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FEATURES

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DEPARTMENTS

Association Office
Continental Automated Buildings Association
1173 Cyrville Road, Suite 210
Ottawa, Ontario, Canada
K1J 7S6

Tel: 613.686.1814; 888.798.CABA (2222)
Fax: 613.744.7833

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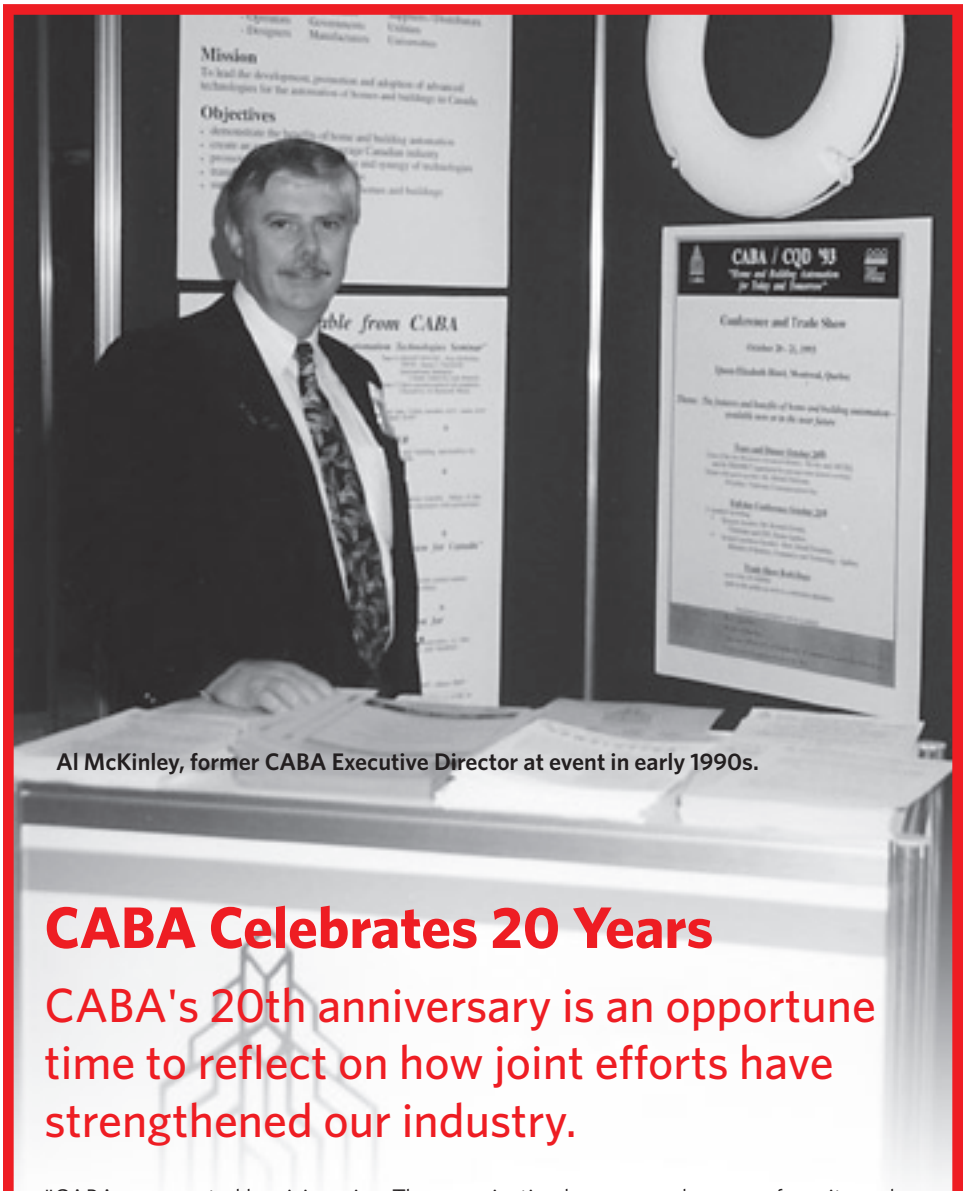

Al McKinley, former CABA Executive Director at event in early 1990s.

CABA Celebrates 20 Years

CABA's 20th anniversary is an opportune time to reflect on how joint efforts have strengthened our industry.

