposed by Congress in the Telecommunications Act of 1996 as they apply to existing facilities. The issue of ILEC compliance with these responsibilities may be on a very different footing by the time any plans conceived under this regime could be implemented. Given the time it will take to develop Section 706 proposals and secure approval, implementation of any such plans likely would follow rather than precede any ILEC Section 271 authority to offer interLATA services. Section 271 authority itself is dependent on a Commission finding that the ILEC meets the “competitive checklist” of Section 271(d)(3), including provisions relating to interconnection and provision of unbundled network elements.

Each class of provider would speak for itself in such proceedings before the Commission, and no third party could now presume to foresee what different providers might wish to put on the table that would be of value to various advanced telecommunications

⁸ The FCC itself has some experience in negotiating infrastructure and service improvements in exchange for changes in regulatory treatment. In its social contract proceedings in the cable industry, the Commission negotiated upgrades to cable plant and service with cable operators in exchange for more lenient regulatory treatment. What is suggested here is different from the cable social contracts, which devolved into settlement vehicles for rafts of rate complaints. Here, the provider would make a proffer of investment on a schedule along with a regulatory design that not only embraces those minimum elements of relief necessary to make the proposed investment economic but also reasonably serves the public interest.

capability deployment business plans. But here are a few ideas about where the proceedings might lead.

For cable operators, the Commission could abjure common carrier-style regulation of the cable plant in the form of cable unbundling. It could recommend to Congress legislative changes that would remove truly advanced capability cable modem services from the class of cable services that are subject to the franchise fee.

For CLECs, the Commission could negotiate with the states for streamlined national approaches to certification issues, and for streamlined interconnection agreement procedures, without waiting for the final adjudication of the Commission's 1997 interconnection rules.

For the wireless industries, the Commission could negotiate national consensus standards on taxation and zoning issues and give close consideration to those forbearance proposals advanced by the industries that pertain directly to accelerated deployment of advanced telecommunications capability.

For ILECs, the suggested approach could mean the attainment of some of the regulatory relief that they sought in their 1998 Section 706 petitions, but only in exchange for the measurable commitment and accomplishment of the deployment of advanced telecommunications capability that really meets the definition set out by Congress. One approach to this problem would be to bifurcate treatment of "new" and "existing" plant investment to deploy advanced telecommunications capability. This would allow adoption of new deregulatory approaches without upsetting the balance that the 1996 Act struck to encourage competition. Nonstructural separations and price caps would guard against cross-subsidization of the services.

Under this approach, existing interconnection, unbundling and other regulations would continue to apply to existing facilities. But new investment in advanced telecommunications capability by any provider and all providers would be subject to a deregulatory regime guided by the following elements:

- the offering of advanced telecommunications capability by any provider would be declared an unregulated service because no carrier is dominant in the market;
- the unbundling and interconnection requirements associated with the "existing facilities" would not apply to the "new facilities";
- price caps on basic services would be used to prevent cross-subsidization where common facilities are used; and
- the capability would be provided over an integrated platform with no structural separation requirement, although non-structural separation safeguards would still likely be necessary.

2. THE DEBATE OVER SECTION 706 NEEDS TO BE ENTIRELY RECONCEPTUALIZED

The debate over Section 706 needs to be entirely reconceptualized. So far, the discussion has been dominated by what kinds of regulatory relief or incentives could be unleashed in order to hasten more ubiquitous deployment of currently available advanced services. This approach risks giving up too much too soon for too little. The best value for the public will result if regulators keep their eyes on the horizon and devise a creative and forward-looking plan that encourages all providers to stretch towards a higher bar. That higher bar should be defined with reference to the text of the statute and should be informed by industry standards describing what advanced capabilities are attainable.

Section 706 of the Telecommunications Act of 1998 presents a vision to which the FCC and the industry are to aspire. It is a warrant for the Commission to pursue not what is already doable, but what is achievable. It was enacted as, and must be construed as, extraordinary authority to accelerate advanced infrastructure deployment, which can be done without denigration of the other goals of the Act.

Section 706 demands debate and problem solving on a higher plane. It invites the FCC and the industry to strive toward a broader vision of what is possible, and not simply debate the status quo. In order to address the challenge of advanced telecommunications capability deployment on this higher ground, the FCC will have to invent a new deregulatory space -- a clearing in the woods -- where providers can compete with one another, free from unnecessary regulation, to connect customers to advanced networks.

Opening the deregulatory pathway can be accomplished by identifying particular goals and creating incentives, while allowing providers to establish their own investment criteria. Comment by the public and knowledgeable industry participants is an essential part of the process. The result will be creative, non-standard approaches to the challenge of providing incentives to investment without undue interference with the market mechanism.

3. CONSTRUCTING A METHOD OF INQUIRY: THE STEPS THAT THE COMMISSION SHOULD TAKE TO PERFORM THE INQUIRY THAT CONGRESS DIRECTED

The language of the statute can be parsed into a series of essential questions that must be answered in order to perform the inquiry mandated by Section 706.

1. What does advanced telecommunications capability mean?
2. Is advanced telecommunications capability being deployed in a reasonable and timely fashion?
3. Is advanced telecommunications capability being deployed to all Americans?

4. What, if anything, should regulators do to accelerate the deployment of advanced capability?

The FCC's notice of inquiry essentially follows this template. If the answer to *either* question 2 or question 3 is in the negative, Section 706 requires the FCC to take the further steps suggested in question 4.

3.1. What Does Section 706 Mean? What Does it Instruct Policymakers To Do?

3.1.1. The Words of the Statute

Section 706⁹ of the Telecommunications Act of 1996 provides as follows:

- (a) In general -- The Commission and each State commission with regulatory jurisdiction over telecommunications services shall encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans (including, in particular, elementary and secondary schools and classrooms) by utilizing, in a manner consistent with the public interest, convenience and necessity, price cap regulation, regulatory forbearance, measures that promote competition in the local telecommunications market, or other regulating methods that remove barriers to infrastructure investment.
- (b) Inquiry -- The Commission shall, within 30 months after the date of enactment of this Act [August 1998], and regularly thereafter, initiate a notice of inquiry concerning the availability of advanced telecommunications capability to all Americans (including, in particular, elementary and secondary schools and classrooms) and shall complete the inquiry within 180 days after its initiation [February 1999]. In the inquiry, the Commission shall determine whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion. If the Commission's determination is negative, it shall take immediate action to accelerate deployment of such capability by removing barriers to infrastructure investment and by promoting competition in the telecommunications market.
- (c) Definitions -- For purposes of this subsection:
 - (1) Advanced Telecommunications Capability. -- The term "advanced telecommunications capability" is defined, without regard to any transmission media or technology, as high-speed, switched, broadband

⁹ Pub.L. 104-104, Title VII, § 706, Feb. 8, 1996, 110 Stat. 153, reproduced in the notes under 47 U.S.C. § 157.

telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology.

- (2) Elementary and Secondary Schools. -- The term "elementary and secondary schools" means elementary and secondary schools, as defined in paragraphs (14) and (25), respectively, of Section 14101 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 8801).

The FCC's efforts to effect the intent of Section 706 have followed two paths. One path has involved its work on petitions for regulatory relief filed pursuant to Section 706. The other has involved its management of the inquiry that the statute directs it to undertake. The FCC's work on the inquiry, especially, reflects its appreciation of the importance of a regulatory climate that is conducive to investments in advanced telecommunications capability:

We intend for advanced technology to have every opportunity to flourish and herein we seek comment on ways to make its deployment more efficient and more inclusive. Advanced capability and services can create investment, wealth, and jobs. They can meaningfully improve the nation's productivity and educational, social, and health care services. They can create a more productive, knowledgeable, and cohesive nation.¹⁰

3.1.2. The Status of Section 706 Matters Before the FCC

In early 1998, several parties filed petitions with the FCC for regulatory relief under Section 706, urging the FCC to act with specificity to promote deployment of higher-speed services, and not to wait for the commencement, conduct and completion of the inquiry required by the statute.

