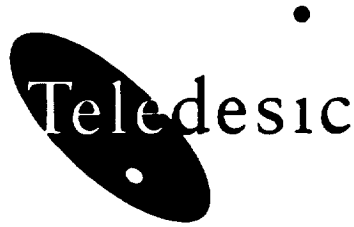

Steve Hooper
Co-Chief Executive Officer

Steve Hooper is co-chief executive officer of Teledesic LLC, which is building a global, broadband "Internet-in-the-sky." Using a constellation of 288 low-Earth-orbit satellites, Teledesic is the first satellite communications network that will enable affordable, worldwide access to "fiber-like" telecommunications services such as broadband Internet access, videoconferencing and interactive multimedia.

Hooper has shared the chief executive officer role with Teledesic Chairman Craig McCaw since December 1997. Hooper, a longtime McCaw associate, also currently serves as chairman of NEXTLINK Communications, Inc., a competitive local exchange carrier.

Previously, Hooper held various positions at AT&T Wireless Services and its predecessor, McCaw Cellular Communications, including president and chief executive officer and chief financial officer. He also was regional president for Cellular One's Pacific Northwest/Rocky Mountain region, where he managed the cellular operation in six Western states and Alaska.

Prior to his work at AT&T Wireless Services, Hooper was assistant vice president and manager of internal financial consulting at Seattle First National Bank.

In addition to serving on Teledesic's board, he serves on the boards of NEXTLINK and Cable Plus Holding Company, one of the fastest growing providers of integrated cable television, telephone and alarm services to multi-family housing units; and on the Board of Trustees for Seattle University.

He has a bachelor's degree in civil engineering from Seattle University and a master's degree in business from the Wharton School.

TESTIMONY OF STEVE HOOPER

CO-CHIEF EXECUTIVE OFFICER, TELEDESIC L.L.C., and

CHAIRMAN OF THE BOARD, NEXTLINK Communications, Inc.

BEFORE THE FEDERAL COMMUNICATIONS COMMISSION

EN BANC HEARING ON

BANDWIDTH

July 9, 1998

Thank you Mr. Chairman and Commissioners. It is a pleasure and an honor to be here with you today. My name is Steve Hooper, and I am co-Chief Executive Officer of Teledesic L.L.C. and Chairman of the Board of NEXTLINK Communications, Inc.

Teledesic and NEXTLINK are part of the proliferation of emerging telecommunications carriers spawned by technological advances and the pro-competitive telecommunications policies of this Commission, Congress and state regulators. These two companies alone plan to invest more than $10 billion to bring advanced telecommunications services to every household in the United States and most of the world. Fortunately for competition, but perhaps unfortunately for us, Teledesic and NEXTLINK are but two of hundreds of new competitors vying to bring these service to a competitive marketplace.

Teledesic and NEXTLINK are each taking different approaches to breaking open the incumbent local exchange companies (or "ILEC") bottleneck to provide advanced telecommunications services. Teledesic is building a satellite system that will create broadband access through "internet in the sky." NEXTLINK, a facilities-based competitive local exchange carrier ("CLEC"), is taking a more down to earth approach and constructing high-capacity, fiber optic networks that today provide competitive switched local and long distance services in more than 32 markets in ten states.

Because their technologies and business plans are so different, you could conclude that these two companies have little in common besides sharing board members. It's more accurate, however, to view them as two different fronts in the battle to bring competition to the local telephone market - one by air and the other by land. Each company has enlisted high profile investors with business acumen and staying power to help them through what

could prove to be a long siege. Teledesic's major investors include Craig McCaw, Bill Gates, Motorola, Boeing and Saudi Prince Alwaleed Bin Talal. NEXTLINK, whose founder and primary shareholder is Craig McCaw, has been able to raise a $2 billion war chest on Wall Street. Recently, NEXTBAND Communications – a joint venture between NEXTLINK and Nextel Communications – won 42 LMDS licenses at a cost of more than $134 million. These licenses can be used to bring wireless broadband services to more than half the U.S. population.

It is ironic that in some proceedings before this Commission, such as Section 271 long distance entry petitions, some incumbent LECs assert that NEXTLINK and other CLECs are formidable competitors widely deploying advanced network infrastructure. In their Section 706 petitions, however, these same ILECs claim that CLECs and other competitors lack the ability or the wherewithal to offer the next generation of advanced services. The ILECs claim that they will not invest in and offer advanced services unless the Commission takes extraordinary action to free them from the market opening requirements Congress and the Commission recently mandated.

The ILECs are wrong on both counts. First, Teledesic and NEXTLINK and their competitive counterparts not only do, but must, offer advanced services to consumers if they hope to succeed against the entrenched incumbent. Second, contrary to ILEC claims, the Commission's pro-competitive rules have not stifled ILEC deployment of advanced services. Far from discouraging innovation and investment, the first stirrings of local competition fostered by those forward-looking rules have finally given the ILECs the business motivation to invest in and deploy new services to the public. As ILEC recent press announcements state, the ILECs are beginning to develop and deploy new advanced services at a rapid clip. The

Commission must not waiver from its resolve to require ILECs to open their networks to competition regardless of whether the services at issue are "basic" or "advanced." Pro-competitive policies remain the best tool to promote innovation, enhance service quality, and ensure universal and affordable access to advanced telecommunications services.

TELEDESIC

Today, mainly in urban areas, communications companies are racing to build out their fiber optic and terrestrial wireless infrastructure to meet growing demand for bandwidth. Outside of these metro areas, however, many of the telecommunications services that require high-speed delivery are currently prohibitively expensive and their deployment is not immediately planned. Even in densely populated regions, extending a fiber network or newly developed technologies such as DSL to the "last mile" individual homes and offices may not be economically feasible. Teledesic's satellite system offers a solution to this problem.

Teledesic intends to deploy advanced network communications through a constellation of 288 satellites which are scheduled for launch beginning in 2002. Unlike most of today's satellite systems which consist of "geostationary" satellites ("GEOs"), the Teledesic Network is a low-earth-orbiting ("LEO") non-geostationary system ("NGSO"). Traditional GEOs hover over one point on the equator at an altitude of approximately 22,300 miles. This altitude causes a minimum transmission latency –or end-to-end delay—of about one-half second. While this "latency" creates an annoying but tolerable delay in certain analog voice transmissions, it can be untenable for video conferencing and Internet applications.

Teledesic will overcome this problem by orbiting its satellites 25 times closer to the earth than GEOs. This "non-geostationary" orbit will allow Teledesic to provide high quality

coverage comparable to fiber throughout the world for such services as broadband Internet access, interactive video, and multimedia at access speeds 2,000 times faster then today's standard analog modems. For example, transmitting a set of x-rays may take four hours over one of today's standard modems. The same images would be sent over the Teledesic in seven seconds.

Teledesic's ability to provide universal access at a cost independent of location will increase competition in most areas and complement terrestrial fiber networks by providing advanced, high-speed services to locations where fiber is yet to be deployed. It will be as easy for Teledesic to serve remote locations in New Mexico or Alaska as it will be to serve midtown Manhattan or downtown Los Angeles. Traditional limitations of geography and demographics that typically constrain land-based service providers are practically meaningless to Teledesic.

While Teledesic will be free from the constraints of location, it does share one constraint with its terrestrial-based brethren. Teledesic plans to make its network available through local service providers and is therefore just as reliant upon the Commission's market-opening, pro-competitive policies as other competitors in the local market.

NEXTLINK

Like Teledesic, NEXTLINK Communications is striving to provide consumers with a viable alternative to the ILEC for their telecommunications needs. NEXTLINK is one of the largest facilities-based CLECs in the country. As a direct result of the competitive opportunities created by the Telecommunications Act of 1996, NEXTLINK has raised billions of dollars which we are currently investing in the deployment of fiber optic networks

and digital switches designed to bring consumers across the nation a competitive alternative for their local and long distance phone service.

NEXTLINK and other CLECs are making great strides to provide advanced telecommunications services to American consumers. NEXTLINK today has the capability to offer customers high bandwidth services. About 20% of our customers are served entirely by NEXTLINK facilities – also known as our "on-net" customers. The majority of these on-net customers have access to full broadband capacity provided by our underlying digital switches and modern fiber-optic networks. NEXTLINK's broadband network can provide such customers SONET channels with transmission speeds up to 9.6 gigabits per second.

While CLECs are making every effort to provide advanced services to consumers, the ILECs still have a stranglehold over essential facilities such as the local loop, and competitors continue to rely upon ILEC facilities to provide service to the majority of their potential customers. Even well funded competitors, such as NEXTLINK, cannot afford to build overnight a substitute local loop to every home and business in this country to provide competitive advanced services.

NEXTLINK is providing advanced services such as ISDN and xDSL to off-net customers in markets where we have been able to obtain access to ILEC loops capable of providing these advanced services. However, because ILECs control bottleneck facilities such as the local loop, NEXTLINK's ability to provide advanced services is to a large extent controlled, and often can be hamstrung, by ILEC policies and practices on issues ranging from pricing of unbundled network elements to collocation.

For example, a competitor's ability to access a local loop in most states is limited to situations where CLECs are actually collocated at an ILEC switch. NEXTLINK was one of

the first CLECs to request collocation on a broad basis as part of its facilities-based entry strategy. During the past two years as we have pursued collocation arrangements under the Commission's collocation rules, NEXTLINK has encountered numerous roadblocks in obtaining collocation arrangements on reasonable rates, terms and conditions. In addition, NEXTLINK has been precluded from providing service due to a lack of physical space in the ILEC Central Offices and a refusal by the ILEC to permit alternative collocation arrangements. These difficulties have hampered NEXTLINK's ability to provide not only basic plain old telephone service ("POTS"), but also advanced services. The practices of the ILECs and policies of this Commission on the issue of collocation thus have a great impact on our ability to provide both basic and advanced services.

RECOMMENDED COMMISSION ACTION

There are several measures that this Commission can and should adopt to facilitate competition, thereby encouraging greater deployment of advanced telecommunications facilities by competitors and ensuring the provisioning of advanced services to the public.

For example, the Teledesic Network's low earth orbit enables the use of small, low power two-way terminals and antennas. Even though the terminals are about the size of the direct broadcast satellite (DBS) dishes, FCC earth station licensing rules require time-consuming and costly technical coordination for each user terminal. The Commission should implement blanket licensing for identical terminals operating with satellite networks. This kind of regulatory streamlining is essential to providing universal access to broadband services through low cost user terminals.

