November 25, 2002

The Honorable Michael K. Powell
Chairman
Federal Communications Commission
445 12th Street, SW
Washington, D.C. 20554

Dear Chairman Powell:

On behalf of the Telecommunications Industry Association (TIA), I am writing to express our growing concern about the profoundly negative effects that job losses, lack of investment capital and continuing reductions in capital expenditures (capex) by telecommunications firms are having on the research and development (R&D) programs of our member companies. As you know from both our filings in various dockets and meetings with you and your staff, the dramatic downturn in the telecommunications sector has led to more than 500,000 job losses, $1 trillion in corporate debt and nearly $2 trillion in market valuation losses in the telecommunications industry alone since 2000. These developments have precipitated an unprecedented slashing of research and development budgets that seriously threatens the future of industry innovation, our global leadership in technology, and in some very important respects, the very security of the United States.

The data available to support this claim, some of which is included herein, are abundant and compelling. For example, telecommunications industry R&D spending in real terms clearly shows a sharp contrast with that of the 1990s. The majority of this decline is directly attributable to the dramatic year-over-year reductions since 2000 in operator capex, which is the lifeblood of our member companies' R&D programs.

Economic Implications of Capex and R&D Cuts

TIA is especially concerned about the implications of capex and R&D spending reductions on the long-term strength of the telecommunications industry and the U.S. economy. In 2002, the telecommunications market represented approximately 6.5 percent of U.S. gross domestic product. This was virtually unchanged from 2001.

According to the 2001 Federal Reserve Annual Report, 2001 was a very difficult year for the U.S. economy as a whole and for the high-tech sector, in particular. As of late 2000, manufacturers and suppliers had begun to reduce production in an effort to limit the build-up of inventories. The strong capital outlays that helped drive the expansion through the late 1990s gave way to a reduction in spending in late 2000 and sharp declines in 2001, in response to weakening demand, an oversupply of some types of capital and declining profits.

Specifically, several factors contributing to spending declines include businesses' decisions to lengthen the replacement cycle for computers in light of weak economic conditions and a build-up in preparations for anticipated Y2K-related problems in 1999 and 2000. Also, corporations may have been overly optimistic about the profitability of some types of "high-tech capital." As expectations were revised, businesses realized they had enough investment to meet anticipated demand. According to the Federal Reserve, in the case of communications equipment, some of the cutbacks resulted from a general retrenchment in light of a more uncertain telecom environment for new investment, as reflected in the growing volatility of equity values for high-tech and telecom companies.

To illustrate, real spending on equipment and software declined 8.5 percent in 2001 after an increase of the same amount in 2000 and double-digit rates of increase for several preceding years. Outlays for computers and peripheral equipment, which had risen more than 30 percent in each of the preceding seven years, fell 9 percent in 2001. Thus, "spending on high-tech equipment, which has accounted for about 40 percent of (equipment and software) spending in recent years, dropped especially sharply (in 2001)."[1] Spending, specifically on communications equipment, swung even more severely, moving from increases of more than 20 percent on average from 1998-2000 to a decline of more than 30 percent in 2001.[2]

Capital spending in the wireless segment of the telecommunications industry has been quite volatile over the past few years. Statistics show that capital spending by wireless carriers declined by 26 percent in 1999; however, in 2000, capex jumped by 71.2 percent for infrastructure, research and development and licenses. Once again, in 2001 and 2002, spending fell by 16.1 percent and 25.4 percent, respectively. Experts forecast that it will also continue to decline in 2003.[3]

Capital spending in the wireline segment of the industry meanwhile has been falling steadily over the past few years. CSFB reports that wireline carriers spent $113 billion in 2000, $93 billion in 2001 and will spend only an estimated $49 billion in 2002.[4] Deutsche Bank analysts have reduced their view of 2003 capital spending by the telephone carriers to a 15 percent year-over-year decline, instead of an expected decrease of 5 percent to 10 percent.[5] The Precursor Group estimates that the capex reductions could be as high as 30 percent for 2003 compared with 2002 figures.[6]

[1] 2001 Federal Reserve Annual Report, p. 14.
[2] Ibid., p. 14-15.
[3] 2003 TIA Telecommunications Market Review and Forecast (draft).
[4] J. Parmelee, "Telecom Equipment - Wireline Update," Credit Suisse First Boston, September 26, 2002.
[5] Ben Klayman, "Telecom Equipment Makers Face Dreary '03 After SBC," Reuters.com, September 27, 2002.
[6] "FCC Deregulations a Telecom Equipment Inflection Point," Precursor Group, October 31, 2002.