Bell Atlantic proposed that the Commission remove several restrictions limiting Bell Atlantic's and other regional Bell operating companies' (RBOCs') use of broadband facilities. Bell Atlantic advocated that it be permitted to provide high-speed broadband services without regard to present local access and transport area (LATA) boundaries. It also proposed that in exchange for developing high-speed broadband services that exceed ISDN (integrated services digital network) speeds, including all xDSL (digital subscriber line) services, it be released from pricing, unbundling, and separations restrictions designed for voice calls. Bell Atlantic also argued that it should not be subject to the mandatory access rules for such services. Additionally, Bell Atlantic stated that its sale of new broadband services should not be subject to price cap and separate affiliate rules.¹¹

¹⁰ Section 706 NOI, *supra* note 2, at para 1.

¹¹ Petition of Bell Atlantic Corporation for Relief from Barriers to Deployment of Advanced Telecommunications Services, CC Docket No. 98-11 (filed Jan. 26, 1998).

In its petition, Ameritech proposed that it be allowed to provide in-region interLATA data services through the Commission modifying the definition of LATA to establish a single global LATA for provision of non-circuit-switched data services and facilities or by the Commission exercising its regulatory forbearance authority regarding the application of Section 271 to non-circuit-switched data services. Ameritech similarly urged that the Commission find that the Section 251(c) rules, which require local exchange carriers to provide unbundled network elements and services for resale, not apply to providing these new data services. Additionally, Ameritech noting that Section 272 would envision Ameritech establishing a separate affiliate, proposed that the Commission adopt "less onerous" separation requirements.¹²

U S WEST advocated that the Commission forbear from applying regulations that frustrate the deployment to rural America of advanced telecommunications capability. U S WEST asked for clearance to build and operate packet- and cell-switched data networks across LATA boundaries and to provide interLATA data traffic "incident" to its provision of xDSL services. U S WEST also urged the Commission to forbear from requiring it to provide competitors with the "non-bottleneck" elements used for these services as unbundled network elements and to forbear from requiring U S WEST to offer these services at a wholesale discount to resellers.¹³

Southwestern Bell Telephone, Pacific Bell and Nevada Bell noted similar restraints on the capability to roll out advanced services. They urged the Commission to pursue advanced telecommunications by forbearing from regulating its DSL service offerings.¹⁴

The Alliance for Public Technology (APT), claiming that there will be a long-lasting shortage of advanced telecommunications capability in some areas, such as inner cities or low-income rural areas, urged that the Commission should use social contracts with incumbent local exchange carriers similar to those the Commission entered into with cable operators. It also urged the Commission to place conditions on mergers and acquisitions, and encourage community-based organizations to create a "demand pull."¹⁵ It also called for a federal/state/community-based "partnering" to help rural and low-income areas fill the void that competitive entities will leave because they need to go where demand and willingness to pay are highest. APT suggests such a partnership is a

¹² Petition of Ameritech Corporation to Remove Barriers to Investment in Advanced Telecommunications Capability, CC Docket 98-32 (filed March 5, 1998).

¹³ Petition of U S WEST Communications, Inc., for Relief from Barriers to Deployment of Advanced Telecommunications Services, CC Docket No. 98-26 (filed Feb. 25, 1998)

¹⁴ Southwestern Bell Telephone Company, Pacific Bell, and Nevada Bell Petition for Relief from Regulation Pursuant to Section 706 of the Telecommunications Act of 1996 and 47 U.S.C. Sec. 160 for ADSL Infrastructure and Service, CC Docket No. 98-91 (filed June 9, 1998).

¹⁵ Petition of the Alliance for Public Technology Requesting Issuance of Notice of Inquiry & Notice of Proposed Rulemaking to Implement Section 706 of the 1996 Telecommunications Act, *Petition of the Alliance for Public Technology* at 27-41 (Feb. 18, 1998) (APT Petition).

necessary complement to a market-based system, because the market for advanced telecommunications capability will likely not be a perfect one.¹⁶

On August 7, 1998 the FCC denied the petitions for the relief requested and instead outlined a proposed plan that would allow incumbent local exchange companies (ILECs), including the Regional Bell Operating Companies (RBOCs), to offer higher speed services with diminished regulatory responsibilities if the services were offered through separate affiliates of the ILECs.¹⁷ The FCC is currently working, as of the date of this paper, on the rules that would govern the formation and operation of the separate affiliates. Several of the RBOCs have indicated that the separate affiliates, as they envision the FCC will define them under the new rules, will not be workable solutions.¹⁸

Simultaneously with the release of the Notice of Proposed Rulemaking on the offering of higher-speed services through separate affiliates, the FCC initiated the Notice of Inquiry (NOI) required by Section 706.¹⁹ In the NOI, the Commission recognized that the availability of advanced services encompassed both a technical and a regulatory challenge. The technical challenge is that much of the present network that ends at the residence of the consumer does not have the capability to be characterized as “advanced”. The regulatory challenge recognizes that the current system is uneven in its treatment of different technologies. Noting that it sought to rely on free markets and private enterprise as much as possible, the Commission sought wide-ranging comment on the issues involved.²⁰ The scheduled completion date of the NOI, also specified in the statute, is effectively February 8, 1999. It is anticipated that the FCC will prepare a report to Congress on or before that date, and that the matter may be scheduled for Commission action at the January 28 meeting.

On December 7, 1998, a coalition of Regional Bell Operating Companies and manufacturers of computers and semiconductor chips announced a plan to increase the rate of ADSL deployment if the FCC granted certain regulatory relief. In a letter to Chairman Kennard, the coalition conveyed a set of core principles that it believed would speed the development of the information economy. The proposal sought to balance the interests of incumbent local telephone companies, competitive local exchange carriers, the computer industry and consumers to accelerate the deployment of advanced network technologies, including higher-speed DSL internet access. The coalition stressed that the

¹⁶ *Id.* at 35-38.

¹⁷ Deployment of Wireless Service Offering Advanced Telecommunications Capability, Petitions of Bell Atlantic Corp., et al, Memorandum Opinion and Order and Notice of Proposed Rulemaking, FCC 98-188, CC Dockets 98-11, 98-15, 98-26, 98-32, 98-78, 98-91, 98-147 (released August 7, 1998) at para 12.

¹⁸ Spokespersons for US West, Bell Atlantic and BellSouth all reflected this view in statements made after the Commission's adoption of the NPRM on Section 706. See "Section 706 Battle Shifts to Details of Separate Affiliates: FCC Eyes Expanding Collocation, Targeted InterLATA Relief", 64 *Telecommunications Reports* 4 (Aug. 10, 1998).

¹⁹ Pub.L. 104-104, Title VII, § 706, Feb. 8, 1996, 110 Stat. 153, reproduced in the notes under 47 U.S.C. § 157.