Second, you should deny the several ILEC "Section 706" petitions that are currently before you. These petitions have nothing to do with fostering innovation. To the contrary, they completely eviscerate the body of law and regulations designed to foster local competition and necessary to promote the provision of advanced services by both CLECs and ILECs. The evidence demonstrates that in response to growing competition spawned by the very statutory and regulatory provisions the ILECs are seeking to eliminate, the ILECs have already decided to deploy new facilities and services to the public. Now is not the time for the FCC to eliminate these important statutory and regulatory safeguards. Indeed, this would be a body blow to competition with the unintended consequence of drying up capital necessary for CLECs to deploy facilities needed to provide competitive services.

In addition to denying the ILEC 706 Petitions, the FCC should take immediate steps to ensure that CLECs continue to play a vital role in the development and provision of advanced telecommunications services by affirming that Sections 251, 252 and 271 of the Communications Act apply to the provision of advanced telecommunications services in equal measure to their application to POTS. In particular, the FCC should clarify that for essential network elements, such as the unbundled loop, ILECs have a continuing obligation to provide nondiscriminatory access to such facilities for the provision of any telecommunications service. Further, the FCC should make clear that the ILECs have a duty to provide nondiscriminatory access to facilities, such as DSLAMs (Digital Subscribers Line Access Multiplexers) that the ILECs can deploy more efficiently solely because of their ratepayer-supported economies of scale and scope. The FCC should also clarify that ILECs' obligations to provide access to OSS that supports the use of network elements are just as important, if not greater than, their obligations to provide OSS access for resale.

Finally, the FCC should examine its collocation rules to address the continuing efforts by ILECs to stunt the growth of local exchange competition through the use of unreasonable rates, terms and conditions for collocation. The FCC's collocation rules were developed more than four years before the passage of the 1996 Act and well before the development of the kind of advanced services we are discussing today. The FCC should reopen its proceeding to get additional comment from those CLECs that have struggled to enter the local markets under the FCC's existing collocation rules. An updated record that is focused on full-fledged, facilities-based CLECs and the provision of advanced services will provide the FCC with an opportunity to modify its rules to address the ongoing needs of the competitive local exchange market.

In conclusion, I urge the Commission on behalf of Teledesic, NEXTLINK and the host of other CLECs not to waiver from your forward-looking policies that got me into this business and to this podium in the first place. This is a critical juncture for the industry and for American consumers who deserve a choice of providers for all telecommunications services, regardless of whether they are denominated "basic" or "advanced." Thank you for your time.

Steven G. Chrust

Vice Chairman of the Board of Directors
WinStar Communications, Inc.

Mr. Chrust is the Vice Chairman of WinStar Communications, Inc. and has served as a member of the Board since 1994. He joined the Company in 1995 and is currently responsible for acquisitions, corporate development and strategic planning.

Mr. Chrust has spent over two decades involved with the telecommunications and financial services industries. He is a former Chairman and Chief Executive Officer of AMNEX, Inc., an operator services long distance company. Previously, Mr. Chrust was Executive Vice President of Executone Information Services, Inc.

ORAL TESTIMONY OF STEVEN CHRUST
VICE-CHAIRMAN OF WINSTAR COMMUNICATIONS, INC.
BEFORE THE FEDERAL COMMUNICATIONS COMMISSION
EN BANC HEARING ON BROADBAND NETWORK DEPLOYMENT
JULY 9, 1998

Good morning Mr. Chairman and Commissioners and thank you for the opportunity to appear before you to discuss broadband network deployment and Section 706 of the 96 Telecom Act. My name is Steven Chrust and I am Vice-Chairman of WinStar Communications, Inc. a wireless competitive local exchange carrier (CLEC).

By way of introduction, WinStar Communications, Inc. is a nationwide CLEC with broadband licenses in the 38 Ghz spectrum, covering the majority of the commercial population and much of the residential population, serving small and medium size business customers, as well as long distance carriers, fiber based competitive access providers, mobile communications companies, local telephone companies and other wholesale customers. Over the next several years, WinStar also will be using new point to multi-point technology, which currently is being tested for commercial use within 12 months, first to business and then certain residential markets.

Our company generally offers the same services as other facilities-based CLECs, but our "last mile" connection is high capacity broadband wireless. This broadband wireless connection enables WinStar to significantly expand the addressable market and offers lower network build-out and operating costs because we do not need to 1) obtain construction permits or rights-of-way; 2) dig up the streets; and 3) string fiber to poles or through conduit which itself is ver labor intensive. We simply place our small antennas on the rooftops of the buildings where we serve customers. We plan to offer a full array of broadband services through the greater

bandwidth we will be able to deliver on a more cost effective basis than wired mediums.

Because we do not need access to the incumbent local exchange carrier (ILEC) local loop or the ILEC switch, except as a transition while we construct our network, our interconnection needs are concentrated principally at the interoffice level for the basic task of interconnection of our network with the ILEC network for termination to customers not on our facilities. It is important though to fully appreciate the need for a transition period which is sufficiently long to allow the new market entrants to compete effectively against the entrenched incumbents who hold great market power and substantial advantages which form significant barriers to entry.

With respect to the deployment of advanced telecommunications capabilities, let me begin by saying that there is no doubt that the Telecom Act has facilitated the deployment of broadband services. It tore down or reduced many of the legal barriers that stood in the way of the success of companies such as WinStar. Its vitality, effectiveness, and relevance two and a half years after its enactment is undiminished. Rather than being a snapshot of the world as it existed at the time of its passage, the Act, and the policies it articulated, was meant to stand the test of time. As a direct result of the Act's passage, customer needs rapidly are reshaping today's telecommunications market, and are forging new models for serving the local marketplace.

The first evidence of this phenomenon is the creation - by the CLECs - of the nation's first digital local networks, in direct response to increased customer demand for broadband capabilities and advanced solutions. This represents a major point of differentiation from the ILECs who still rely principally on copper wire technology for the local loop. Importantly, however, the competitive pressure that the CLECs have brought to bear is directly responsible for moves by the incumbents to embrace new technologies and to upgrade their networks. Even without having any of their regulatory prayers answered, various incumbents have announced recently that they are investing billions of dollars in new technologies. This is not an accident or

an anomaly that has occurred despite the 96 Telecom Act, rather it is a direct result of the success of the Telecom Act in empowering CLECs to satisfy market needs for advanced technologies. Competition, not regulatory relief, is the best incentive to deployment of advanced telecommunications capabilities.

Many CLECs operate state-of-the-art networks with asynchronous transfer mode (ATM) backbones that support both ATM and frame relay services. In fact, CLECs today are among the nation's leading providers of frame relay. For example, WinStar is the largest holder of high bandwidth 38 Ghz spectrum in the United States and we use this spectrum in providing high capacity, broadband services to our customers, what we call "Wireless Fiber℠ Service". In addition to supporting such high bandwidth services, our 38 Ghz-based networks and the networks of other CLECs, provide an additional advantage -- the ability to offer and manage unified voice and data services over a single network infrastructure.

With respect to the role of Section 706 in fostering the deployment of advanced telecommunications capabilities, let me stress that the Telecom Act as written is technology neutral; when it comes to interconnection, unbundling, collocation, and resale of the incumbents' networks, the Act does not distinguish between data and voice networks, and that was not the point of Section 706, either. The Act stands for the proposition that networks are networks, regardless of the services provided over them.

As their packet switched networks are developed and deployed, the incumbents will not abandon their circuit switched networks, rather they will merge these two delivery mediums into one network. In the end, it is the seamless integration of these incumbent networks with the networks of their competitors, resulting in a unified voice and data network under diversified ownership, that was the ultimate goal of the Act. Section 706 was not intended undermine this goal, by dividing the nation's telecommunications system into voice or data networks, or into

regulated and unregulated networks, rather it was intended to foster the development of advanced telecommunications capabilities. In fact, doing so will subvert the benefits technology is now beginning to offer as all services will be deliverable on the same network, reducing cost and increasing productivity.

For CLECs to reach their full potential in deploying technology for advanced services, and to provide added incentive for the incumbents to do the same, the Commission must make certain that the procompetitive provisions of the 96 Act, Sections 251, 252, and 271, are fully implemented. In addition, the Commission must ensure that any actions taken under Section 706 are consistent with the interconnection policies and rules adopted by State commissions. State commissions in the last two and a half years have established many innovative and effective rules and policies governing combination of unbundled network elements, sub-loop unbundling, collocation, and performance measurements and standards — all of which are essential to CLECs for the deployment of advanced services.

Finally, I would like briefly to address a couple of market barriers that are unique to wireless CLECs, and that have a significant detrimental impact on our ability to deploy our broadband networks. Among the current problems that require immediate resolution are discriminatory access to roofs and telephone blocks in buildings, and discriminatory access to the "last ten feet" of wire in buildings.

Access to roofs, and to the telephone "66" blocks in the common space in buildings, requires WinStar to negotiate individually with each building owner even though the incumbent LEC has in most cases automatic entry. Each building owner has its own set of terms and conditions, which vary by building by also vary by carrier within the same building. The time spent on negotiations is a major delay in the installation of the competitive facilities. Experience has shown that many private property owners simply refuse to allows competitors to install facilities

in their buildings or on their property, while other owners charge new providers, but not incumbent carriers.

In fact, there is a disturbing and serious trend, particularly among national building management companies, to attempt to leverage their control of building access to extract and portion of the CLECs' - but not the incumbents' - revenues. As a result, tenants in these building will not be able to enjoy the benefits of competition or if so will be required to pay additional onerous costs to the landlord for the right to access to the new competitor's service.

Once you have access to the roof, access to the "last ten feet" of wire inside the buildings is the crucial connection to the customer on any given floor. Today we are experiencing discriminatory and inconsistent treatment within one ILEC's territory and complete refusal from other ILECs to access the "last ten feet." For example, Bell Atlantic in New York is required by the state public service commission to offer access to the "last ten feet" as a tariffed service to all providers, but Bell Atlantic in Massachusetts has refused our requests to access completely because no law or regulation requires it to offer the service. Ameritch has also completely refused our request to access the inside wire in all five states, despite the fact in many instances, Ameritech still owns and controls the inside wire.

For all of these significant problems and others, the major incentive the RBOCs have to cooperate and solve them is the section 271 long distance entry carrot If we are to see these barriers to entry fall, we need to stay the 271 course. WinStar does not support any change in Commission policy that would alter the effectiveness of the local competition provisions of the Act - Sections 251, 252, and 271. We believe that full implementation of these sections is the best way for the Commission to promote the universal availability of advanced telecommunications services under Section 706. CLECs must have the same rights under Sections 251, 252, and 271 for advanced telecommunications services as they have for conventional telephone services.

In the end real local telecommunication competition means facilities-based local loop competition for all services, whether voice or data. Development of alternative broadband facilities is the only way to eliminate the final bottleneck but only if the transition from a monopoly environment to one where there is robust and sustainable local competition is being carefully overseen and actively fostered by the regulators. The CLECs have accepted the challenge of providing competition in the local markets - the path that started with the Telecom Act. We are on the verge of creating the world's most powerful telecommunications and information network. Now is not the time to change the course.