U.S. Position as a Technological Leader Threatened

While companies have resorted to cost-cutting measures for short-term savings, these measures should raise a warning flag, as you indicated in October at the Goldman Sachs Communicopia XI Conference in New York. Telecommunications companies – both vendors and service providers – with substantial market shares will suffer from innovation declines that result from less capital and research and development spending. These declines already are leading to fewer new products and services, thereby limiting consumer choice. Thus, any collapse of some part of the telecommunications industry can and will threaten to undermine traditional centers of technological excellence and productivity in the United States.

Due to the industry's current problems, companies are focusing almost exclusively on core priorities, which include cutting costs, revenue retention and revenue generation in the short term. Carriers are focusing on maintaining existing services and reducing operating expenses. For both carriers and equipment vendors, reductions are coming as staff and benefit cuts, travel and office expense reductions, and notably, reductions in capital expenditures and research and development. According to one research consultancy, there is less priority being placed on the roll-out of new services "simply because capex has to be focused on controlling and reducing costs and maintaining revenue streams."[7] What is worrying to many analysts and those in the telecommunications industry is that any realized gains thus far have come from cost-cutting – not from growing top-line revenues.[8] Such practices will not create a sustainable upswing for the industry anytime soon.

Venture capital financing for telecommunications also continues to decline. This does not bode well for innovative new telecommunications products and services for broadband infrastructure. Third quarter 2002 figures indicate that venture capital for telecommunications firms fell by 32 percent. Only 67 telecommunications companies received funding, out of a total of 647 firms, according to a Pricewaterhouse Coopers/Venture Economics/National Venture Capital Association/MoneyTree survey.[9] Of the $4.5 billion in venture capital financing in third quarter 2002, only $555 million went to the 67 telecommunications firms. Figures such as these have not been this low since 1998. Industry experts cite regulatory uncertainty, declines in capital spending, stock market volatility, mergers and a limited amount of public offerings as reasons for the lackluster statistics.

Corporate difficulties are taking their toll on the number of students enrolling in computer science and engineering classes nationwide. The trend does not bode well for the future of telecom and high-tech experts educated in the United States. For example, the University of Michigan reported a 20 percent drop in computer science class enrollment this academic year; Ohio State University reported a 30 percent drop; and enrollment at the University of Florida's engineering school is down 10 percent this

[7] "Refocusing the Telecom Capex Priorities: Cost Cutting, Revenue Retention, Revenue Generation," Probe Research, October 2, 2002.
[8] Jon E. Hilsenrath, "Employees Bear Brunt of Corporate Thrift," Wall Street Journal, November 1, 2002.
[9] Ann Grimes, "Venture-Capital Financing Falls to 1998 Levels, Continuing Slide," Wall Street Journal, October 29, 2002.

year.[10] Among other factors, these declines are being attributed to a weak job market in the high-tech and telecommunications sectors and the changing nature of tech jobs.

Telecom R&D and Homeland Security

Dramatic declines in R&D spending have significant negative implications for America's ability to protect itself from the new and previously unimagined threats posed by terrorism. The benefits of strong, well-funded R&D programs include continuing innovation in vital infrastructure protection measures, such as increased information security, reliability and survivability of networks. Additionally, there are a host of security-related benefits associated specifically with broadband and the ongoing research on this technology that could contribute to the war on terrorism in a wide variety of ways.[11]

Telecom Manufacturers are Bearing the Brunt of the Collapse

TIA has amassed statistics from its member companies and recent press reports that illustrate the downward spiral in research and development funds, venture capital investment and capital spending, as well as the staggering number of job cuts of late – of 1.6 million total workers nationwide for the first nine months of 2002, an estimated 334,000 are in the telecommunications industry.[12] The following are some examples:

- **Acterna**, based in Germantown, Maryland, recently announced plans to reduce its workforce by 350, bringing its total number of employees down to 3,000 people worldwide. The figure marks a 46 percent decline in total employees from the spring of 2001. Acterna cited a 45 percent drop in sales as a result of telecommunications equipment spending cuts by its customers as the reason behind the layoffs.[13]
- **Alcatel**, whose U.S. headquarters is based in Plano, Texas, recently announced plans to cut its workforce to less than 60,000 by the end of 2003, down from 99,000 employees at the start of 2002, and 120,000 employees as recently as 2000. The estimated most recent 40,000 job cuts planned over two years represent one of the biggest corporate downsizings in European corporate history.[14] As of late October 2002, the company already began to cut 1,000 jobs in the U.S., representing about 13 percent of its U.S. workforce.[15]
- **Ciena**, based in Linthicum, Maryland, will further cut its workforce by 450 employees, or 17 percent. The latest round follows cuts made earlier this year when Ciena eliminated over 1,000 jobs. The job losses are compensating for falling revenues due to a slash in spending by telecom service providers. In addition, Ciena's R&D spending fell by 26 percent between October 31, 2001 and July 31, 2002. Ciena's chairman, Patrick Nettles, indicated in mid-November that the market for optical networking gear in 2002 likely would

[10] Michelle Kessler, "More students high-tail it out of high-tech classes," USA Today, October 9, 2002.
[11] See TIA Letter to Governor Tom Ridge, January 11, 2002.
[12] Michelle Kessler, "More students high-tail it out of high-tech classes," USA Today, October 9, 2002.
[13] Yuki Noguchi, "Acterna to Lay Off More as Losses Mount," Washington Post, October 31, 2002.
[14] "Alcatel Plans More Staff Cuts, Sets $491 Million in Charges," SmartMoney.com, September 22, 2002.
[15] "Alcatel to Slash 1,000 U.S. Jobs," Seattle Post-Intelligencer, October 28, 2002.

fall 54 percent below last year's levels, and the 2003 market is expected to be even smaller.[16] Nettles emphasized the importance of broadband growth and a national broadband policy as a means for reviving the U.S. telecommunications sector.

- **Cisco Systems**, based in San Jose, California, has seen its market capitalization plunge to about $74 billion from around $555 billion in late March 2000. Cisco's research and development spending was down 10 percent from October 31, 2001 through July 31, 2002. The company plans to maintain R&D spending at an annual rate of $3.3 billion.[17]
- **Corning**, based in Corning, New York, anticipates continued revenue declines and job cuts as a result of "additional carrier capital expenditure reductions, lack of industry consolidation and bankruptcies," according to James B. Flaws, Corning's vice chairman and CFO.[18] Earlier this year, Corning announced a $600 million restructuring plan that called for the elimination of 4,000 jobs, or 13 percent of its workforce, and the closing of some manufacturing and research facilities. In 2001, Corning cut 10,000 workers.[19] Moreover, Corning's research and development spending declined by 24 percent from June 29, 2001 to March 31, 2002.
- **Ericsson**, whose U.S. headquarters is based in Plano, Texas, announced plans in May 2002 to cut its research and development costs by about $773 million and to close half of its 80 R&D offices worldwide.[20] Moreover, the company, which had 107,000 employees in 2002, plans to reduce its workforce to less than 60,000 by the end of 2003.[21] The company warned that industry sales of equipment for mobile phone networks would fall at least 20 percent in 2002 and are likely to decline further in 2003, resulting from operators' attempts to save money by cutting back on new network deployments and equipment spending.[22]
- **IBM**, based in White Plains, New York, has trimmed its workforce by 5 percent, selling off lagging operations and fine-tuning its semiconductor business. This also has included cost cutting in research and development and in sales. IBM cut 15,000 jobs during the second quarter of 2002,[23] and research and development spending was down 10 percent between September 30, 2001 and June 30, 2002.
- **Intel**, based in Santa Clara, California, recently announced it would cut its capital spending for 2002 to $4.7 billion, down from its January 2002 projection of $5.5 billion. In comparison, Intel spent $7.3 billion on capital expenditures in 2001.[24] The company also announced plans to cut 4,000 of its 82,000 positions in the fourth quarter of 2002.[25]

