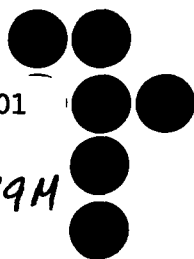


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VIDEOCONFERENCING—WHEN?

April 27, 1989

Seminar Notes

**MASSACHUSETTS INSTITUTE OF TECHNOLOGY
COMMUNICATIONS FORUM**

VIDEOCONFERENCING--WHEN?

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Seminar Notes

**Elliot M. Gold
President, TeleSpan Publishing Corporation**

**James Morriss
Director of Marketing, PictureTel Corporation**

**Professor David Staelin, Moderator
MIT**

**Gail Kosloff
Rapporteur
MIT**

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This session of the Communications Forum commemorated the silver anniversary of AT&T's Picturephone introduction. The presentations illustrated that although advances have been made in the areas of technology, interconnectivity, and so forth, the videoconferencing industry is still young. However, both speakers support a positive prognosis for the future of videoconferencing and picturephone-like products.

The first speaker, Elliot Gold, has been the President of TeleSpan Publishing Corporation since 1981. Mr. Gold reviewed the history of the Picturephone from its 1964 introduction at the New York World's Fair. To put this in historical perspective, he noted that AT&T introduced Picturephone well before the company's divestiture. At this time, Gold observed that communications and computing technology were not as advanced as today. For example, consumer TV was growing in popularity, 98% of U.S. telephones were still rotary dial, timesharing computers were just being demonstrated.

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Mr. Gold showed the audience a videotape by Werner Bundschuh to illustrate what Picturephone[®] was like when it was first introduced. The original Picturephone, developed by Bell Labs, displayed a black and white image, had a small "footprint," could transmit a picture (for intracompany communications only) of a document as well as a person's voice and image.

Gold discussed the rationale and timing behind AT&T's introduction of Picturephone[®]. He noted that telephone companies worldwide wanted to use the extra capacity on their networks for more than voice applications. Since the Baby Boom generation was also growing in its usage of TV and telephones, videophones seemed a good idea at the time. According to Gold, at the earliest stages of the videophone introduction, people had no expectations about videoconferencing increasing productivity.

Gold addressed some of the reasons why he believes it took so long for videoconferencing and the videophone concept to "turn around." He believes that the primary roadblocks have been the high transmission costs (in 1970, \$2,000/hr.), the cost of the

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early codecs (in 1980, \$230,000), high cost of videoconferencing rooms (in 1981, \$.5 to \$1 million), lack of standards for compressed video, and a lack of local access circuits.

Mr. Gold noted that he believes videoconferencing has arrived and the industry has actually grown faster than predicted.

He showed the audience another videotape; this one illustrated the nature of videoconferencing technology in the early 1980s (e.g., a 56 kbps videoconferencing codec from Widcom, a now defunct company). Gold believes that at this time there was a lot of "technology for technology's sake" in the market and little interest from prospective business buyers.

He believes that a lot has changed in the market especially in the past year. For example, Gold noted that in 1988 videoconferencing equipment prices were down 80%, picture quality reached "good" levels, picture quality at 128 kbps and 384 kbps was good, most LATAs (Local Access and Transport Areas) offered switched 56 kbps and higher access, big name companies became associated with the market, and systems have become more

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reliable. The CCITT has also been working on a single standard for (64 kbps-2.048 Mbps) compressed video; prototypes are to be ready around 1990.

Mr. Gold also played an audio tape of a Benny Goodman and Gene Krupa and related it to the future of the videoconferencing market. Gold believes that like the success realized by Goodman and Kroopa, videoconferencing will be a part of a larger market.

The second speaker, Jim Morriss, Director of Marketing for PictureTel Corporation, spent 10 years employed by AT&T actually selling videoconferencing and Picturephone meeting service. He believes that the market for videoconferencing is now and is growing because of fundamental changes in the cost and convenience of the technology. He used the example of facsimile technology to illustrate that as the price of a technology/product drops, and it becomes increasingly convenient because of wider deployment, its adoption rate is likely to boom. Facsimile, like videoconferencing, relies on transmission services.