Thank you, and I welcome any questions you may have.

Maurice France

A founder of RadioConnect Corporation, the company's President and CEO is Mr. Maurice France, an experienced technical and business executive with over 30 years of experience in the electronics, communications and data networking fields with the U.S. Navy, TRW and now RadioConnect. Mr. France's projects have included spacecraft data networks, satellite communications control systems, secure communications, broad band cable Local Area Networks and currently, commercial wireless communications products. He holds patents in both cable modems and wireless communications systems.

Mr. France received the Chairman's Award for Innovation from TRW. He holds a BEE from the Georgia Institute of Technology, is a member of the IEEE and an avid sailor.

July 6, 1998
FCC Presentation Speaking Papers

H. Maurice France

What Technology?

The way to win a race is to run more than one horse.

Current Technologies

- Wired
  - Copper
  - Fiber
- Wireless
  - Radio
    - Satellite
    - Terrestrial links
    - In building links
  - Optical
    - Terrestrial links
    - In building links

Infrastructure based technologies

- Telephone lines
- Broadband Cable
- Fiber Optics
- Power lines
- Licensed Wireless

Non-infrastructure based technologies

- Unlicensed Wireless
- Free space optical

Unlicensed Wireless Technology

Wireless technology in general is not a panacea. There are many limitations to its use. Line of sight transmission is required for operation in most of the available spectrum allocations.

The unlicensed bands have "Shared Use" of the spectrum and must accept interference from others. Much of the older unlicensed equipment meets only the minimum requirements of the rules and, as a result, offers less than stellar performance in today's environment.

However, the new generation of unlicensed equipment is designed to operate in these shared bands and makes good use of previously secret techniques to greatly increase its' resistance to interference and to reduce its' interference to others.

These techniques allow more efficient use of the spectrum by increasing the density of communications. Perhaps more importantly, a large number of these new devices can be co-located at a single point of presence to make wireless internet serviced access a viable activity.

Backbone

Current unlicensed wireless technology can support a relatively "skinny", but highly reliable backbone. The voice and data requirements of a small community, or a small to medium sized business could be supported assuming line of sight and distances of 20 miles or less.

Rather than being the backbone itself, we see such links as being the next tier in the network architecture distributing the data to many smaller locations from a wired or licensed microwave backbone node.

Last Mile (or 20)

This is the forte of the new generation of unlicensed wireless technology. More sophisticated coding, transparent error correction and recent FCC regulatory changes have made relatively high speed point to point links highly reliable.

The most important feature of this technology is the lack of infrastructure cost. With this technology, a school district can connect the district office with other buildings on campus or other campuses. The capital costs are relatively low and the life cycle costs are very low due to the lack of fees for use.

Our cash strapped schools often have more greater access to funds for capital improvements than funds available for operations and maintenance.

Last 100 Feet

This is the domain of unlicensed wireless. The reality is that things move around within the home or office. The wiring in the walls is never where you want it to be. The 803.11 wireless standard appears to be the best fit for this application.

Barriers and Cost

There are three major issues with manufacturers of unlicensed equipment. The first problem concerns the long term availability and viability of these allocated shared bands. The second is the expense and time required to obtain authorization for a new product. And the third is new rule making, good (higher power for point to point) and bad (placing a restricted band adjacent to a shared band where wide bandwidth modulation is a requirement, which effectively reduces the spectrum within the shared band).

What Should the FCC Do?

From our company's view, the best thing that the FCC has done to serve our point to point link market, has been to modify the radiated power limits for gain antennas. These higher effective radiated power limits make 20 mile links reliable for commercial applications.

However, the next regulatory change should be to allow point to multipoint operation with the same directional antennas and power levels. This will have a profound effect on the user cost of equipment and will not increase the power density within the spectrum.

This change alone would allow a next generation system to provide essentially ADSL rates to the residence with several residences supported by a single unit at the Internet Serviced Provider.

Ali Shadman
Vice President - Corporate Strategy
Ameritech

Ali Shadman is vice president of corporate strategy, responsible for working with Ameritech's business units to determine new opportunities and strategies for growth.

Ameritech (NYSE:AIT) serves millions of customers in 50 states and 40 countries. Ameritech provides a full range of communications services, including local and long distance telephone, cellular, paging, security monitoring, cable TV, electronic commerce, on-line services and more. One of the world's 100 largest companies, Ameritech (www.ameritech.com) has 66,000 employees, 1 million shareowners and $23 billion in assets.

Shadman joined Ameritech in 1987. He has held a variety of network operations and systems planning, design and integration positions at Ameritech, including general manager - network services and technology planning. In February of 1995, he joined Ameritech New Media as vice president - operations and business development, responsible for planning, systems integration, information systems, construction and operations for the Ameritech broadband network. He was appointed to his current position in May 1997.

Shadman came to Ameritech from MCI in Washington, D.C., where he was director of technology development, responsible for introduction and integration of state of the art telecommunications systems into the MCI network. Prior to that post, he served MCI as senior member of technical staff.

From1979 to 1983, Shadman was a member of technical staff at International Satellite Communication in Washington, D.C., involved in advanced satellite system concepts. From 1977 to 1979, Shadman worked in planning and design of the Domestic Satellite Network at the Telecommunications Research Center of National Iranian Radio and Television in Tehran, Iran.

Shadman received his bachelor's and master's degrees in electrical engineering from Oregon State University. He earned his Ph.D., with an emphasis in stochastic control theory, from that institution in 1977.

4/97

Ameritech's Advanced Telecommunications Proposal
FCC En Banc Meeting July 9, 1998
Ali Shadman Vice President Corporate Strategy

Without question, the digital revolution and the explosion of data applications both at the consumer and business level are the driving forces shaping the telecommunications industry. That future will require an advanced telecommunication infrastructure consisting of multiple interconnected carriers bringing easy to use and useful multi media applications to consumers and businesses.

In this complex world, telecommunication providers face risks on three fronts:

1) Market Risk – will customer demand meet expectations

2) Technological Risk – will it work and which set of standards or technologies will prevail

3) Regulatory Risk – will current rules prevent operating efficiencies, restrict cost recovery, or limit pricing options in a competitive market

Ameritech fully accepts and understands the market and technological risks associated with deploying advanced telecommunication infrastructure. Our focus here is on the regulatory risk and how these risks are unnecessarily impeding our deployment and speed to market for advanced telecommunication capabilities.

I'd like to first focus on two issues.

What is the advanced technology that needs to be deployed and what are the regulatory risks impeding that deployment.

1. Deployment

A. **Broadband Data Services:** Applications include: intranets, extranets, lan to lan connectivity for multiple office sites, ability to place multiple traffic types (voice, video, and data) on the same network with

guaranteed quality of service. Examples of technology to support these applications include frame relay, ATM and transport.

B. **Internet Access**: Applications include: Dial-up access to e-mail, chat groups, newsgroups, and world-wide-web. Examples of technology to support these applications include authentication servers, e-mail servers, web hosting servers and transport. Under current restrictions ILECs are forced to introduce an additional provider for the interLATA component of the data service introducing billing complexities, customer service dilemmas, and reliability issues for the customer.

C. **Broadband Access Technologies**: Applications include: High speed access to the internet, secure fast access to corporate lan for remote office workers. Examples of technology to support these applications include DSLAM mux, ATM, and transport.

2. Regulatory Risk

The single largest risk and barrier to the rapid deployment of advanced telecommunication capabilities is the interLATA restriction.

While LATAs may make sense in the voice world, they are meaningless in the data world. The virtual connectivity of data networks defies traditional definition of physical boundaries, such as LATAs.

LATA boundaries increase network inefficiencies and limit Ameritech's ability to provide customers the services they want. Customers do not think in terms of local versus long distance for these ATCs.

Ameritech would also be able to provide interLATA transport using its own network, rather than forcing the customer to deal with multiple service providers, for that capability. This would give Ameritech the ability to more effectively manage and control its facilities on an end-to-end basis, providing customers with better service (reliability and availability) through a single point of contact for all components of their service.

Removal of the interLATA prohibition for ATCs would enable Ameritech to compete on a level playing field in this rapidly developing market.

1) For data traffic dedicated to a single customer (e.g., a bank with branches in multiple LATAs), Ameritech could offer data facilities to serve that customer where it currently cannot today. Notably, such a network may use little, if any, of Ameritech's traditional ILEC network.

2) For non-dedicated traffic, Ameritech could concentrate all its data traffic into one or two strategic nodes like its competitors - IXCs, CLECs – do today, rather than arbitrarily separating and handling the traffic by, LATA. Among other things, Ameritech would be able to more efficiently use the inherent economies of scale associated with SONET rings and the architectures, which they make possible, enabling more customers to use these technologies.

Until these barriers are removed, service providers will continue to be frustrated with the lack of progress in delivering broadband services to the home. Witness Microsoft's $1B dollar investment in Comcast allegedly to spur cable modem deployments.

I'd like to conclude with two more points:

What should Ameritech do and what should the Commission do.

1) Ameritech will continue to meet its obligations under the Act.

Ameritech recognizes as an incumbent LEC we have obligations to other carriers seeking to deploy advanced telecommunication capabilities.

Ameritech will continue to provide:

- unbundled loops
- collocation for transmission equipment associated with advanced telecommunication capabilities
- nondiscriminatory access to network elements

Ameritech plans on offering its advanced telecommunications capabilities through a lightly regulated subsidiary. Ameritech's subsidiary will act like any other CLEC and will use the same operational support systems for

ordering, establishing trouble tickets, billing etc. that are available to all CLECs. It would maintain separate books, not own joint transmission or switching equipment and obtain all telecommunication services, network elements and collocation from tariff. Ameritech does not believe all of the requirements of Section 272 should apply. In particular the restrictions on use of incumbent employees for installation and maintenance services, and the restrictions on sharing of administrative services will slow the introduction of these services.

2) **What should the Commission do?**

To quickly and efficiently facilitate the provision of the advanced data services consumers are demanding, the Commission should do the following:

- Authorize Ameritech immediately to provide new advanced telecommunications services across LATA boundaries;

- Eliminate, or minimize to the extent possible, regulatory requirements that would require Ameritech to establish inefficient, redundant operations, and that would preclude it from tapping the expertise of telephone company personnel in designing and offering advanced telecommunication services;

- Confirm that advanced telecommunication capabilities provided by a data subsidiary would not be subject to 251(c) obligations and that its regulation would be the same regulation that applies to the other, more dominant, data service providers in its provision of new advanced telecommunication services.