²⁰ Section 706 NOI, *supra* note 2, at paras 3-5.

nation's telecommunications networks were not keeping up with needs for faster, more reliable access to the Internet.²¹

The record before the Commission addressing Section 706 reflects a commitment to advanced telecommunications services as well as the need to be released from regulatory obligations, by a range of interests. Less clear from the record are points that both commence and delineate the debate. For the purpose of Section 706 to be served, the Commission recognized that it must articulate the goals to be obtained and determine how free markets and private enterprise can pursue these goals.²² This presentation suggests the parameters of debate as well as substantive recommendations of how the range of interests involved can pursue deployment of advanced telecommunications capability. From the outset, advanced telecommunications capability must be defined – not as a desire by one class of providers finally to deploy services already available to anyone who wishes them in areas where they are offered – but to ensure that what is deployed reflects something truly greater than what is currently available. Within this challenge is securing advanced telecommunications services for all Americans, as the law requires, and doing so in a timely fashion. Significantly, the Commission must also address how to accelerate deployment: what incentives to create or what restrictions to remove.

3.1.3. The Importance of a Working Definition of Advanced Telecommunications Capability

The statute provides the following definition of advanced telecommunications capability:

(d) Definitions -- For purposes of this subsection:

(3) Advanced Telecommunications Capability. -- 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.

The FCC so far has not said what constitutes advanced telecommunications capability, and has sought comment on how the concept should be defined. It has zeroed in on the use of the terms "broadband" and "high-speed" in the statutory definition, and has asked in broad terms how these terms should be defined and applied in the Commission's inquiry.

It is important to adopt such a definition soon because all the other aspects of the Section 706 inquiry depend upon how advanced telecommunications capability is defined. The

²¹ Letter to the Honorable William E. Kennard, Chairman, Federal Communications Commission, December 7, 1998, submitted on behalf of Bell Atlantic, BellSouth, Compaq Computer Corporation, Gateway, GTE, Intel, Microsoft, SBC, and US West. Although it represents an admirable and creative effort, the coalition's proposal does not serve as an example of the deregulatory proffer that is proposed here because it does not promise deployment of truly advanced telecommunications capability. It involves deployment of ADSL.

²² Section 706 NOI, *supra* note 2, at paras 3-5

absence of a definition thus far in the debate means that the parties that are applying for regulatory relief and the parties that are trying to comment helpfully in the record in the notice of inquiry lack guidance on what the FCC is setting out to measure to assess whether advanced telecommunications capability is being deployed in a reasonable and timely fashion.

In the absence of a definition, the measurement process lacks a measuring stick, and parties are free to assert that any service over existing facilities that is faster than technologies that are currently reasonably widely available to residential subscribers, such as ISDN, constitutes advanced telecommunications capability. This sells the concept of advanced telecommunications capability and what Congress sought to do via Section 706 too short; it obtains for the public no quantum leap toward a robust, bi-directional network.

The FCC need not and should not adopt a strict and permanent definition of advanced telecommunications capability. To do so would sacrifice the benefit of flexibility, a concept that fits hand in glove with the dynamic, recurrent review process that Section 706 envisions. But the FCC can adopt a working definition, which can evolve over time, of what advanced telecommunications services means so that:

- the deployment of services meeting that definition can be measured as Section 706 envisions;
- carriers, the public, the Congress and policymakers will know how high the bar has been set for purposes of considering what policy initiatives or remedies may be appropriate to encourage the deployment of advanced telecommunications services.

This market certainty will support the deployment that Section 706 seeks to encourage.

The definition of advanced telecommunications capability need not be, and must not be, static. A dynamic approach has been applied, for example, by the ITU, in other contexts.²³ The definition can and should reflect the dynamism and flexibility of Section 706, which instructs the FCC to take periodic soundings of the state of deployment.

To translate the language of the statute, which describes a policy goal, into an operational definition, it is necessary to look at work that describes communications capabilities that can do what Congress has in mind. A logical place to look is at the work of the Cross-Industry Working Team which has organized "Class Profiles" for telecommunications capabilities and the end-user services and applications that they can provide, and the end-user equipment associated with such services and applications.²⁴

²³ See ITU-T Recommendation 1.211: Integrated Services Digital Network (ISDN) Service Capabilities, Document 1.211 at section 2.4.2 (March 1993).

²⁴ Cross-Industry Working Team, Class Profiles for the Current and Emerging NII (February 1997), available at www.cnri.reston.va.us under "XIWT Working Papers". The Cross-Industry Working Team filed the Class Profiles paper in the Section 706 Notice of Inquiry docket (CC Docket No. 98-146) on October 26, 1998. Letter of Charles N. Brownstein, Executive Director, Cross-Industry Working Team to Magalie Roman Salas, Secretary of the Commission, dated October 20, 1998.

A table summarizing the Class Profiles is reproduced below. It represents the consensus view of professionals in the allied fields of communications, equipment manufacture and computing.²⁵ The Working Team took its cue from the computing industry's successful initiative to kickstart multimedia PCs by developing a standard upon which consumers could rely to reduce uncertainty when buying computers advertised as capable of running multimedia applications.

²⁵The corporate members of the Cross-Industry Working Team are 3Com Corporation, Alcatel Telecom, American Management Systems, Apple Computer, AT&T, Bay Networks, BBN, Bell Atlantic, Bellcore, BellSouth, Cisco, Citicorp, Compaq, Corning, Cybercash, Digital Equipment, EarthLink Network, EPRI, Ericsson, Fujitsu, GTE Laboratories, Hewlett-Packard, Houston Associates, Hughes Network Systems, IBM, Intel, InterTrust, Lucent Technologies, MCI Communications, Motorola, NIST, NEC, New York Times, Nortel (Northern Telecom) Novell, Philips Research Briarcliff, Prodigy Services, QuantumLink, SAIC, Silicon Graphics, Southwestern Bell, Sprint, Sun Microsystems, Texas Instruments, US West, and West Group.

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
	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 ²⁶
	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.²⁷

As among the profiles identified by the Cross-Industry Working Team, Class 3 is the minimum profile that meets Congress' Section 706 goal of robust, high-speed, bi-

²⁶ By implication, the reference is to such services with substantial upstream capability.

²⁷ For each Class Profile, the information regarding Data Transfer Rate has been added to the content of the Team's original chart.

directional transmission, allowing such transmission at the rate of 1 to 10 Mbps over a sustained period of time. With the Class 3 profile, users would enjoy improvements in services such as:

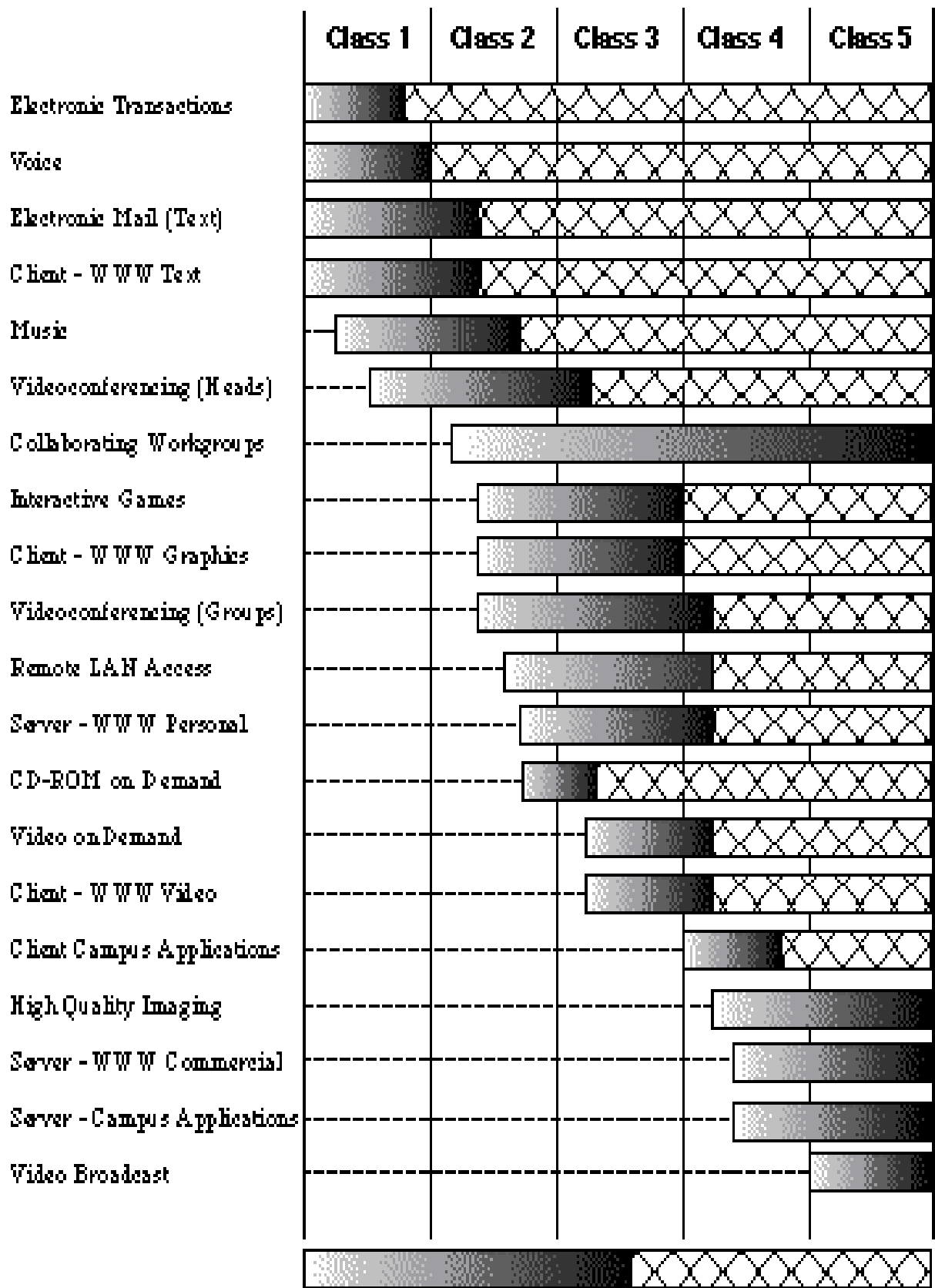
- Video-conferencing
- Workgroup collaboration
- Interactive games
- World Wide Web server functionality from home or from a small office, with high graphic and interactive content beyond today's typical personal or small business home page capabilities
- Remote Local Area Network access for work purposes from home or another away-from-office location
- CD-ROM quality access to remote data

Additional services that would be possible in a widely-distributed way for the first time would include:

- Entertainment-quality video on demand
- Client campus applications, including telepresence
- Delivery of high-quality images, where such high quality really matters, as in x-ray images
- Commercial World Wide Web server functionality
- Video broadcast surrogate

Class 4, naturally, embraces and describes an even more robust capability, and should serve as a long-term goal for the Commission as it undertakes the recurrent reviews of the state of deployment of advanced telecommunications capability that Section 706 directs the FCC to undertake. The chart below illustrates the continuum of improvements in services associated with the Class Profiles.²⁸ Section 706 gives the FCC broad latitude to take steps to encourage the deployment of advanced telecommunication capability, and the law contains no injunction against intermediate steps toward long-term goals, and the Class 3 profile is a good place to start -- a significant improvement over currently available capability, but within reach of timely deployment.

²⁸ The chart is reproduced from Cross-Industry Working Team, Class Profiles for the Current and Emerging NII (February 1997), available at www.cnri.reston.va.us under "XIWT Working Papers".



Domain over which an increasingly acceptable level of service capability can be achieved unconstrained by economics

Domain over which increasing bandwidth no longer provides a perceptible increase in service capability

3.2. Is Advanced Telecommunications Capability Being Deployed In A Reasonable And Timely Fashion?

Section 706(b) requires the Commission to “determine whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion.” The Commission’s notice of inquiry addresses the question in logical terms:

Section 706(b) requires that the Commission “determine whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion.” We ask, first, how to make the statutory determination whether deployment is occurring “in a reasonable and timely fashion.” For example, is the event whose occurrence we must detect the deployment of new facilities, or the actual use of services by subscribers? Second, must we, or should we, adopt a time-specific schedule or set objective targets to meet this requirement? If we should, what would the schedules or targets be? Also, we recognize that the Act requires that we promote deployment of advanced services in a competitive, deregulatory environment. To what extent should the time frames for deploying other technologies inform our interpretation of reasonable, timely deployment? What technologies should we look to for guidance regarding these time frames?²⁹

The only legislative history illuminating this provision is provided in one passage in the Senate Commerce Committee Report, which states that this determination “shall include an assessment by the FCC of the availability, at reasonable cost, of equipment needed to deliver advanced broadband capability.”³⁰

Breaking this first part of the “reasonable and timely” inquiry into its components, the Commission should examine, with respect to equipment needed to provide advanced telecommunications capability:

- (1) whether the equipment is “available”, and
- (2) whether the equipment is priced at “reasonable cost.”

Determining the availability of the equipment should be based on a rather straightforward assessment on whether vendors are offering to sell equipment that can provide advanced telecommunications capability. Under this definition, equipment in the research development phases of the innovation process would not qualify as “available.” Equipment vendors must be ready to take orders in order to meet this proposed standard for assessing availability.

²⁹ Section 706 NOI, *supra* note 2, at para 59.

³⁰ S. REP. NO. 23, 104th Cong., 2nd Sess. at 50.

The issue of “reasonable cost” is more complex, but extremes can be delimited. One extreme is to note whether the equipment can be deployed so that the revenue generated by the provision of advanced telecommunications capability utilizing the equipment in question is at least sufficient to cover all the costs of providing such service, including research and development. There are several possibilities concerning how to approach the determination. One is to ascertain that the equipment can be deployed at reasonable cost if a business case can be made for deployment. Such a case must demonstrate that the revenue generated by the provision of advanced telecommunications capability utilizing the equipment in question is sufficient to cover all the costs of providing such service, including depreciation expense. Under these conditions, it is certainly logical to conclude that the cost of the equipment is “reasonable.” Stated differently, it is unreasonable to expect a carrier to deploy equipment and suffer a loss from such deployment.

At the other extreme, another possible method of assessing “reasonable cost” is to examine the cost of the equipment needed to provide advanced telecommunications capability relative to equipment used to provide far less sophisticated service, like narrowband voice. Presumably, if equipment to provide advanced telecommunications capability (defined earlier as 1-10 Mbps bi-directionally) can be deployed at approximately the same cost as equipment capable of providing narrowband voice (56 Kbps), then the advanced telecommunication capability, which is at least twenty times faster, is priced at reasonable cost.

It appears from the legislative history that Congress assumed that deployment of advanced telecommunications capability would be deemed untimely if the equipment to provide such capability is available at reasonable cost, under the second definition above, but nonetheless is not being deployed. This is a reasonable assumption particularly with respect to ILECs, which invest billions of dollars annually to expand the local access portion of their networks to accommodate new customers and rehabilitate deteriorated plant. If equipment to provide advanced telecommunications capability can be deployed at a cost comparable to the cost of the equipment to provide narrowband voice, an ILEC’s decision not to deploy substantially more advanced capability provides the basis for a finding that the deployment of advanced telecommunications capability is not timely.