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One of the fundamental changes that is driving the videoconferencing market, in Morriss' opinion, is the increased worldwide availability of dial-up digital telephone services. Morriss explained that in the U.S. this service is based on 56 kbps technology and in Europe on 64 kbps. While AT&T has had the capabilities for five years now, U.S. Sprint and MCI just introduced dial-up digital telephone services in 1989. The increased competition has resulted in lower prices. For example, for a videoconferencing system operating at a rate of 112 kbps, the hourly cost of connection is approximately \$30/hour.

Another change is the availability of acceptable video quality over these transmission networks. Morriss noted that video compression technology has improved over the past ten years to produce good quality at lower data rates (refer to Exhibit 1). The codecs available in 1978 ran at 6 megabits while the codecs of 1988 have achieved satisfactory picture quality at data rates of 112 kbps (two 56 kbps lines).

According to Morriss, a third factor which is driving the growth

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of the videoconferencing market is the improved system price performance offered by VLSI technology. With this improved technology, videoconferencing systems, for example, have dropped in price from several thousand dollars to under \$50,000. Morriss envisions a future in which videoconferencing systems will be common in desktop workstations. However, for the near term Morriss sees videoconferencing systems, not videophones, being implemented by the market.

Mr. Morriss, like Elliot Gold, also emphasized the importance of worldwide standards. Morriss explained that ISDN, which will soon be deployed in the United States and parts of Europe, will provide 64 kbps data capability. He also noted that P X 64 standards for video are also being developed. These standards are based on technology similar to PictureTel's first generation compression algorithm, MCT. Morriss believes these standards are important for several reasons including the provision of global connectivity, the removal of psychological barriers of non-interoperability, as a stimulus for the market, and in order to encourage large companies (e.g., the Japanese) to become players

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in the market. Morriss alluded to the positive effect that standards had on the growth of the facsimile market.

Morriss believes that changes in the business environment are further stimulating the videoconferencing market. He noted that competition is increasing and business is faster paced. Morriss explained that this brings new challenges to companies today. He believes "responsiveness" is a must and that a company's priorities must be "quality, schedule, and cost" in order to be successful. Morriss also observed that strategic alliances are becoming a business norm. All in all, he believes that there are shorter "windows of opportunity" in today's markets and that videoconferencing is a tool that can help business capture these opportunities.

Morriss noted that businesses are changing their perspective of communications as a "strategic tool" rather than an expense. He noted that Aetna Life & Casualty uses videoconferencing to improve its efficiency. Morriss explained that PictureTel sells videoconferencing as a tool which provides the dimensions of an

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in-person meeting without the inconvenience of travel.

He noted that he does see a difference in buying behavior between early videoconferencing users and more recent customers.

The earlier customers did look at travel replacement savings from videoconferencing, while today's customers are taking a more strategic view of the role of videoconferencing to improve their total business. (Refer to Exhibit 2 for a list of some of PictureTel's Users.)