With a level playing field established, Ameritech is committed to make the investment necessary to bring our customers the connectivity, bandwidth, and applications envisioned for the multimedia environment of the 21st century.

The existing regulatory requirements significantly constrain Ameritech's incentive to invest in facilities and equipment necessary to provide new, advanced telecommunications services, by (1) precluding it from providing internet backbone services; (2) denying it the ability to meet customers' demand for end-to-end, high speed data services; and (3) increasing the already significant cost of providing such services.

Biography of Charles J. McMinn

Mr. Charles J. McMinn is President and Chief Executive Officer of Covad Communications Company. Mr. McMinn is a founder of the company and also serves on its Board of Directors. He is responsible for the strategic direction of the firm and its day to day operations.

Mr. McMinn has over twenty years of experience in creating, financing, operating, and advising high technology companies. In the last several years, he has focused almost exclusively on information technology and communications businesses while managing his own consulting business, Cefac Consulting. Mr. McMinn has worked closely with a variety of major consulting firms, including Gemini Consulting and Regis McKenna. His most recent engagements included defining a strategy for Lucent, Intel and Broadband Technologies to accelerate the deployment of Fiber to the Curb technology and providing advice to Ameritech on business strategy for Asynchronous Digital Subscriber Loop (ADSL) data services.

From 1992 to 1993 Mr. McMinn was the first President and CEO of Visioneer Communications where he raised $5.5M in venture capital and grew the organization to 20 people. Prior to Visioneer, Mr. McMinn held numerous marketing and engineering positions in Silicon Valley companies including Director of Engineering and Director of Marketing for Megatest Corporation, a venture backed startup in the Semiconductor Test Equipment business.

From 1986 to 1992 Mr. McMinn was a General Partner at InterWest Partners, a venture capital partnership located in Menlo Park, CA. While at InterWest, Mr. McMinn was responsible for all aspects of the venture capital investment process for early stage technology companies and served on the Board of Directors for five firms.

Mr. McMinn began his Silicon Valley career as the product manager of the 8086 microprocessor at Intel Corporation.

Mr. McMinn received a Bachelors of Science in Electrical Engineering from Brown University in 1974 and a Masters Degree in Electrical Engineering from Syracuse University in 1976. He received an MBA from the Harvard Business School in 1978, where he was a Baker Scholar graduate.

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Before the Federal Communications Commission (en banc)
July 9, 1998

Chuck McMinn, Chairman of the Board,
Covad Communications Company

Mister Chairman, Commissioners, I appreciate the opportunity to talk to you today.

Since its founding just 20 months ago, Covad has built an all-digital, all-packet network in the San Francisco Bay area that passes well over a million homes and businesses. We are continuing our expansion this year into the metropolitan markets of Seattle, Los Angeles, Boston, New York, and Washington.

Covad's advanced telecommunication network is used by two sets of customers. Corporations use it to connect employees who work at home to their multi-state and multi-national computer networks. From their residences, workers connect at the same speed and security they would have in their corporate offices. Covad's network is also used by ISPs to provide their small business and residential customers with affordable, high-speed Internet access.

Covad provides service to workers where they live. Our network is a residential network. We have an abiding interest in collocating in Central Offices that serve residential areas.

We provide residential connection speeds ranging from ISDN to T1 using several DSL technologies. Our network architecture involves leasing a local loop, locating equipment in the end-user's home and compatible equipment at the termination of the copper twisted pair. This is usually, but not always, in the serving Central Office. From the Central Office, traffic moves to Covad's regional data aggregation center, and, from there, to a company computer network or an ISP.

Simply put, Covad would not be in business without the Telecommunications Act, its implementing regulations, and the access to unbundled network elements and interconnection that is

provided. Implementation has not been easy. For example, we have an antitrust suit pending against Pacific Bell. (Information was included in one of our recent FCC filings.)

However, *overall*, at least with respect to early adopters of DSL services, the promise of competition in the Telecomm Act is in the early stages of realization.

The challenge is to move beyond offerings to early adopters. If this Commission and each State Commission are to encourage the deployment of advanced telecommunications capability to *all* Americans on a reasonable and timely basis, then commercial concerns relating to cost and delay need to be addressed by public policy.

The FCC is justifiably concerned about the pace of DSL roll-out to all Americans. We are also concerned—the pace Covad's roll-out is too slow, caused by a maze of hurdles constructed by incumbent LECs, from unreasonable collocation practices to spotty access to loops capable of supporting these services.

I suggest the Commission address the structural problems associated with the reasonable and timely introduction of advanced services to all Americans by considering a structural solution.

If ILECs wish to provide DSL services in-region, they should be required to provide these services through a separate entity. This separate entity would have to obtain the inputs essential to provide DSL service in exactly the same manner as Covad or any other competitor. By "exactly the same", I mean "exactly the same" – the same procedures and costs to obtain local loops, interconnection agreements, collocation space, OSS, and so on, would apply. Such an ILEC-originated entity should face the same obstacles that my business faces every day.

In theory, Covad supports the concept of a separate ILEC entity. However, as you know, the details of how this plan is implemented are important, and not any "separate subsidiary" would do. Indeed,

implementation of this concept would need to take into account a number of concerns.

For instance, we need to ensure that the separate ILEC entity not be the only DSL provider that can collocate in a particular central office. Therefore, the Commission should ensure the existence of a competitive market by requiring that at least 4 other CLECs are collocated in a particular central office before the separate ILEC entity be permitted to provide deregulated interstate packet switched data services from that central office. A structural solution like this is consistent with solutions the FCC has used in allocating PCS spectrum, assignment of orbital slots and other similar situations.

There should be on-going and detailed public reporting and accounting practices for this separate ILEC entity. These reports also should include sufficient information to ensure that the separate ILEC entity is not receiving favored treatment from the ILEC network provider.

Companies like Covad should be able to obtain access to unbundled copper loops—both physical ends of the copper wire—in the same manner as the separate ILEC entity. Loops should not be rendered "unbundleable" merely because the ILEC entity is providing service to a particular customer.

Moreover, the separate ILEC entity should be required to provide its services pursuant to the terms of an already-existing interconnection agreement. There is an inherent problem in having the ILEC "negotiate with itself", and ILECs have taken the position before you and the Courts that Section 252(i) of the Act only permits CLECs to "MFN" an entire, pre-existing interconnection agreement.

The whole point of this endeavor is to ensure that "all Americans" obtain access to advanced telecommunications services. I believe it does not overstate the situation to say that the United States is at a regulatory cross road. If ILECs insist upon being able to offer these services on an integrated basis, there is only one option available to the Commission: endless disputes and litigation as to what constitutes an "interLATA data" service, increased regulation in the

form of cost allocation proceedings (to "fairly" attribute costs as between DSL and POTs), extensive investigation into ILEC "no space for collocation" claims in central offices, spectrum unbundling proceedings (to determine whether, and under what circumstances, competitors were entitled to use the ADSL frequencies of a loop over which an ILEC continued to provide POTs), and seemingly endless litigation over these disputes.

The United States can go down that road. Or it can go down the road that I have just outlined—a structural solution to inherently structural problems. Whatever the Commission does in this regard will have huge future effects given the rate of growth for packet switched services.

Covad cannot satisfy the pent-up demand on competitive terms if necessary elements of its service are unilaterally determined to be unavailable in residential neighborhoods, are subject to delay, or if innovation is artificially retarded by regulation that effectively rewards legacy technology.

We need at least the following four fundamentals if we are to bring innovative new services to the mass market. I believe that a properly-constructed structural solution will help hasten the implementation of these fundamentals—

First, reasonably priced physical collocation in every Central Office. Covad has had some success with "cageless collocation" as a means to reduce cost, time to market, and unilateral ILEC claims of "no space available". We have reached an accommodation with US WEST. Other ILECs, like Bell Atlantic, have not been cooperative, promising instead state-by-state opposition to an admittedly "technically feasible" approach to minimize the anticompetitive effects of ILEC control of this bottleneck facility.

Second, local loops that are "priced right". For example, many ILECs and States have imposed digital loop premiums. Digital loops do not cost more to provide than analog loops and more often than not *are the exact same copper facility.* Pricing digital loops with as

much as a 50% premium levies a "broadband tax" on high speed access that delays mass market deployment.

Third, prompt provisioning of DSL-capable loops and associated OSS in whatever manner an end-user requires them. Covad's current technology allows high speed service to homes beyond 18 kilofeet from the central office and to the ever-increasing number of homes served by fiber-fed digital loop carriers. But the introduction of that technology should not be impeded by regulation or legacy philosophies or operations. Local loops should be viewed as extensions of an end user's CPE – the subscriber should make a choice about service that would drive the technology supporting the local loop. An ILEC should *not* decide subscriber service levels either by inaction or technology fiat. [Covad has available a working paper that discusses technology issues in a public policy context.]

Fourth, freedom to place equipment in, and otherwise use, collocation space in a manner of our choosing in order to introduce the most efficient, evolving network architectures. ILEC attempts to limit the introduction of modern miniaturized equipment modules reflects, at best, an outmoded circuit switched world view.

It is clear that we are far away from these fundamentals being in place nationwide.

Indeed, the same ILECs that provide the cost studies that often result in high digital loop premiums, now promise DSL service at prices insensitive to state-to-state cost variations of that very same critical input – the local loop. Moreover, their federal tariffs would allocate all of the loop costs associated with DSL provisioning to subsidized POTs. These ILEC tariffs take the affirmative position that the loop is "free" for ILEC DSL service. In contrast, the loop is the single largest recurring cost that Covad faces!

The same ILECs that object to Covad's cageless collocation proposals provide themselves with cageless collocation and its attendant cost and speed advantages. Some ILECs promise DSL

provision from Central Offices where, they have informed us, no space is available to collocate our DSL equipment. By ignoring provisions of the Act requiring determinations of "no space" be made by State Commissions, ILECs effectively and unilaterally control the critical input of Central Office space and its usage.

The same ILECs that control what and when essential facilities will be made available to Covad and its ISP customers are the same ILECs that operate their own ISPs whose offerings are increasingly and inherently bundled with both DSL and subsidized POTs.

Creation of separate, ILEC-originated entities would not guarantee that the remaining ILEC would provision necessary facilities in a timely fashion, but it could eliminate the comparative disadvantage of existing data CLECs. Moreover, a structural solution could create a much-needed incentive for ILECs to open bottleneck network facilities on an identical basis to all competitive entrants.

To be successful in reaching *all* Americans, this Commission should recognize the national importance and interstate characteristics of DSL services and the facilities used to provide these services. Unlike other technologies that may also be capable of providing broadband service, DSL is being provided today using copper infrastructure that is already ubiquitous.