The Commission needs to develop a careful record on this point. Its assessment of the availability and affordability of the equipment needed to deploy a truly advanced telecommunications capability should take into account that, as developed below, one ILEC reports that it is already starting to deploy fiber to the curb and to the home. The Commission should be open to other indicia that the equipment needed to deploy advanced telecommunications capability is available at a reasonable cost, even if it is more expensive than upgrades to the copper loop that would deliver less dramatic improvements in speed, and therefore do not meet the definition of advanced telecommunications capability. This should guide its determination that the equipment and know-how to deploy a truly advanced telecommunications capability is available and affordable, yet such capability is not being deployed in any significant way, and thus cannot be deemed deployed in a reasonable and timely fashion. Because the services that

really meet the definition of advanced telecommunications capabilities are not being deployed in any significant way, they cannot be deemed deployed – today – in a reasonable and timely fashion.

A question likely to surface in the debate is whether it makes sense to strive for deployment of truly advanced telecommunications capabilities when services that offer improvements in speed but do not meet the definition have not yet penetrated the market for various reasons, including cost. The answer is that the statute requires the stretch that striving toward such a goal entails. The statute does not instruct deregulation to foster the deployment of the least expensive upgrade; it requires a methodical analysis of what constitutes advanced telecommunications capability, whether it is being deployed in a reasonable and timely fashion, and whether it is reaching all Americans.

3.3. Is Advanced Telecommunications Capability That Meets Congress' Goals Being Deployed To All Americans?

Congress established an ambitious goal in directing the FCC to attend to the deployment of advanced capability to "all Americans". The words of this directive aim for deployment of advanced capability to an even larger number of households that subscribe to voice grade telephone service, or plain old telephone service (POTS), which is 94.1 percent according to the most recent figures available from the FCC³¹, with availability (homes passed) at an even higher rate, approaching 100 percent. Advanced telecommunications capability that meets the full measure of what the industry can provide to fulfill Congress' direction are nowhere close to being deployed to all Americans by this standard; they are not being deployed today significantly at all specifically to residential customers.

Deployment of voice grade and higher-speed competitive local services is occurring in some areas, but not ubiquitously. Competitive local service providers in all categories, including CLECs and local service resellers, still accounted for less than 5 percent of total local service revenues in 1997.³² Competitive local services, where deployed, are predominantly reaching customers in urbanized areas³³ and business as opposed to residential customers.³⁴

Some providers are deploying services that allow relatively higher-speed transmission compared to the 56K-capable modem-over-POTS available today, but none of what is currently being deployed meets the full measure of what the industry can provide to fulfill Congress' direction. These services do not meet the bar envisioned by Congress in Section 706 in three important respects:

³¹ Statistics of Communications Common Carriers, Industry Analysis Division, Common Carrier Bureau, Federal Communications Commission, November 1998 at 317, Table 8.1, Telephone Penetration in the United States.

³² *Local Competition*, Industry Analysis Division, Common Carrier Bureau, Federal Communications Commission, at 1 and Table 2.1 (Dec. 1998).

³³ *Id.* at 1.

³⁴ *Id.* at 2, Table 4.14 at 96.

1. the bandwidth or bit rates associated with the systems being deployed are insufficient to meet the definition of advanced telecommunications capability that Congress' definition embraces;
2. the systems are unlikely to be deployed to “all Americans” as required in Section 706(b) because of technical limitations in the current environment; and
3. the systems are not being deployed (and likely, in some cases, cannot be deployed) in a “reasonable and timely” fashion as required under Section 706(b), despite the apparent availability and affordability of the equipment needed for these technologies.

Each of the various higher-speed technologies that is currently being deployed to provide advanced services fails to meet the bar in one or more of these ways. This does not mean that they are not worth deploying; to the contrary, they are highly worthwhile services that meet near-term end-user demand for higher rates of speed. But the following analysis of the ways in which each of the services fails to meet the bar that the FCC should establish to define Section 706 demonstrates that offering regulatory relief or incentives for deployment of advanced services that providers are already willing and able to provide will not advance the vision that Congress articulated in Section 706, and will not extract for the public the maximum value that Section 706 can obtain for the public.³⁵

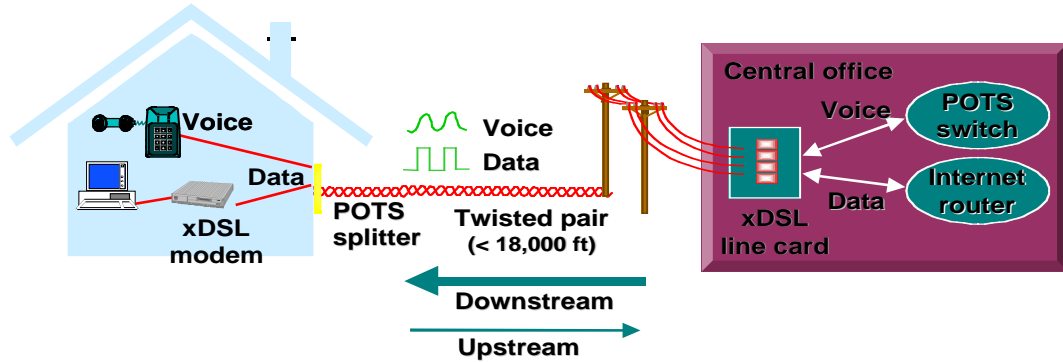
3.3.1. Digital Subscriber Line

Digital Subscriber Line 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. The family includes several variations of type, speed and configuration, and are referred to collectively as xDSL, where "x" may be "A" for Asymmetric, or "V" for Very High Speed, for example.

Figure 1 shows how xDSL is configured. The bit rate capacity of a xDSL system depends upon the length of the copper loop and other factors.

Figure 1

Digital subscriber loop (xDSL):



Source: Corning

Table 1 shows the transmission capacities of two varieties of xDSL, asymmetric xDSL (ADSL) and very high-speed xDSL (VDSL). These services can be fast if the loop length is not very long.

Table 1

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

Source: IEEE Communications

The ILECs have made numerous announcements of plans to deploy xDSL, mostly in the form of ADSL. Although some forms of xDSL technology could be deployed in a “reasonable and timely” fashion (*i.e.*, the equipment is available at reasonable cost and is being deployed), xDSL, as it is being deployed, does not satisfy Section 706.

First, ADSL (or ADSL lite), the version of xDSL that is being deployed by most ILECs and CLECs, does not meet the definition of “advanced telecommunications capability” that the FCC should adopt. ADSL allows for the transmission upstream of 16-640 Kbps. This fails to meet the definition of a Class 3 service described above (*i.e.*, 1-10 Mbps bi-

directionally). Some versions of xDSL, like VDSL and HDSL, conform to the definition, but deployment of these versions has been much slower.

Second, xDSL has certain technical limitations that make it impossible to deploy to “all Americans.” As the FCC has recognized, four factors limit the performance of xDSL over the existing copper plant:

1. length of the loop (*i.e.*, transmission speeds are inversely proportional to loop length);
2. condition of copper loop;
3. the existence of bridge taps and loading coils; and
4. the number of twisted pairs in the same binder group owing to electromagnetic interference³⁶

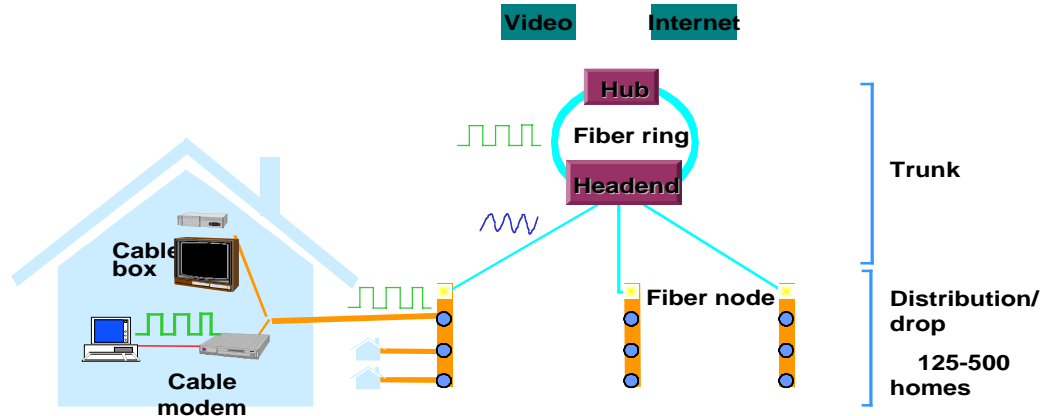
Because of these limitations, any version of xDSL that meets the definition of advanced telecommunications capability cannot be deployed to all Americans in their homes without a major investment to upgrade the local loop, an investment that few companies appear willing to make under current conditions. Further, the nature of xDSL as an add-on to the copper wire loop also means that, in the long-term, it is an interim and temporary solution at best and eventually will meet physical limits of the medium for transmission speed.