[16] Peter Howe, "With an industry shakeout, telecom will stay depressed, Ciena founder says," DigitalMass, November 15, 2002.
[17] John Chambers' comments at UBS Warburg Conference, November 12, 2002.
[18] "Corning Sees Sales at Low End of its Forecast Amid Telecom Sector Weakness," SmartMoney.com, October 9, 2002.
[19] Ibid.
[20] "Ericsson plans cuts in research and development," Telecomworldwire, May 3, 2002.
[21] Kim Gamel, "Ericsson Posts $540M 3Q Loss," Excite News, October 18, 2002.
[22] Buster Kantrow, "Ericsson's Loss Widens," Dow Jones Newswires, October 18, 2002.
[23] William Bulkeley, "IBM Net Falls 18% on Flat Revenue," Wall Street Journal, October 17, 2002.
[24] Floyd Norris, "Intel's Real Problem: It Spends Too Much," New York Times, October 18, 2002.
[25] Matt Richtel, "Intel Profit Is Far Short of Forecasts," New York Times, October 16, 2002.

- **Lucent Technologies**, based in Murray Hill, New Jersey, plans to cut another 10,000 employees, bringing its workforce to 35,000 by the end of 2003, down from 62,000 at the beginning of 2002. Three years ago, Lucent employed more than 150,000.[26] Lucent and Bell Labs, its R&D "crown jewel," drastically reduced R&D spending by about one third from fiscal year 2001 ($3.5 billion) to fiscal year 2002 ($2.3 billion). The decrease in R&D spending in fiscal 2002, as compared with fiscal 2001, was primarily due to staff reductions and product rationalizations under Lucent's restructuring program.
- **Motorola**, based in Schaumburg, Illinois, has initiated a five-point restructuring plan, in which it will reduce its workforce to 93,000 employees by June 2003, down from 150,000 in August 2000.[27] Approximately 17 percent of its workforce was cut in June 2002. In addition, R&D expenditures were down 9 percent between September 30, 2001 and June 30, 2002. Revenues in its personal communication and cellular infrastructure divisions have declined substantially in the first three quarters of 2002.
- **Nortel Networks**, whose U.S. operations are based in Richardson, Texas, indicated in mid-September 2002 that it may not return to profitability until after mid-2003. Nortel also has indicated a plan to eliminate 7,000 jobs by the end of this year, leaving its workforce with about 35,000,[28] which is down from 95,000 in the last few years. This follows a 28 percent decline in research and development spending by the company for the period September 30, 2001 through June 30, 2002.
- **Remote Switch Systems**, based in Loveland, Colorado, cut its research and development budget by nearly 50 percent in 2002.
- **Sumitomo Electric Lightwave**, based in Research Triangle Park, North Carolina, has lost nearly 230 employees since 2000. It cut its research and development budget by 24 percent in 2002 and plans to reduce it by another 15 percent in 2003.
- **Sun Microsystems**, based in Santa Clara, California, announced in mid-October that it plans to cut 4,400 jobs, or 11 percent of its workforce. These latest cuts will reduce the total workforce from about 39,000 as of June 2002 to about 35,000.[29] Furthermore, Sun reduced its R&D expenditures by 3 percent between September 30, 2001 and June 30, 2002.
- **Tellabs**, based in Naperville, Illinois, announced significant third quarter losses in October, attributed to charges and sharply lower sales amid weak demand for telecommunications equipment. It announced plans to lay off about 800 of their 4,700 employees in the near future.[30] Previously it had reduced its staff by 3,300. Tellabs cut its R&D expenditures by 13 percent between June 29, 2001 and March 31, 2002.
- **Texas Instruments**, based in Dallas, Texas, recently announced it would trim nearly 500 jobs from its workforce of about 35,000. Weak sales for chips in

[26] Christopher Stern, "Lucent Ends Dismal Year," Washington Post, October 24, 2002.
[27] Johnathan Burns, "Motorola Cuts Sales, Earnings Forecasts; Shares Hit 52-Week Low," Dow Jones Newswires, October 16, 2002.
[28] Ben Dummett, "Only Surprise in S&P's Nortel Cut Is That It Took So Long," SmartMoney.com, September 18, 2002.
[29] Don Clark, "Sun Microsystems Posts Loss, Plans to Reduce Staff by 4,400," Wall Street Journal, October 18, 2002.
[30] Sue Goff, "Tellabs Posts Loss," DowJones Newswires, October 18, 2002.

personal computers and related products are to blame for some of the company's problems.