Covad employees, and our principle suppliers, see themselves as adjuncts to the computer industry. We are dedicated to providing cheaper, faster, better products that utilize the most innovative technologies. Collectively, we need to ensure that the 40 million home computers now connected to the wrong network – the legacy monopoly circuit switched network – are, in quick order, connected to the right network – a continually innovative, competitive, packet switched network.

Thank you for your consideration.

Milo Medin
Senior Vice President, Engineering and Chief Technology Officer
@Home Network

Milo Medin is Senior Vice President of Engineering and CTO, overseeing the development of @Home Network s high-speed backbone. @Home's performance-engineered scaleable network removes Internet "traffic jams" and enables true end-to-end management. In addition, the Network employs replication and caching technologies that dramatically improve network efficiency.

Prior to joining @Home Network, Medin served as project manager at the NASA Ames Research Center. During his tenure, he directed the NASA National Research and Education Network project that, in combination with partners at Lawrence Livermore National Lab, deployed a high speed national ATM infrastructure connecting major supercomputing and data archiving centers. He also supervised the primary west coast Internet interconnect network. In addition, he pioneered the global NASA Science Internet project, providing network infrastructure for science at more than 200 sites in 16 countries and 5 continents, including Antarctica, and initially helped establish the TCP/IP protocol as an industry standard.

@HOME NETWORK

WRITTEN STATEMENT OF MILO MEDIN
SENIOR VICE PRESIDENT FOR ENGINEERING AND CHIEF TECHNOLOGY OFFICER
@HOME NETWORK
BEFORE THE FEDERAL COMMUNICATIONS COMMISSION
JULY 9, 1998

Overview

At Home Corporation ("@Home" or "the Company") is a leading provider of Internet services over the cable television infrastructure and leased digital telecommunications lines to consumers and businesses. @Home's primary offering, the @Home service, allows residential subscribers to connect their personal computers via cable modems to a new high-speed Internet backbone network developed and managed by the Company. This service enables subscribers to receive the "@Home Experience," which includes Internet service over hybrid fiber co-axial ("HFC") cable, at transmission speeds of up to 100 times faster than typical dial-up connections, "always on" connection, and rich multimedia programming through an intuitive graphical user interface. The content foundation of the @Home Experience is provided by the Company's @Media group, which aggregates content, sells advertising to businesses and will provide premium services to @Home subscribers.

For businesses, the Company's @Work services provide end-to-end managed connectivity for Internet, intranet and extranet solutions over a variety of transport media including the cable infrastructure and leased digital telecommunications lines. In addition, @Work is developing a next generation platform to support networked business applications and other value-added data networking solutions. In order to accelerate deployment of the @Work connectivity solutions into major U.S. metropolitan areas, the Company established a strategic relationship with Teleport Communications Group, Inc. ("TCG") the country's largest competitive local exchange carrier ("CLEC") in April 1997, to provide co-location facilities and local telecommunication circuits for @Work's infrastructure and subscriber connectivity. By combining the @Home broadband network with cable, telephone and technology relationships, @Work provides a foundation for nationwide delivery of network-based business applications and other value-added data networking services.

@Home has entered into distribution arrangements for the @Home service with Tele-Communications, Inc. ("TCI"), Cablevision Systems Corp. ("Cablevision"), Comcast Corporation ("Comcast), Cox Enterprises, Inc. ("Cox"), Rogers Cablesystems Limited ("Rogers"), Shaw Cablesystems Ltd. ("Shaw"), Marcus Cable Operating Company, L.P. ("Marcus") and InterMedia Partners IV L.P. ("InterMedia") (collectively, the "Cable Partners"), whose cable systems pass approximately 50 million homes in North America. As of March 31, 1998 approximately 5.5 million of these homes were currently passed by upgraded two-way HFC cable, and @Home believes that the Cable Partners will complete the upgrade of systems passing a majority of their homes within five years. As of April 30, 1998, @Home had launched its service through its Cable Partners in portions of 27 cities and communities in the United States and Canada, including those listed below, and had approximately 100,000 cable modem subscribers.

TCI	Comcast	Cox
Arlington Heights, IL	Baltimore, MD	Hampton Roads, VA
Fremont, CA	Detroit, MI	Hartford, CN
Hartford, CT	Orange County, CA	Omaha, NE
Seattle, WA	Philadelphia, PA	Orange County, CA
	Sarasota, FL	Phoenix, AZ
	Union, NJ	San Diego, CA

Rogers	Shaw	InterMedia
Toronto	Calgary	Nashville, TN

Vancouver Toronto

@Home was founded in March 1995 and currently has approximately 400 employees. @Home is based in Redwood City, California.

@Home Service

The Company's primary offering is the @Home service, a comprehensive Internet solution that leverages the two-way HFC cable television infrastructure and the Company's technological and programming capabilities to provide the @Home Experience, which the Company believes is the most compelling consumer Internet experience currently available. By connecting via a cable modem to the @Home broadband network through the local cable infrastructure, subscribers to the @Home service can achieve peak data transmission speeds of 2 to 5 Mbps (2,000 Kbps to 5,000 Kbps), which is over 100 times faster than the peak data transmission speed of a 28.8 Kbps dial-up modem. This high bandwidth is critical for sophisticated multimedia applications, broadband advertising, online commerce and interactive games. The @Home service offering also includes standard Internet service provider ("ISP") functionality, including Web page hosting for subscribers, and the ability to create and manage multiple email accounts. In addition, the two-way cable infrastructure is "always on," providing instantaneous access to the Internet and eliminating the need for a time consuming dial-up procedure using the telephone network.

@Home's programming services, provided by the @Media group, enhance the @Home Experience by aggregating high-quality and compelling multimedia content from the Internet into an intuitive graphical user interface. The home page for the @Home Experience (the "@Home Page") provides the user with access to an array of multimedia content "Channels," powerful tools and Web-based applications designed specifically to take advantage of @Home's broadband network architecture. The Company believes that the @Home Page broadens the appeal of online services beyond technology enthusiasts to the mass market by simplifying navigation, increasing the subscriber's knowledge of Internet resources, presenting compelling high-bandwidth content (such as animated graphics, near-CD-quality audio and video clips), and stimulating persistent usage with timely, dynamic, highly sought-after data streams. The @Home Page includes a variety of tools to obtain information quickly and easily. For example, the "How Do I" section, which is one click from the @Home Page, provides users with a variety of step-by-step solutions to such tasks as making plane reservations and checking movie schedules. The @Home Experience also permits @Home subscribers to access online services, purchase software and engage in multiplayer gaming and interactive shopping.

The @Home service is currently offered to consumers in the United States for flat monthly fees generally ranging from $35 to $55, including a cable modem provided by the Cable Partner. Installation of the @Home service is provided by the Cable Partner at prices generally ranging from $75 to $175. Upon installation, each new subscriber's personal computer is configured for the @Home Experience with @Home client software, which provides access to the @Home Page. In addition to making the Internet considerably easier to access for consumers, the @Home client software offers advertisers and content providers a rich and consistent client environment for delivering multimedia advertising, content and applications. The Company is currently developing the capability to deliver the @Home Experience to televisions via set-top boxes connected to the cable infrastructure, and thereby meet the needs of a broader market of non-computer users.

@Work Services

For businesses, @Work services provide end-to-end managed connectivity for Internet, intranet and extranet solutions over a variety of transport media including the cable infrastructure and leased digital telecommunications lines. In addition, @Work is developing a next generation platform to support networked business applications and other value-added data networking solutions. In order to accelerate deployment of @Work's connectivity solutions in metropolitan areas throughout the United States, the Company has established a strategic relationship with TCG, the country's largest CLEC, to provide targeted co-location and local telephone circuits for infrastructure and subscriber connectivity. The Company currently offers two services: @Work Internet and @Work Remote.

@Work Internet. The @Work Internet service delivers dedicated, high-speed, end-to-end

managed Internet connectivity to commercial enterprises over leased digital telecommunications lines and HFC cable. The @Work Internet service offers telecommunications dedicated access options at peak data transmission speeds ranging from 56 Kbps to 45 Mbps. These solutions are priced competitively vis-à-vis existing alternatives. The telco-based @Work Internet service is currently available in numerous metropolitan markets including Chicago, Los Angeles, New York, Orange County, San Diego, San Francisco, Seattle, and Washington, D.C.
In February 1998, @Home and Cox announced the availability of the @Work Internet service via Cox's HFC cable infrastructure in Orange County, Phoenix, and San Diego. Businesses in these markets that are passed by two-way HFC cable can connect directly to the @Work Internet service. The @Work Internet HFC service is a shared bandwidth solution that offers peak data transmission speeds of 2 to 5 Mbps downstream using the @Home broadband network.
@Work Remote. The @Work Remote Service is the Company's first Virtual Private Networking ("VPN") solution. This solution provides a secure, high speed method for corporations to extend their Local Area Networks ("LANs") to telecommuters and branch offices via the cable infrastructure. In November 1997, @Home announced a non-exclusive agreement with TCI, Cox and Comcast to develop, deploy and market @Work Remote in areas served by these Cable Partners. The @Work Remote service also includes the network equipment and software needed to connect the corporate LAN securely to the @Home broadband network via high-bandwidth local telephone circuits. @Work Remote users will be able to gain secure access to all of their corporate LAN resources 24 hours a day, seven days a week. @Home offers virtual private network capability between branch offices and corporate headquarters.

@Media Services and Technologies

The @Media group sells advertising and, in partnership with content providers, packages advertising-supported content and facilitates online transactions and services for @Home subscribers. Advertisers and content providers can utilize @Media technologies that enable them to exploit the high-bandwidth, multimedia capabilities of the @Home broadband network. The @Media group sells advertising through several advertising formats including banners, half-banners, and the "B*box," a broadband audio/video advertising space. With the B*box, advertisers are not constrained by the Web banner paradigm and can broaden their creative presentation using video clips, audio and animation. Advertisers have the ability to enhance their message by using multimedia tools and technologies such as Flash, Quicktime Video, and Real Audio. Current advertisers include Proctor & Gamble, Clorox, Toyota and Unilever.
In addition to receiving advertising fees, the @Media programming services provide a variety of revenue sources. Examples of @Media programming services include:

Real-Time News and Entertainment Services. Continuously-updated headlines delivered in the News, Sports and Finance @Home channels, and video clips presenting top stories, sports highlights and movie previews. Current @Media partners include Bloomberg, CNN Interactive, The NBA and E! Online.

Enhanced Search and Directory Services. Leading search and directory services integrated into the @Home Page. @Home shares in the advertising revenue generated from these services. Current @Media partners include BigBook, Excite, Infoseek, Switchboard, WhoWhere, Yahoo! and Zip2.