3.3.2. Cable Modems

Cable modems are another candidate technology to provide advanced telecommunications capability. They are deployable only in cable systems that have been upgraded to the hybrid fiber-coaxial cable architecture. Figure 2 describes how a cable system with a cable modem is configured.

³⁶Deployment of Wireless Service Offering Advanced Telecommunications Capability, Petitions of Bell Atlantic Corp., et al, Memorandum Opinion and Order and Notice of Proposed Rulemaking, FCC 98-188, CC Dockets 98-11, 98-15, 98-26, 98-32, 98-78, 98-91, 98-147 (released August 7, 1998) at para 29 n. 46

Figure 2
Hybrid fiber coax (HFC)/cable modems



Source: Corning

Typically, a cable system uses digital modulation and compression techniques to provide digital service using 250 MHz of capacity, only six MHz of which are devoted to cable modem service. This six MHz can accommodate 30-40 Mbits for modem service because the capacity is shared among all subscribers. These transmission speeds per user range from 1.5-36 Mbps downstream and 128 Kbps – 10 Mbps upstream.

Cable modems are being quickly deployed by the cable television industry. By the end of 1998, it is estimated that the cable modem service capability will pass 19 million homes and will serve 500,000.³⁷ By the year 2000, the capability is expected to pass 64.7 million homes and serve 11.8 million homes.³⁸

It appears that cable modems could be deployed on a “reasonable and timely” basis (*i.e.*, the equipment is available at reasonable cost and is being deployed). However, the capability provided by cable modems does not meet the definition of advanced telecommunications capability for two reasons.

First, the cable modems being deployed by the cable television industry do not have sufficient upstream capacity to meet the definition of advanced telecommunications capability. Cable modems are a shared architecture and thus provide a range of upstream and downstream capacities depending upon how many customers use the capability simultaneously. As noted above, the upstream capacity frequently is slower than is desirable in an advanced telecommunications capability environment, and at speeds as

³⁷ NCTA Comments at 8-9.

³⁸ *Id.* at 9-10.

low as 128 Kbps, is short of the 1 to 10 Mbps range associated with a Class 3 service. Reengineering the cable plant to dedicate more than 6 MHz to cable modem service could lift the speed to the Class 3 range, but this does not appear to be happening in the normal course or the foreseeable future.

Second, cable modem services may be outside the jurisdictional scope of Section 706 because they are not telecommunications services.³⁹ Rather, they have been treated as a "cable service", particularly since the definition of that term was expanded in the Telecommunications Act of 1996 to include "interactive services"⁴⁰. Cable operators are specifically exempt from regulation as common carriers insofar as they provide cable service.⁴¹ The Commission should weigh this argument carefully. It has been raised as a shield to argue that the cable industry should not be treated to more regulation in the interest of deploying advanced telecommunications capability, which would run counter to the deregulatory thrust of Section 706. But it should not be used counterproductively to shut the cable industry out of the exercise of creative incentive plans to accelerate the deployment of advanced telecommunications capability that will support Class 3 services.

3.3.3. Fiber Optics

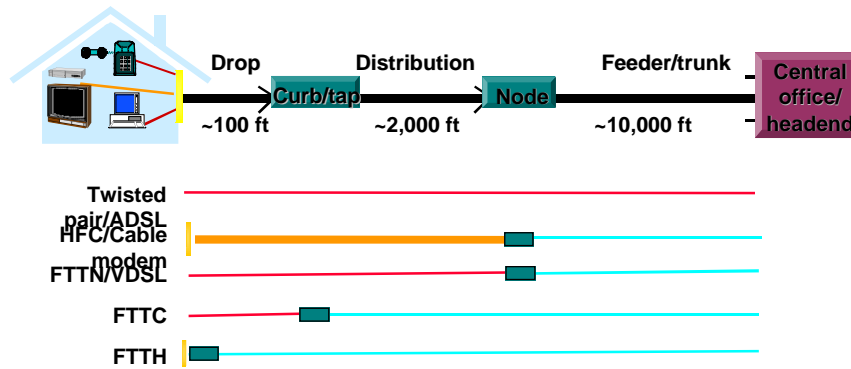
Another technology that could be used to provide advanced telecommunications capability is fiber optics. Figure 3 below reflects how fiber could be deployed.

³⁹ See NCTA Comments at 21. Internet Over Cable: Defining the Future In Terms of the Past, Office of Plans and Policy Working Paper, May 1998 at v, pp. 65-74.

⁴⁰ Internet Over Cable: Defining the Future in Terms of the Past at pp. 65-74.

⁴¹ 47 U.S.C. § 541(c).

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



Source: Corning

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
Fiber to the Home (FTTH)	> 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 the 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.⁴² 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.⁴³ Other ILECs and CLECs are also deploying fiber, but the aggregate level of deployment is still small.

The current deployment of fiber solutions also does not provide the basis for a decision that advanced telecommunications capability is being deployed to all Americans on a reasonable and timely basis. Such systems can provide sufficient capacity to meet the definition of advanced telecommunications capability (*i.e.*, 1-10 Mbps bi-directionally), but they cannot meet the other requirements in Section 706.

⁴² BellSouth Comments at 15.

⁴³ *Id.*

Most importantly, fiber solutions are not being deployed in a “reasonable and timely” fashion because they are available at reasonable cost, but are not being deployed in any significant volume (with the exception of Bell South). The cost is reasonable because fiber to the curb can be deployed for approximately the same cost as narrowband copper systems in new construction and a rehabilitation of existing plant. Yet, only one ILEC has announced plans to deploy fiber in all new construction and rehabilitation.

This pace of roll out means that unless the FCC acts to change the climate a fiber-based advanced telecommunications capability likely will not be deployed to “all Americans” until some time in the decade of 2030.⁴⁴

3.3.4. Wireless Technologies

There are three wireless architectures that qualify as broadband delivery to the home: direct broadcast satellite (DBS), multichannel multipoint distribution system (MMDS), and local multipoint distribution system (LMDS). All three present formidable opportunities for the provision of advanced services, yet none offers the immediate prospect for providing advanced telecommunications capability in reasonable and timely manner under Section 706.

3.3.4.1. Direct Broadcast Satellite

DBS offers the largest number of homes passed, with ultimate mobility and essentially a global reach. Additionally, DBS encompasses substantial system capacity, up to 32 six MHz carriers downstream. Yet, sharing the capacity among a large number of homes dilutes the capability per home. More significantly, while DBS accommodates 1.3 Gbps of digital data downstream (assuming 6 bits per Hz), there is no upstream capacity⁴⁵ other than the local telephone line.