R&D Expenditure Declines Cause for Worry

TIA has collected research and development expenditure data for 36 of its member companies, many of which have experienced declines in the period from September 30, 2001 through June 30, 2002. The following chart illustrates that the recent R&D declines are "a cautionary sign that the innovation of recent years cannot be taken for granted,"[31] while underscoring the importance of a continued broad R&D strategy, including a manufacturing focus. The implications are especially important in light of the fact that federal R&D expenditures have been declining over the course of the last 50 years, while industry's share of R&D spending has been increasing. With this, it is critical that industry be able to maintain and *increase* R&D spending in the future in order not to risk falling behind other developed economies.

[31] "R&D Overload," Financial Times, October 3, 2002.

R&D Expenditures

	TIA Member Company	% Change	Time Frame
1	Acterna Corporation	-35%	Sept 30, 2001 to June 30, 2002
2	ADC Telecommunications	2%	Oct 31, 2001 to July 31, 2002
3	ADTRAN Inc.	-4%	Sept 30, 2001 to June 30, 2002
4	Advanced Fibre Communication	88%	Sept 30, 2001 to June 30, 2002
5	Applied Innovation Inc.	-16%	Sept 30, 2001 to June 30, 2002
6	Avaya Inc.	6%	Sept 30, 2001 to June 30, 2002
7	CIENA Corp.	-26%	Oct 31, 2001 to July 31, 2002
8	Cisco Systems	-10%	Oct 31, 2001 to July 31, 2002
9	Cognitronics Corporation	-17%	Sept 30, 2001 to June 30, 2002
10	Corning Incorporated	-24%	June 29, 2001 to Mar 31, 2002
11	Digital Lightwave Inc.	-16%	Sept 30, 2001 to June 30, 2002
12	Electronic Tele-Comm.	-20%	Sept 30, 2001 to June 30, 2002
13	IBM	-10%	Sept 30, 2001 to June 30, 2002
14	Intel Corp.	12%	Sept 30, 2001 to June 30, 2002
15	Motorola, Inc.	-9%	Sept 30, 2001 to June 30, 2002
16	Lucent Technologies	-36%	Sept 30, 2001 to June 30, 2002
17	Next Level Communications	-55%	Sept 30, 2001 to June 30, 2002
18	NMS Communications	19%	Sept 30, 2001 to June 30, 2002
19	Nortel Networks Corp.	-28%	Sept 30, 2001 to June 30, 2002
20	Performance Technologies	-11%	Sept 30, 2001 to June 30, 2002
21	Polycom Inc.	48%	Sept 30, 2001 to June 30, 2002
22	Redback Networks	-6%	Sept 30, 2001 to June 30, 2002
23	Riverstone Networks	9%	Dec 1, 2001 to Aug 31, 2002
24	Scientific-Atlanta	1%	Sept 30, 2001 to June 30, 2002
25	Sonus Networks	-46%	Sept 30, 2001 to June 30, 2002
26	Sorrento Networks Corpora	-33%	Oct 31, 2001 to July 31, 2002
27	Stratos Lightwave	-16%	Oct 31, 2001 to July 31, 2002
29	Telekelec	9%	Sept 30, 2001 to June 30, 2002
30	Tellabs	-13%	June 29, 2001 to Mar 31, 2002
31	Tellium Inc.	-18%	Sept 30, 2001 to June 30, 2002
32	Texas Instruments	13%	Sept 30, 2001 to June 30, 2002
33	Turnstone Systems	-50%	Jun 29, 2001 to Mar 31, 2002
34	Verilink Corp.	-59%	Sept 30, 2001 to June 30, 2002
35	Vina Technologies	-11%	Sept 30, 2001 to June 30, 2002
36	Westell Technologies	-42%	Sept 30, 2001 to June 30, 2002
	Average Fall in R&D Expenditures	-14%	Sept 30, 2001 to June 30, 2002

Source: Yahoo! Finance

Conclusion

With an economy that is likely to stay sluggish through 2003 and consumer confidence at a low point, the Telecommunications Industry Association believes that the key to breathing new life into our depressed industry should begin with more widespread deployment of broadband networks and services. You, yourself, recently acknowledged that broadband services are going to be "indispensable to recovery and the long-term growth prospects of the (telecommunications) industry."[32] We appreciate your understanding of the dire strait facing our industry today, as illustrated in your October 2002 speech in New York when you urged telecommunications service providers to spend more money on new equipment to ensure the survival of equipment suppliers. The entire industry's recovery depends on the ability of large and small equipment makers to continue developing new and innovative technologies.