Digital Audio Services. Near-CD-quality audio on various music, talk and event channels (e.g. jazz, rock and 24-hour sports talk) via @Home's TuneIn service. Users can simultaneously listen to TuneIn and browse the Internet. Current @Media partners include CNET Radio, Net Radio, SportsLine and The DJ.

Software Purchase with Real-Time Downloading. Purchase and download software titles at speeds substantially faster and with greater reliability than a typical dial-up modem. @Home has partnered with Release Software to create the "SoftwareNow" store. In addition to faster than normal download speeds, SoftwareNow gives @Home users multiple, unique purchase options including a "Try-Before-Buy" option and rental software.

High-Speed Multiplayer Gaming. Download and play popular Internet games against other online players, delivered via the @Home Games channel. Because the @Home Network combines high speed with very low latency, it is an excellent environment for high-quality game play. The Company has already co-located game servers on the network backbone and is currently developing the capability in conjunction with SegaSoft to offer multiplayer online games to @Home subscribers.

Interactive Shopping. Evaluate and purchase goods via an interactive multimedia shopping experience. Current @Media partners include Amazon.com, BUYDIRECT, N2K, PC Connection and Reel.Com.

The @Home Broadband Network

The Company designed the @Home broadband network on the premise that sustainable, high-performance Internet access requires a new, scalable architecture to alleviate Internet bottlenecks and to enable true end-to-end network management capabilities. Residential subscribers access the network primarily through high-speed cable modems, which attach to their personal computers via a standard Ethernet connection, while businesses can also connect through CLEC telecommunications networks. The three key principles of @Home's network strategy are moving data closer to the user, end-to-end network management and "always-on" service.

Moving Data Closer to the User. The @Home broadband network utilizes caching and replication technologies to move the information that a subscriber requests close to the subscriber. Local caching reduces backbone network traffic, enabling the @Home broadband network to overcome a fundamental weakness of the Internet¾duplicative data transfers. For example, when a subscriber downloads a video clip from a Web site, the user must "pull" data across the Internet from that Web site to the user's ISP and finally to the user's computer. If the user's neighbor requests the same video clip from that Web site, the neighbor must pull the same data across a similar path. In contrast, @Home's approach would move the video clip over its high-speed backbone only once in a given geographic area and retain it in a local cache near the user's home where it could be accessed by every subscriber within that area without retransmission over the backbone. This approach of building intelligence into the network fabric allows us to trade-off compute power and storage against network transport, allowing us to deliver very high performance to our subscribers at a much lower price point than the equivalent "dumb" network.

End-to-End Network Management. End-to-end network management is achieved through @Home's proactive network quality, service and performance management systems. The @Home broadband network provides visibility from the Company's servers (or content partners' servers) across the backbone and all the way to the subscriber's home. Because the @Home broadband network is centrally managed, the Company can dynamically identify and enhance network quality, service and performance, or address issues before they affect the user experience. Also, this end-to-end management allows us to deploy advanced network technologies such as IP multicast and Quality of Service (QoS), which would otherwise not be feasible to deploy across multiple network operators with today's technology.

"Always On" Service. The @Home broadband network is "always on", unlike switched technologies such as dial-up and Integrated Services Digital Network ("ISDN") technologies. The user is always connected to the Internet as long as their computer and cable modem are on. This eliminates the need for a time-consuming connection process, as with a dial-up service, and changes the way the customer uses the Internet.

Proximate users share high-bandwidth access (much like corporate LANs) and may limit the effective bandwidth that is available to a given subscriber at a given time. However, this shared connection is particularly efficient and well suited to the sporadic nature of Internet traffic, where browsing tends to consume bandwidth in discrete bursts intermixed with periods of inactivity. As subscriber penetration increases, the cable operator has multiple cost-effective alternatives to increase capacity, including allocating additional 6 MHz channels for the @Home service or reducing the number of subscribers sharing a given bandwidth by adding nodes, with each node serving a smaller number of subscribers over the same fiber-optic infrastructure.

The primary components of the @Home broadband network are the Company's high-speed private national backbone, RDCs, regional networks, headends (including caching servers), network connections and cable modems and the Network Operations Center. See attached diagram.

Private National Backbone. @Home operates its own private national backbone, which consists of a network of high-speed asynchronous transfer mode ("ATM") communications services that the Company leases to connect its RDCs and regional networks with content providers and the Internet. These services currently operate at a speed of 45 Mbps and can be upgraded to 155 Mbps or higher. This backbone can be viewed as a high-speed "parallel Internet" that connects via @Home's routers to the

Internet at multiple network access points ("NAPs") with "Tier-One" peering status, which permits the Company to exchange Internet traffic with other nationwide ISPs. @Home peers with both national backbone operators and also smaller operators where such peering would bypass congested parts of the public Internet, and/or improve performance for our users accessing content from these networks. @Home believes that robust inter-connectivity between backbone operators is critical for the overall success of the Internet, and has a fairly broad peering policy.

Regional Data Centers. The RDCs act as service hubs for defined geographic areas, such as major metropolitan areas, providing key services, including email, news groups and chat facilities, to subscribers, managing network performance proactively, replicating content and applications, and providing a cost-efficient infrastructure to cache and multicast data throughout a region and to house local content and subscribers' Web pages. @Home uses "high availability" servers from Sun Microsystems, Inc. in its RDCs for these mission-critical activities. The Company had deployed RDCs in 19 geographic areas as of December 31, 1997. The Company estimates that to provide the @Home service throughout North America it will need to deploy between 40 and 50 RDCs.

Regional Networks. The regional networks consist of network routers and switches that interconnect @Home's RDCs and its national backbone to multiple cable headend facilities at speeds of 45 Mbps to 155 Mbps. These networks generally take advantage of cable operators' fiber optic infrastructures that are normally used to transport cable television signals from a consolidated master headend facility to other headends within a region. This approach often allows @Home to avoid the high cost of leasing conventional high-speed communication services from local telephone companies when deploying high-speed connectivity in a region.

Headends. The cable system headends are connected to each RDC through the regional network. In order to move data as close to the subscriber as possible and to avoid repetitive transmission of the same data, the headends employ high-performance caching servers that store frequently accessed content locally, thereby greatly reducing the amount of data transmission (and corresponding transport costs) in higher layers of the network. In addition, local caching servers can compile far more comprehensive usage data than is normally attainable on the Internet, which can be used for network troubleshooting, tuning performance and tailoring the @Home service.

Network Connections. The last leg of the network connection is from the headend to the consumer over a cable operator's HFC cable system. Multiple fiber optic lines carry the signal from the headend out to cable "nodes" in each neighborhood, which in turn connect through traditional coaxial cable to the home. These fiber optic nodes typically service from 300 to 2,000 homes in a relatively modern cable system. In such a system, each television channel requires 6 MHz of the 450-750 MHz of total system capacity. Downstream transmission of the @Home service utilizes a similar channel. Upstream transmission, however, utilizes a frequency range not used for traditional broadcast by cable systems. This range is more prone to interference than downstream channels, which effectively limits the peak upstream transmission speed. To date, virtually all @Home Network deployments have been done on "2-way" or reverse activated plant. We believe that this gives our users the best performance and "always-on" connectivity, while reducing cost to us. While it is possible to use a telephonic return solution, it is clearly inferior to a 2-way approach in terms of user satisfaction and network cost effectiveness (due to the cost of the telephony modem pool's trunks back to the PSTN).

Cable Modems. In the home, a cable modem connects to the cable television coaxial wiring and attaches to the user's personal computer via standard Ethernet connections. While peak data transmission speed of a cable modem depends on the specific model and can approach 10 - 27 Mbps downstream and 0.7 - 10 Mbps upstream, the performance that subscribers actually experience is often constrained by the capacity of their personal computers, the capacity of the server being accessed, and the type of network architecture utilized. The North American cable industry has recently adopted a set of interface specifications for hardware and software to support the delivery of data services utilizing interoperable cable modems. @Home believes that these specifications, together with the agreement that the Company entered into with Intel

Corporation in July 1997 relating to the development of "plug and play" modems, will facilitate the growth of the cable modem industry and the availability of lower cost interoperable cable modems through retail channels.

Network Operations Center @Home provides end-to-end network management through its Network Operations Center (the "NOC"). The NOC uses advanced network management tools and systems to monitor the network infrastructure on a 24 x 7 basis, enhancing its ability to address performance bottlenecks before they affect the user experience. From the NOC, the Company can manage the @Home broadband network from end-to-end, including the backbone, RDCs, regional networks, headend facilities, servers and other components of the network infrastructure to the user's home.

Competition

The markets for consumer and business Internet services and online content are extremely competitive. @Home's most direct competitors in this market are Internet service providers ("ISPs"), national long distance carriers, local exchange carriers, wireless service providers, online service providers (such as America Online Inc.) and Internet content aggregators. Many of these competitors are offering technologies that will attempt to compete with @Home's high-speed data service offerings. Such technologies include Integrated Services Digital Network ("ISDN") and ADSL. In January 1998, Compaq Computer Corporation, Intel Corporation, Microsoft Corporation, other technology companies and numerous telecommunication providers announced an initiative to develop a simplified version of ADSL, referred to as "ADSL Lite", that reduces the complexity and expense of installing the service. While commercial tests of this simplified version of ADSL are not expected until the end of 1998, this initiative has the potential to accelerate the deployment of ADSL services and pose a competitive threat to @Home.

Conclusion

@Home appreciates this opportunity to appear before the FCC. We would be happy to provide you with any additional information on the @Home network and the services we provide.

Biography of
W. Richard Morris

Richard is a graduate of the University of Utah where he received degrees in Economics and Business Management. He continued his studies at Brigham Young University Law School where he graduated with a J.D. degree.

His career began with Northwestern Bell Telephone Company nearly 20 years ago when he began work in the legal department. At the time of the AT&T divestiture, Richard joined the AT&T legal department where he worked as a General Attorney in the state regulatory arena. During his tenure with AT&T, he also served as External Affairs Vice President for a five state area.

In 1990, Richard joined Sprint's External Affairs department as a General Attorney providing support to Sprint's Local Telecommunications Division. In 1996 he accepted the position of Director of Regulatory Policy . He assumed his current position as Vice President – Local Market Integration in Sprint's National Integrated Services organization in 1997.

Comments of
W. Richard Morris
Vice President – Local Market Integration
Sprint Corporation

FCC En Banc
Section 706 of Title 47 U.S.C. Implications
July 9, 1997

Sprint appreciates the opportunity to participate in today's En Banc presentations concerning implementation of Section 706 of the 1996 Act.