DBS fails to meet the requirement of Section 706 in two ways. First, it fails to meet the definition of advanced telecommunications capability because of its lack of upstream capacity.⁴⁶ As noted earlier, a system must provide for the transmission of broadband signals in both directions, downstream as well as upstream, to meet the definition.

Second, DBS also presents substantial cost challenges that make its deployment unable to the reasonable and timely standard. As noted earlier, the Commission must look to the

⁴⁴ This calculation is based on assumptions that line growth is 2.2 percent per year, that annual rehabilitation growth is at 1.5 percent, and that fiber is substituted for copper in all new builds and rehabilitations. See "Cost of a National Fiber-Optic Infrastructure," prepared for the FCC Conference on Video Dialtone by John Lively, Oct. 28, 1992

⁴⁵ Walkoe, Wilbur J., Broadband Local Access Architectures, *1998 Annual Review of Communications* at 505.

⁴⁶ *Id.* at 505.

availability of the equipment at reasonable cost in assessing whether deployment is reasonable and timely. While DBS equipment is available, its cost is quite high. Some estimates show the cost per subscriber at \$2,000-\$3,000. This high cost is driven by the need for high reliability in the service offerings which, given the complexity of the system, is an expensive proposition. Also, enhancements require long lead-time as upgrades parallel the complexity of the present system. These factors hinder DBS' deployment can in a reasonable and timely manner.

3.3.4.2. Multichannel Multipoint Distribution Service (MMDS)

The MMDS microwave system has a 15-mile service radius for primarily one way signals. There is substantial capacity, 33 six MHz carriers downstream, but very limited upstream capacity. The rate of digital transmission is 1.2 Gbps, assuming 6 bits per Hz. MMDS is also limited by line of sight requirements.

MMDS suffers from the same limitation as DBS in that it has insufficient upstream capacity to meet the definition of advanced telecommunications capability. It does, however, meet the reasonable and timely standard.

3.3.4.3. Local Multipoint Distribution Service (LMDS)

The LMDS cellular microwave system is probably the most flexible of all current wireless systems. But with a cell radius of only three miles, it requires a large number of cells to serve a metropolitan area. Bit rates decline as load/penetration increases requiring smaller sectorized cells. In LMDS, thirty 40 MHz channels are available and can carry traffic in either direction. The digital capacity is 1.2 Gbps, assuming 1 bit per hertz.⁴⁷

It may well be possible to provide advanced telecommunications capability via LMDS. However, the technology is so new that little practical knowledge about it exists.⁴⁸ Thus, a definitive assessment of whether LMDS meets the requirements of Section 706 is not possible at this time.

4. WHAT SHOULD POLICYMAKERS DO TO SPREAD THE BENEFITS OF ADVANCED TELECOMMUNICATIONS CAPABILITY TO ALL AMERICANS?

With the determination that advanced telecommunications capability, defined in a way that minimally meets Congress' goals, is not being deployed to all Americans in a reasonable and timely fashion -- that it is not being deployed in any significant way at all even though the equipment needed to deploy the capability is currently available at reasonable cost -- Section 706 requires the Commission to take remedial action. If the FCC were writing on a clean slate, without the instruction of Section 706, it might conclude that the right answer might be to do nothing and let

⁴⁷ *Id.*

⁴⁸ Salloum, Hady R. , How Does Local Multipoint Distribution Service (LMDS) Compare to Fiber to the Home (FTTH), 1998 National Fiber Optic Engineers Conference (NFOEC), Volume I.

market demand provoke the eventual deployment of advanced capability. But Section 706 reflects Congress' judgment that as a matter of social, economic and competitiveness policy, a passive approach is not enough and that deployment of advanced telecommunications capability is an affirmative goal. It reflects Congress' judgment that in advancement of that goal, the FCC should ensure that there are no regulatory obstacles to deployment and should take proactive steps to promote competition in this area.

To date the debate has focused on whether there are in fact regulatory obstacles that are retarding the deployment of advanced telecommunications capability. The ILEC applicants for regulatory relief from unbundling requirements and inter-LATA restrictions assert that these regulations, among others, make investment in advanced capability uneconomic. Interexchange companies, cable operators and others respond that relief from such regulations is premature and cannot be granted without undermining the balance of incentives that the 1996 Act intends will motivate the ILECs to open the local market to competition. They argue that the ILECs' regulatory obstacles argument cannot be accepted because the ILECs in fact deploy higher speed services in response to announcements that cable modem services will be offered in a particular area

The debate over whether regulations are the causative factor, or even a causative factor, in the pace of investment in advanced telecommunication capability and can be blamed for ILEC failure to deploy capabilities for which equipment is already available is potentially endless and probably unresolvable. Many parties have asserted that regulation or the prospect of regulation will adversely affect their investment plans.⁴⁹ Resolving the question is not necessary, strictly speaking, in order for the FCC to perform the inquiry specified in the statute. But it is relevant at the phase where the FCC decides what steps to take after a determination that advanced telecommunications capability is not being deployed in a reasonable and timely fashion to all Americans. It is relevant because in order to decide what remedial steps are appropriate, the FCC has to decide what means it has within its jurisdiction to accelerate deployment of advanced telecommunications capability.

To date, the debate has been stuck around the issue of whether the ILECs' deployment of advanced services merits regulatory relief, and whether it would advance the deployment of advanced telecommunications capability to impose new regulations on the cable plant in the form of cable unbundling. Reframing the debate about Section 706 and moving it to higher ground requires moving past this debate. Moving forward requires a plan to encourage investment by all potential providers of advanced telecommunications capability. It requires shifting the perspective on what may be done to accelerate deployment of advanced telecommunications capability beyond the entrenched regulatory debates of today, concerning services that are easily within reach of deployment, to a much higher and more ambitious plane.

⁴⁹ Some of the RBOCs argued in their submissions to the Commission that regulatory burdens are stifling their deployment of ADSL service. *See, e.g.*, Bell Atlantic Comments at 9-14; GTE Comments at 14-17; SBC Comments at 3. Comments of the National Cable Television Association responding to the NOI, filed September 14, 1998 at 27-30, Reply Comments of the National Cable Television Association to the NOI, filed October 8, 1998 at 10-18.

Beyond articulating a standard and establishing incentives in the form of a regulatory step-back that will attract investment directed toward advanced telecommunications capability, there is the need for a streamlined process to effectuate the goals of Section 706. The Alliance for Public Technology suggests that providers enter into social contracts, as was done in the cable rate regulation context.⁵⁰ In those orders, the FCC provided that in exchange for a pledge committing investment that would enhance the cable transmission infrastructure, and would result in improved audio and video quality, as well as additional programming and services, the FCC gave advance approval to discrete rate increases. While not free from controversy because of the multi-jurisdictional issues surrounding cable rate regulation, the orders resulted in improvements to the cable infrastructure, with enhanced reception quality and additional programming and services resulting. No cable operator that entered into an agreement defaulted on its obligations.

The FCC should establish a process that provides for both individual entities, or entities sharing common interests, to present a commitment to meet the standard articulated in exchange for release from regulation. The commitment should detail the services to be made available, how the investment will reflect the standard and the number of individuals who will benefit. Opportunity to pursue market tests or experiments reflecting deployment of advanced capability should be afforded. An opportunity for public comment on how the proposal meets the FCC's implementation of Section 706 is essential. A determination by the FCC should be made pursuant to a pre-determined and expeditious schedule.