Should capital expenditures and research and development spending continue their downward spiral, however, the health and welfare of the entire high-tech industry – and the U.S. economy – will suffer potentially irreversible harm in the mid- to long-term. This will only serve to erode U.S. industry's position as a recognized and proven worldwide leader in technological innovation. In other words, if we are not selling equipment, we are not innovating. As you asserted, "(Equipment makers) have kept the network at the cutting edge of the world. They must survive for our future."[33]

In order to ensure the industry's continued survival, having the right regulatory framework in place is a critical and absolutely necessary part of the equation, particularly with regard to stimulating broadband deployment. In fact, regulatory reform has topped a list of factors enumerated by many telecommunication executives – both operators and manufacturers – that could affect capital expenditures and research and development spending over the next several years.

As noted earlier, it is widespread broadband deployment that has the greatest potential of lifting the sector and providing tremendous economic and social benefits to society. Broadband is an accelerator of economic development. This is because of the significant economic and social benefits of using broadband technologies for many applications. With broadband access, worker productivity increases, jobs are created and wages grow in many cases. Broadband creates opportunities for bundling services together, and it enables operators to offer more services to consumers at lower prices, thus creating added efficiencies in both time and money. It also facilitates the growth and development of important applications such as telemedicine, distance learning, teleworking, public safety protection, e-government and equal access to information for persons with disabilities, among others.

Substantial investment is needed, however, to realize these benefits. As a result, regulations must not act as deterrents to building and upgrading advanced networks. Thus, TIA urges the Commission, in its pending triennial review proceeding on policies

[32] FCC Chairman Michael K. Powell speech at the Goldman Sachs Communicopia XI Conference, New York, NY, October 2, 2002.
[33] Ibid.

regarding unbundled network elements (UNEs),[34] to promptly determine that incumbent local exchange carriers should not be required to provide unbundled access to *new, last-mile broadband facilities*. Such a determination would recognize the folly of applying outdated rules aimed at legacy voice networks to the capital-intensive, nascent and generally competitive broadband marketplace. TIA urges the Commission to act quickly to adopt the recommendations contained in TIA's and the High Tech Broadband Coalition's filings on the *UNE Triennial Review*[35] and in the other broadband-related proceedings.

While the FCC certainly cannot, by itself, solve all of the industry's problems, it can take these significant steps to encourage facilities-based competition and the influx of investment that is needed in order to meet the rising demand for broadband applications. It not only would signal the importance of broadband, but would help return the flow of capital into the sector, encourage service providers to invest once again in new equipment and allow industry to pour money back into R&D. Our industry then would be better situated to widely build out the advanced networks that will support the growth of innovative products and services, thus growing the industry's way to profitability once more.

Sincerely,

Matthew J. Flanigan
President
Telecommunications Industry Association

cc:
The Honorable Kathleen Q. Abernathy
The Honorable Michael J. Copps
The Honorable Kevin J. Martin
The Honorable Jonathan S. Adelstein
The Honorable Donald L. Evans, Secretary of Commerce

[34] *In the Matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers*, CC Docket No. 01-338; *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, CC Docket No. 96-98; *Deployment of Wireline Service Offering Advanced Telecommunications Capability*, CC Docket No. 98-147, Notice of Proposed Rulemaking, FCC 01-361 (rel. Dec. 20, 2001) (hereafter "*UNE Triennial Review*").

[35] Comments of the Telecommunications Industry Association (Apr. 5, 2002); Reply Comments of the Telecommunications Industry Association (July 17, 2002); Letter from Matthew J. Flanigan, TIA, to Hon. Michael K. Powell (June 4, 2002); Comments of the High Tech Broadband Coalition (Apr. 5, 2002); Reply Comments of the High Tech Broadband Coalition (July 17, 2002).