In early June Sprint announced its Integrated On-Demand Network, or ION initiative, to the industry and regulators. At the core of this initiative is Sprint's resolve to provide broadband capability with integrated voice, video and data services, to both business and residential telecommunications customers. This opportunity to discuss the provision of new, innovative broadband services to the market is very timely, as is a frank discussion of the dangers of implementing Section 706 of the Telecommunications Act of 1996 in an improper manner.

Sprint believes that there are several technologies that hold promise in delivering broadband services. At the high end of the market, where dedicated wireline facilities are currently used, Sprint believes wireline facilities will continue to be the facility of choice. As broadband extends to what is now the switched services market, Sprint believes that xDSL, cable modem technology and broadband wireless may all ultimately be used to provide broadband services to the consumer market.

The scarce resource in the delivery of broadband technology continues to be the last mile facility that is largely dominated by the ILECs. While Teleport, MFS and others have built state-of-the-art facilities in large urban areas, these facilities do not directly connect with most business customers and connect with very few consumer market customers. The ILEC continues to be the bottleneck to the customer.

While cable companies may provide a wireline alternative to some customers in the future via cable modem technology and their own class 5 switching, there is not much real competition via cable facilities in the consumer market at this point in time. The same is true of broadband wireless technology: there is promise in the future but no significant competitive activity at this point.

This brings us, once again, to the current bottleneck: the ILEC's last mile. To use these monopoly last mile facilities, several data CLECs have been collocating with ILECs to provide xDSL services. However, this activity is occurring only in major, urban

markets. The ILECs have increasingly responded by announcing xDSL and data network deployments of their own. As history has shown, however, in smaller offices competition will develop slowly, if at all, because there is not enough market to support multiple facilities-based providers. The ILEC, deploying first, will dominate this segment of the market and competition will not develop in much of America.

Many of the RBOCs have petitioned the Commission to declare that their data networks, including proposed interLATA networks, and associated technology such as xDSL and ATM switching should be exempt from regulation. They claim that regulation of these services, networks, and technology discourages deployment because they would otherwise be required to open these services and facilities to resale and unbundled network element purchase by potential competitors. The implied threat is that rather than provide new services to the public, the RBOCs in question would forego deployment of these new services and facilities if they were subject to the statutory requirements of the Telecommunications Act of 1996.

There is great danger in granting the 706 petitions of the RBOCs. First, there is a risk to the Commission's ability to regulate the ILECs' traditional network and earnings. As Sprint's ION announcement has shown, traditional voice telephony can become part of a data stream on a data network. There will be few data networks in the future that do not carry voice and in the near term, such networks may carry more digitized voice traffic than traditional data or video. Thus, deregulation of data provides an avenue for the RBOCs to move their core voice services from a regulated status to a deregulated status by digitizing the voice and sending it over integrated data networks. As this occurs, price cap regulation would be destroyed as regulated voice services and earnings are migrated to the data services that the RBOCs seek to provision in a deregulated manner.

Deregulation of data services may well reduce customer choice and reduce competition for a great number of Americans, defeating the very purpose of Section 706. Large, urban centers have been attracting xDSL deployment by data CLECs and the ILECs have rapidly been announcing deployment of xDSL technology and data networks to serve these urban areas. In smaller population centers there will not be competitive room for multiple deployment of xDSL technology. This means that the ILEC, with the largest expected local service market share, will likely be the only company deploying xDSL. The simple conclusion is that in smaller markets, the RBOC is likely to be a monopoly in xDSL deployment.

Even in urban markets, xDSL competition may not be assured in many offices because of the lack of either physical or virtual collocation space for data CLEC equipment. Further, the xDSL equipment deployed by data CLECs may be different than that deployed by ILECs creating significant maintenance and training expenses if the ILECs continue to demand that only they can install and maintain equipment in a virtual collocation environment. Finally, only UNEs applied to ILECs assures that innovative, integrated services will be available in ILEC offices where space is at a premium.

The outcome sought by the RBOCs is harmful because those that have made 706 filings don't propose to make these xDSL and other data facilities available to other parties. As a result, Sprint, and other innovative competitors, are prohibited from using Section 251 of the Act to obtain xDSL through UNEs or resale. This, in turn, will mean that the benefits of ION -- with its innovative, integrated voice, data and video capabilities -- and of other innovative services provided by others, will be unavailable to many captive ILEC customers, including those customers receiving service out of smaller, more rural, or otherwise less competitive offices. A result which leaves ILECs as the only supplier of broadband in many areas and which denies access to these capabilities by their competitors is not the vision of either Section 706 or the rest of the Act.

Sprint strongly urges the Commission to stay the course charted by Congress – use Sections 251, 252, and 271 to open the market and provide competitive choices to consumers. Competition will attract broadband deployment, as recent ILEC announcements have already shown, and access by other carriers to ILEC xDSL, data services and facilities will increase customer choice. The result will be more broadband services by more providers than would be the case if the existing ILEC monopoly is deregulated.

Joseph R. Zell
President - !NTERPRISE Networking Services
U S WEST Communications

Joe Zell is president of !NTERPRISE Networking Services for U S WEST Communications, the unit responsible for product development and operations for all data and Internet-related products and services. !NTERPRISE was created by U S WEST in 1992 to address the advanced data and network integration needs of customers in its 14 western and midwestern states. !NTERPRISE is growing at record levels. Sales increased from $8 million in 1992 to nearly $1 billion in 1997.

Zell was named to his current position in 1997. Previously, he was president of the Carrier/Wholesale Division of U S WEST, which provides wholesale product marketing, sales and operations support for long distance, wireless and local exchange carriers. He also served as vice president of Markets and Innovation at !NTERPRISE, where he was responsible for developing, sourcing and managing applications and products that address the full range of voice, video and data networking.

Zell began his career at U S WEST in 1991 as director of Product Development for !NTERPRISE. Later, he served as the executive director of Applications Innovation. In that position, he developed many new services and applications, which included frame relay, ATM services, transparent local area network services and networking integration solutions.

Before joining U S WEST, Zell was with WilTel, now WorldCom, for six years and held a variety of marketing and product development positions. During that time, he was responsible for the development and introduction of the industry's first frame relay service. Prior to his tenure at WilTel, Zell worked at United Technologies Communications, a PBX manufacturer, and in sales at MCI and Xerox.

Comments of Joe Zell

made before the Federal Communications Commission at the

July 9, 1998 En Banc Hearing

Mr. Chairman and Commissioners of the Federal Communications Commission, my name is Joe Zell, and I am the President of !nterprise Networking Services, division of US WEST Communications. !nterprise is responsible for product development and operations for all data and Internet-related products and services. It is an honor to appear before you today to discuss Section 706 of the Telecommunications Act of l996 and the critical need for wider deployment of advanced telecommunications services to customers in the U S WEST territory.

Mr. Chairman, I wish to applaud you for your recent remarks in which you indicated a willingness to shield data services from the unbundling and resale requirements of the Act. Resale and unbundling represent two significant barriers for U S WEST to deploy advanced telecommunications services. Given, however, the unique demographics of the U S WEST territory, we continue to stress the need for interlata relief for data only.

Current providers of advanced data services are targeting large business customers in major metropolitan areas exclusively and are ignoring customers outside of the target market altogether. Consequently, Americans residing outside of the major metropolitan areas are being denied access to advanced telecommunications services, contrary to the intent of the l996 Act. Consumer groups, educational institutions, rural legislators, and economic development

authorities all support U S WEST's petition because they fully understand and appreciate the vast wealth of information and advantages that high speed access to the Internet represents.

U S WEST Communications' territory covers a 14 state area in the Western and Midwest regions of our nation and its unique characteristics are striking. We serve the largest territory of any RBOC – almost three times the RBOC average –and yet we have the fewest access lines. Household density is less than half the RBOC average. These factors make U S WEST's territory relatively less attractive for new, facilities-based competitors. U S WEST however, in 1997 alone, invested $1.9 billion of capital to construct, improve, upgrade and repair the telephone infrastructure within our region. We have already announced our intent to deploy high speed data services in all of the major cities located within our region, and by the end of 1998, we expect to have deployed high speed services in at least 30 cities across our 14 state region.

If given the targeted relief requested under Section 706, U S WEST stands ready to deploy these advanced telecommunications services on a broader basis than it currently has planned. Many communities and many Americans currently lack high speed Internet access, especially in U S WEST's territory. These communities and Americans are at risk of being relegated to information *have nots* in the 21st century. U S WEST's position in its region makes us the most likely company to deploy advanced telecommunications and information services on a widespread basis to rural America.

Recently, U S WEST installed high speed, frame relay service to 26 elementary and secondary schools operated by the Bureau of Indian Affairs. Found in the extremely rural parts of Arizona and New Mexico, children that attend these schools are frequently without even the basic tools of education. With the installation of high speed Internet connections, both students and teachers now have access to information and teaching aids that previously have been beyond their reach. For those schools in the single LATA state of New Mexico, U S WEST, in cooperation with rural independent telephone companies, was able to provide cost effective and complete end-to-end connections. In southern Arizona, however, the existence of a LATA boundary required the involvement of an interlata carrier. This regulatory requirement increased the cost of connecting four (4) schools in rural, southern Arizona by $3,244.00 per month. Had U S WEST been allowed to deploy its data infrastructure across the LATA boundary, this type of additional charge would not have been necessary.

U S WEST is using Digital Subscriber Line technology, known generically as "XDSL" to provide high speed data access in portions of our region. Currently, under the brand name MegaBit Services, we are deploying Rate Adaptive DSL "RADSL" which uses customers' existing copper loops to provide high-speed data transmission without interfering with the transmission of voice simultaneously over the loop. A MegaBit customer uses a special modem that creates a data channel on the loop apart from the existing voice channel. The customer's loop is connected to a second modem in the central office. The second modem sits in a shelf called a digital subscriber line access multiplexer

(or "DSLAM") that directs the voice traffic to the ordinary circuit-switched network and routes the data channel to a packet-switched network. In the packet-switched network, data is routed between ATM or frame relay switches connected to each other by private lines, and then to a business site or to an ISP for routing to the Internet.

U S WEST believes that it is good public policy and sound business to increase the number of customers who have access to these new high speed data services. The Internet contains a wealth of information and resources for everyone - including students, professionals, retirees and the homebound. Further, high-speed data transmission is the foundation for extending crucial services to people outside major metropolitan areas. For example, access to high speed data services will enable a doctor in Trinidad, Colorado to consult with doctors at a hospital in Denver, Colorado, resulting in the delivery of excellent and timely medical services. Without this service, a patient would have to travel approximately two hundred miles and incur unnecessary expenses and delays in treatment. The medical staff in Trinidad today cannot practice telemedicine with staff in Denver because procuring the essential facilities from a competitive provider is cost prohibitive and/or simply not available. This is true even though a competitive access provider, runs a major hi-cap facility very near Trinidad, but does not provide any way for out-of-state Colorado consumers to gain access to it.