This means that the FCC should approach the issue on two tracks:

1. On the first track, the FCC should invite industry parties to propose specific ways in which regulations can be amended, waived or streamlined to facilitate investment in advanced telecommunications capability. The context for discussing such proposals could be the model that some states have used to negotiate a transition from rate of return regulation to price cap regulation.⁵¹ The government would commit to such regulatory changes in exchange for a commitment to deploy advanced telecommunications capability on an agreed upon schedule, reflecting an accelerated pace. Any potential provider of service

⁵⁰ Petition of the Alliance for Public Technology Requesting Issuance of Notice of Inquiry and Notice of Proposed Rulemaking to Implement Section 706 of the 1996 Telecommunications Act, filed February 18, 1998.

⁵¹ The FCC itself has some experience in negotiating infrastructure and service improvements in exchange for changes in regulatory treatment. In its social contract proceedings in the cable industry, the Commission negotiated upgrades to cable plant and service with cable operators in exchange for more lenient regulatory treatment. What is suggested here is different from the cable social contracts, which devolved into settlement vehicles for disposing of flotillas of rate complaints. They came to represent a way to mitigate penalties. Here, the provider would make a proffer of investment on a schedule along with a regulatory design that not only embraces those minimum elements of relief necessary to make the proposed investment economic but also reasonably serves the public interest. *See* Implementation of Sections of the Cable Television Consumer Protection and Competition Act of 1992; Rate Regulation, MM Docket No. 93-215, Report & Order and Further Notice of Proposed Rulemaking, 9 F.C.C.R. 4525, 4678 (1994).

-- common carrier, cable operator, wireless provider -- could approach the FCC with such a proposal.

2. On the second track, the FCC could develop such plans for classes or groups of providers, with the participation of such providers. Each class of providers currently operates under a separate legacy of regulation. Some entities operate under Title II, some under Title III and others under Title VI. A uniform solution under Section 706 is difficult given these disparate starting points under legacy regulation. These different starting points also mean that the various potential providers of advanced telecommunications capability are in the position of needing different kinds of relief and incentives in order to accelerate deployment of advanced telecommunications capability.

This approach would leave it up to companies in the various provider industries to suggest how deregulation and other policy incentives would facilitate and accelerate deployment of advanced capability. So far in the debate, the ILECs' requests for regulatory relief have dominated the discussion, but in a refocused debate directed toward deployment of truly advanced capability, other providers could identify forms of relief and incentives valuable to their business plans. All of these providers would speak for themselves in such a debate; no third party could presume to sketch out all of the forms of relief and incentives that would be meaningful to the various providers, but a few possibilities are suggested here.

In developing approaches for classes of providers, the FCC should be guided by several principles:

- deregulation, as opposed to adopting new forms of regulation
- parity in regulation among the various classes of potential providers of advanced telecommunications capability, and
- neutrality as among technologies for bringing the capability to end-users, *i.e.*, no "tilt" in the approach that would favor wireline providers over wireless providers.

The application of these principles to the various potential providers of advanced telecommunications capability would mean:

For Cable Operators -- Cable operators have not sought regulatory relief in the Commission's Section 706 proceedings. Their advocacy in the proceeding has had two aims: (1) to defend against the prospect of a new regime of regulation on cable modem services in the form of cable unbundling, and (2) to some extent, to avoid premature regulatory relief for the ILECs that might disrupt interconnection agreements. The imposition of a new regime of cable unbundling would run counter to the directive of Section 706, which emphasizes deregulatory approaches.

Thus, to implement this approach for cable operators, the Commission could abjure common carrier-style regulation of the cable plant in the form of cable unbundling. It could recommend to Congress legislative changes that would remove truly advanced

capability cable modem services from the class of cable services that are subject to the franchise fee.

For CLECs -- Neither have CLECs been in a position to seek regulatory relief, unburdened as they are by legacy regulation. But CLECs may find relief from lengthy state certification regimes, or uniformity of treatment of local rights of way, or streamlined procedures for interconnection of advanced networks an attractive spur for new investment in deploying truly advanced telecommunications capability.

Thus, to implement this approach for CLECs, the Commission could negotiate with the states for streamlined national approaches to certification issues, and for streamlined interconnection agreement procedures, without waiting for the final adjudication of the Commission's 1997 interconnection rules.

For Wireless Providers – The wireless industries have stressed their ability to implement advanced telecommunications capability. In their comments responding to the NOI, the wireless industries cautioned the FCC against attempting to pursue regulatory parity within the confines of a one-size-fits-all structure that could result in more onerous regulation for wireless providers. The industries noted that fostering advanced telecommunications requires focus on particular markets and to do otherwise would perpetuate outdated frameworks. The industries counseled against using labels such as broadband and narrowband to characterize the presence or lack of advanced telecommunications capability, because both, they argued, have the capability envisioned by Section 706⁵². It recommended that particular attention be committed to the range of federal, state, and local taxes and mandates that interfere with wireless entities provision of advanced telecommunications capability.⁵³ The industry also enumerated several statutory provisions where it would be appropriate for the FCC to forbear as well as efforts the FCC should pursue so wireless carriers can obtain access to provide services.

Thus, to implement this approach for the wireless industry, the Commission could negotiate national consensus standards on taxation and zoning issues and give close consideration to those forbearance proposals that pertain directly to accelerated deployment of advanced telecommunications capability.

For ILECs -- The relief sought by ILECs is well understood in the debate. To implement the suggested approach for ILECs could mean the attainment of some of the regulatory relief that they sought in their 1998 Section 706 petitions, but only in

⁵² Comments of the Personal Communications Industry Association, In the Matter of 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, (NOI), CC Docket No. 98-146 (Aug. 7, 1998) submitted September 14, 1998, reply comment, September 14, 1998.

⁵³ Ex Parte Submission: Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans, CC Docket No. 98-146; "Unintended Consequences: Public Policy and Wireless Competition" by Dr. Michael L. Katz and John B. Hayes, November 12, 1998

exchange for the measurable commitment and accomplishment of the deployment of advanced telecommunications capability that really meets the definition set out by Congress. One approach to this problem would be to bifurcate treatment of "new" and "existing" plant investment to deploy advanced telecommunications capability. This would allow adoption of new deregulatory approaches without upsetting the balance that the 1996 Act struck to encourage competition. Nonstructural separations and price caps would guard against cross-subsidization of the services.

Under this approach, existing interconnection, unbundling and other regulations would continue to apply to existing facilities. But new investment in advanced telecommunications capability by any provider and all providers would be subject to a deregulatory regime guided by the following elements:

- the offering of advanced telecommunications capability by any provider would be declared an unregulated service because no carrier is dominant in the market;
- the unbundling and interconnection requirements associated with the "existing facilities" would not apply to the "new facilities";
- price caps on basic services would be used to prevent cross-subsidization where common facilities are used; and
- the capability would be provided over an integrated platform with no structural separation requirement, although non-structural separation safeguards would still likely be necessary.

Open approaches such as this will keep the FCC on course with the direction of Section 706 that it "shall encourage . . . the deployment . . . of advanced telecommunications capability." Accordingly, the FCC's primary focus must be on the impact that its actions will have on investment in advanced telecommunications capability. The Commission's goal should be to optimize the climate for investment decisions. In evaluating potentially conflicting proposals for relief under Section 706, the FCC should consider the likely overall effect on investment on advanced telecommunications capability.

The Commission's goal should be to create a clearing in the woods of regulation in which all providers can compete, unfettered by regulation, to serve up advanced telecommunications capability to users. It should strive toward this parity not by adding regulations to one class of providers so that they will be equally burdened by regulation. Nor should it deregulate the current infrastructure in a way that will be at odds with the goal of the Telecommunications Act to open the local exchange to competition. The FCC should instead create incentives for all providers to step up to a new environment in which deregulated parity is achieved in exchange for significant new investment that will bring end-users dramatic improvements in speed and service.