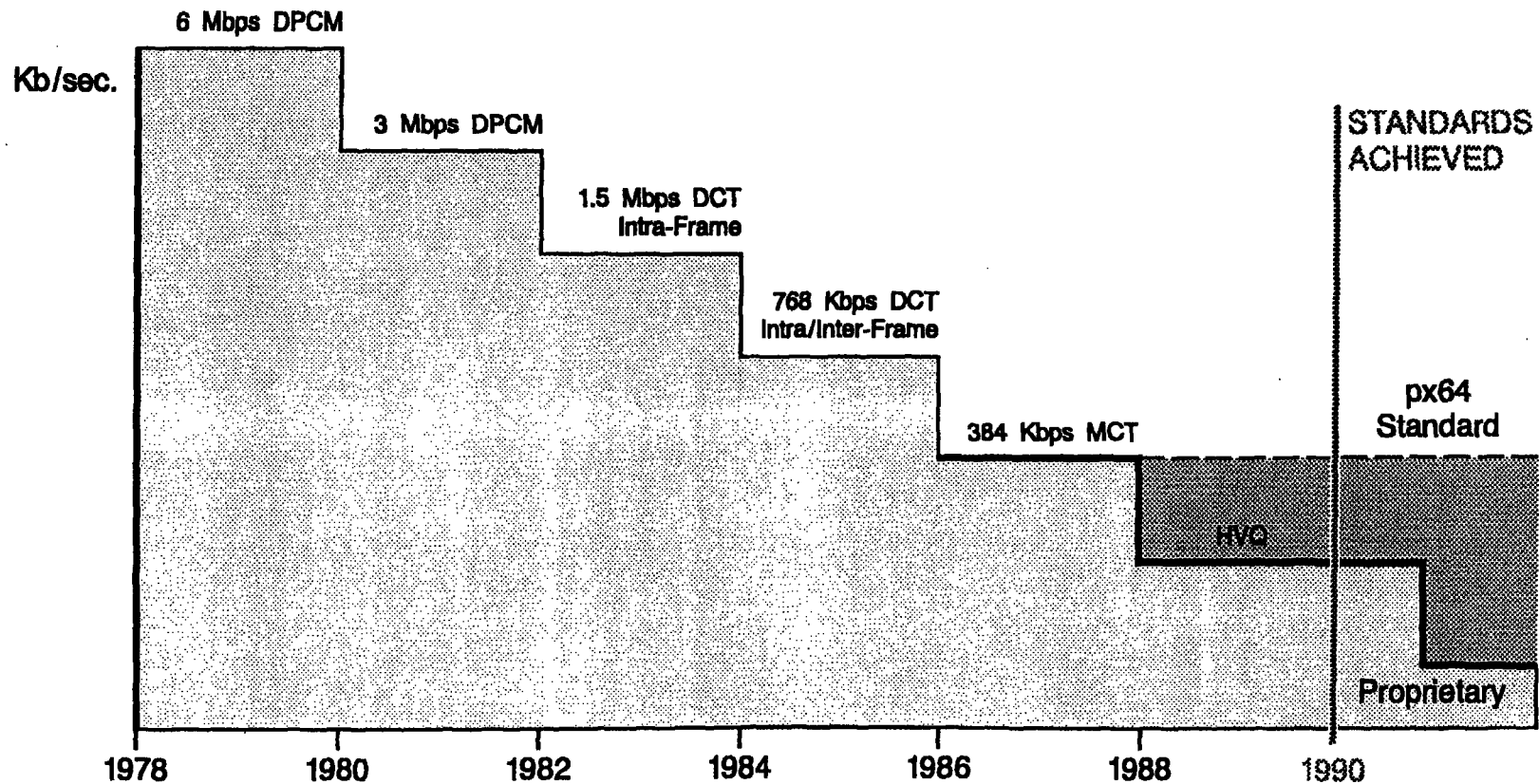
Morriss noted that PictureTel's product and pricing has changed since 1984 when the company was founded. In terms of cost, its codec (C-2000) was priced at \$70,000 in 1987, while its newest product (C-3000 introduced in 1988) list for \$30,000. Morriss believes that systems must be priced under \$10,000 for a videophone market to emerge. Morriss announced that PictureTel was planning to announce the first videoconferencing system designed for mass production (V-3100) in May of 1989.

In closing, Morriss announced that PictureTel had yearend 1988 codec shipments of 131 units as compared with 62 units in 1987.

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The company's annual revenues almost doubled in the 1987-1988 period going from 3.33 million in 1987 to 6 million in 1988. Morriss expects this positive growth trend will continue.

Video Compression Technology Produces Good Quality At Low Data Rate



CH0138-06

Exhibit 1

PICTURETEL

Some of PictureTel's Users:

Communications

- AT&T
- Contel
- Fiat SEPA
- France Cable & Radio
- GTE
- Italtel
- Swedish Telecom

Aerospace/Defense

- Boeing
- E-Systems
- General Electric Defense
- McDonnell Douglas
- National Security Agency
- NATO
- Northrop
- SAIC
- U.S. Air Force
- U.S. Army
- Westinghouse Defense

Industry

- Apple Computer
- Bechtel
- Mitsubishi

Finance & Insurance

- Atlantic Mutual
- General Electric Capital
- Goldman Sachs
- Merrill Lynch
- Metropolitan Life
- Prudential

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Exhibit 2