U S WEST firmly believes in and wants to deploy these high speed Internet and data services. But rules and regulations place several limits on its

deployment. US WEST is not currently allowed to build a high speed data backbone across its region no matter how desperately one is needed. Such deployment in the U S WEST region requires a very significant investment by the Company. To make this new investment possible and efficient, we have requested very targeted relief from a few provisions of the Telecommunications Act of 1996 that are acting as barriers to robust deployment. U S WEST simply wants the ability to transport DATA - not voice - across LATA boundaries and to be relieved from the requirement to unbundle the non-essential pieces of our data network, or to resell these new data services to competitors at a discount.

Such relief would enable U S WEST, for example, to provide a private system of community colleges scattered throughout Colorado with a very cost-effective means of connecting its campuses. Today this one connection, a single circuit, constitutes 48 percent of the community college's telecommunications monthly budget. Whereas with the requested relief, the costs could be reduced significantly while providing a far superior data transmission service.

The inescapable fact remains that investment is not being made by others (who are not subject to regulations) in many areas of our territory. If restrictions on region wide deployment continue, the economic obstacles will likely deprive our customers of these critical advanced telecommunications services. Recently, several competitive access providers have announced the launch of several national IP backbones, but they all miss the majority of the US WEST territory.

US WEST recognizes, of course, that one of the key issues

surrounding this debate is how will other service providers gain access to the unbundled loops necessary to offer competitive alternatives to US WEST's MegaBit Service. US WEST is committed to developing procedures and safeguards adequate to insure non-discriminatory access for all service providers. U S WEST strongly supports and welcomes competitors to provide service to its subscribers throughout the region. For example, U S WEST has already negotiated a significant number of interconnection agreements with other carriers and has more under negotiation. Further, U S WEST has developed innovative solutions to creatively respond to the needs of carriers, including cageless collocation and spot frames in the central offices. These creative approaches facilitate competition and at least one interconnector has publicly praised U S WEST for its innovative interconnection terms. Nonetheless, for economic reasons, these competitors are targeting the metropolitan areas and large businesses and are not seeking to deploy advanced services to anyone outside large metropolitan areas.

With the requested relief, the broader deployment of advanced telecommunications services is made possible because the additional investment in switches and facilities can support not only RADSL services, but also a host of data applications for large and small business. Granting US WEST the requested relief under Section 706 will not only enable U S WEST to compete to provide advanced telecommunications services in major metropolitan areas, but can also insure that these services are more broadly deployed outside of the urban hubs. This, in turn, will go a long way toward

fulfilling Congress' desire for widespread deployment of advanced telecommunications services.

Section 706 of the Telecommunications Act of 1996 directs both the FCC and state commissions to "encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans," and to do so "by utilizing, in a manner consistent with the public interest, convenience and necessity . . . regulatory forbearance ... or other regulating methods that remove barriers to infrastructure investment. " Section 706(a) and (b) constitute an express grant of authority to the Commission and a statutory command to use that authority.

There is nothing in the words of Section 706 limiting which regulatory barriers the FCC is required to remove. Nor does the text of Section 706 contain any limit on the FCC's power to forbear from applying innovation-frustrating regulations, other than that it be exercised in the public interest. On the contrary, Section 706 speaks in broad and mandatory terms. State and federal regulators "shall" encourage the rollout of advanced technologies by using regulatory forbearance and removing barriers to investment. And if the FCC finds, after inquiry, that "all Americans" are not receiving access to advanced services and technologies, "it shall take immediate action to accelerate deployment of such capability by removing barriers to infrastructure investment."

All U S WEST is seeking, pursuant to the specific terms of the Telecommunications Act, is the ability to increase access to advanced telecommunications services - such as access to the Internet- to make life better

for residents in our region. Section 706 is designed for one purpose - to prevent the development of technological "haves" and "have nots" as the Information Age progresses. We want the customers that reside in the less urban portions of our territory to be among the "haves" so they may access high speed data and the wealth of information that resides on the Internet.

Mr. Chairman and Commissioners of the Federal Communications Commission, thank you for the opportunity to appear today. I look forward to responding to any questions you may have.

Level 3
Communications

James Q. Crowe
President
Chief Executive Officer
(402) 536-3670
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James Q. Crowe

Personal Profile

James Q. Crowe is President and CEO of Level 3 Communications, Inc., formerly known as Kiewit Diversified Group Inc., a wholly owned subsidiary of Peter Kiewit Sons', Inc. (PKS). Level 3 is a diversified corporation with interests in construction, mining, telecommunications, energy and infrastructure privatization and development.

Mr. Crowe previously held the position of Chairman and CEO of MFS Communications Company, Inc. (MFS) from July 1986 until December 1996. When the company merged with WorldCom, Inc. in 1996, he was then elected Chairman of the Board of WorldCom.

MFS was the parent corporation of a family of companies serving the communications needs of business and government, and was a unit of PKS until September 1995 when it was spun off and became an independent, publicly owned corporation. Prior to founding MFS, Mr. Crowe was Group Vice President of Morrison Knudsen Corporation.

Mr. Crowe presently serves on the board of directors of Level 3 Communications, Inc., Peter Kiewit Sons' Inc., RCN Corporation, Commonwealth Telephone Enterprises, Inc., and Inacom Communications, Inc.

Mr. Crowe was graduated from Rennselaar Polytechnic Institute with a Bachelor of Science degree in mechanical engineering. He also holds a Master of Business Administration degree from Pepperdine University.

Level 3 Communications

Introduction to Level 3

Level 3 is an international communications company building an end-to-end network optimized for Internet Protocol technology. Level 3 will offer a full range of communications services beginning in the third quarter of 1998. Level 3's goal is to continuously lower the unit cost of communications and, over time, to offer services which approach the quality of interaction achieved by physical presence.

Level 3's Business Plan

- Level 3 will address all market segments with a full range of communications services.
- Services include private line, Internet access, Web hosting, virtual private networks and PSTN quality voice and fax.
- Level 3 will sell directly to larger business and provide wholesale services to others for resale to medium and small business, and residential customers.

Note: Level 3's choice of direct and wholesale sales channels is determined by the company's view that its central goal - significantly lowering the unit cost of communications on a continuous basis - requires scalable, broadband local access. This access is currently available only for larger businesses. The failure of legal/regulatory policies intended to make copper loops available to competitors of the incumbent local phone companies (primarily the Bell Operating Companies) on a reasonable basis makes broadband access for smaller businesses and residential consumers one of the nation's most serious communications issues. Level 3 intends to review it's choices of sales channels as legal/regulatory and technical/factors evolve.

Level 3 is constructing an international, end-to-end network optimized for Internet Protocol Technology

- 50 U.S. city networks with multiple fiber rings
- 15,000 miles of U.S. intercity networks
- 13 European city networks
- 3,000 miles of pan-European network
- Advanced fiber capable of carrying multiple wavelengths (Dense Wave Division Multiplexing or "DWDM")
- No legacy circuit switches

The Level 3 network is designed to be continuously upgradable.

- Multiple conduits to accommodate future changes in fiber/transmission technology
- Emphasis on open, non-proprietary equipment interfaces
- Operating support systems are modular and upgradable
- Financial assumptions based on average asset lives significantly shorter than industry standard

Level 3's network is designed to interconnect with the public telephone network

- Interconnected for both traffic (in band) and signaling (SS-7 out of band)
- Enables quality and setup times equal to the public telephone network

Communications technology and market structure consideration relevant to Sec. 706.

Current advanced data networks are more cost effective than traditional circuit switched networks.

Cost to Move a CD-Rom (650 MB) From New York to Los Angeles

Data Network	$1.98
	Public Telephone Network
	$27.08

Assumptions

Local Switched Connection (each)	$.005/min
Long Distance	$.01/min
45Mb Internet port (each)	$19,000/mo
DS-3 Dedicated Line (each)	$1,000/mo
Packet overhead	10%

- The foregoing analysis is based on service provider cost, not selling price and thus extraneous factors such as access charges do not affect the conclusion.

- The performance/price of technologies underlying the communications network are now improving at exponential rates.

Technology	Time to Double Performance Purchased Per $
Frame Relay	10 Months
Transmission	13 Months
Routing	20 Months
ATM	40 Months

Source: "Why Circuit Switching Is Doomed,"
Peter J. Sevcik, Business Communications Review, Sept., 1997, and
Level 3 Communications Estimates

- Current industry assumptions with respect to capital intensity, average asset lives, margins and unit cost projections do not reflect rapid continuous improvements in technology.

- Unit pricing reductions have not reflected improvements made possible by technology improvements.

- In effect, communication capacity has been rationed by high prices.

- Unit demand for communication is higher than supply and is price elastic for the foreseeable future.

- Fundamentally, the communications industry has asked the wrong question for a significant period of time, i.e, "What set of network facilities meets current aggregate demand at the lowest cost?"

- The proper question for the industry and the regulators is "Over time, what set of network facilities results in the lowest unit cost of communications given the price elasticity of communications demand?"

- Current regulatory policy is at odds with the goal of continuously lowering the unit cost of communications.
  - Access charges are a per unit charge which, if not modified, will shortly represent the dominate fraction of unit cost.
  - Current legal/regulatory policies do not make copper loops available to companies seeking to aggressively deploy high bandwidth, low unit cost technologies (such as xDSL). The ILEC's have a direct economic incentive to slow deployment of these technologies since the services they currently sell over these loops command unit prices (i.e., price per unit of bandwidth) many times higher than the services competitors desire to offer.

Policy considerations for the Federal Communications Commission

- Rapidly implement a universal services subsidy program which:
  - is competitively neutral
  - is not proportional to unit demand and thus is not a brake on unit cost reduction
  - is provided to those in need of subsidies as determined by policy makers, not industry participants

- With respect to data networks, develop clear policy statements which require open, non-discriminatory interconnection between and among public switched telephone providers and new advanced data networks. Chairman Kennard's recent speech to the Federal Communications Bar Association is a clear statement of this key objective.

- With respect to advanced data networks, utilize industry governed, independent bodies, industry consensus, etc., to set technical and economic standards. The approach taken by the Securities and Exchange Commission toward the capital markets may be a reasonable analogous model in this regard. The pace of technical change makes traditional communications regulatory processes too cumbersome and slow.

- Develop a policy which ensures that local copper loops, upon which most Americans will depend for the foreseeable future, are available to innovators deploying high bandwidth technologies. These policies should explicitly ensure that entities owning these loops have an economic incentive to make them available to those deploying new technologies. Again, Chairman Kennard's recent speech is a guidepost. Copper loops are clearly "essential facilities" as described in his remarks.