"CABA was created by visionaries. The organization has come a long way from its early years, and so, of course, has the industry. The progress that has been made is the sum of a tremendous numbers of ideas and hard work enacted by the CABA membership, its staff, and the industry at large." — **Al McKinley, former CABA Executive Director**

"Heartiest congratulations to CABA members and staff on your remarkable milestone. Challenging times require dedicated staff and committed members – and indeed that has been the secret to CABA's twenty years of success. It's a real pleasure for me to salute CABA, and to recognize its outstanding achievements."
— **Jack Fraser, former CABA President**

"CABA is an excellent association to further industry thought and insights. The broad and diverse CABA membership also provides expanded opportunities for networking and collaboration." — **Martin Cullum, CABA Chairman of the Board**

"CABA is an excellent organization. Its mantra is to be the definitive information source for home and building automation and it achieves this objective by providing the industry with outstanding research and practical steps to drive the development of high performance home and buildings." — **Brad Haeberle, Vice President, Siemens**

"In 1994, when I joined CABA, I felt the initiative of a few major manufacturers and utility companies was an opportunity to keep abreast of trends that had the potential to affect technological development within our industry. My intention at that time was to participate for only a few years. Now 14 years later, I am still involved at the highest levels, and it goes without saying that CABA is the best method to network, monitor technological and industrial developments and most importantly, develop opportunities to grow your business." — **Leo DelZotto, President, Tridel Corporation**

Virtual Travel via Telepresence

By Ken Wacks

As the data throughput rate of the Internet continues to increase, applications are moving beyond text and graphics to multimedia. Television and meetings via the Internet are emerging as two applications that will profoundly change consumer and business use of the Internet.

In this article, I will introduce telepresence: a method for conducting business meetings among participants not physically present using audio and video equipment that simulates a live meeting. Internet TV is an exciting new entertainment medium that will be explored in a future issue of *iHomes & Buildings*.

A Telepresence Meeting

A telepresence meeting creates a single meeting consisting of participants in two or more separated locations. They can see and hear each other as if they were sitting around a single conference table. Also, they can share text and graphical materials.

Telepresence is presented in a specially designed conference room. The room contains a table with chairs on one side and large high-definition televisions (HDTVs) at eye level on the other side. Remote participants appear on the TVs full size as if they were sitting around the table. High quality audio allows discussions at usual volume levels. Cameras are positioned so the speakers have eye contact. The participants can use Web collaboration tools to share documents.

Figure 1 illustrates a typical installation with three 65-inch HDTVs. This configuration is designed to simulate a physical meeting-room conversation via life size images, eye contract, and an appropriate distance between the speakers. The illusion of presence is created by a combination of technology and human factors.

Telepresence is the next logical progression from audio conferencing to Web-based conferencing with the addition of video. Video telephones were introduced by Bell Laboratories at the 1964 World's Fair in New York, but were not widely marketed. While video conferencing has been available commercially for more than 20 years, it has been very expensive with mediocre performance.

The attractive feature of telepresence is the realistic representation of remote participants. Telepresence creates an illusion of intimacy so the distant participants are engaged in the conference as if they were physically present. According to Frost & Sullivan, telepresence is enabled by the confluence of:

- An increasingly mobile dispersed worldwide workforce.
- Improved videoconferencing technologies that use broadband Internet access.
- Online social networking.
- Video-enabled commerce.

The Technology of Telepresence

The technical factors that need to be managed for telepresence include acoustics, microphones, speakers, lighting, camera positions, display positions, and display size. Telepresence is effective when it delivers a real-time end-to-end video and audio (A/V) stream. The challenge is digitizing the A/V data and sending the data packets through the Internet.

The Internet is fundamentally a delivery system for a sequence of digital data packets, where the Internet routers keep packets moving toward the destination. Each packet is handled separately and may be routed differently even from those packets in the same sequence.

Figure 1 – Conference Room Telepresence
(TelePresence Systems 3000, courtesy of Cisco Systems, Inc.)

The end equipment is responsible for assembling this sequence of packets into a useful message or A/V stream. Telepresence requires that packets be delivered in proper sequence almost in real time with imperceptible delay, jitter, and packet loss, while maintaining synchronization between the sound and image.

For effective telepresence, the local information technology (IT) provider (the corporate IT department) and the Internet service provider (ISP) must manage:

- Bandwidth and quality of service.
- End-to-end authentication and encryption including traversals of firewalls and network address translation (NAT).
- Call setup and support for multiple locations.
- Network pre-installation assessment, provisioning, monitoring, fault detection, and troubleshooting.

Quality of service (QoS) for telepresence guarantees a maximum delay and jitter. A Service Level Agreement between the user and the ISP stipulates such a guarantee. The ISP is expected to offer call admission control to reserve bandwidth prior to a telepresence call. This may be enabled via a virtual private network with managed IP (Internet Protocol) and security services. For telepresence calls between organizations, firewall traversal is important while maintaining data security. Effective telepresence requires 1-20 Mbps per second Internet service, depending on the number of screens and screen resolution. To achieve this data rate with the required QoS, the communications channel must be lightly loaded, with voice and video traffic limited to about one-third of the link capacity.

The network must be continuously monitored for traffic peaks to adjust traffic routing. Telepresence requires a network availability of 99.999 per cent. To achieve this goal the service providers monitor the communications path, detect and correct errors, deal with component failures, and operate in spite of any distributed denial-of-service attacks.

The Effectiveness of Telepresence

The prime application of telepresence is business meetings without travel. Telepresence can also facilitate new organizational and collaborative work methods. Even small companies now have employees working from remote locations or from home. The "water-cooler" socializing and impromptu meeting of co-located employees can be replaced with telepresence.

The challenge of telepresence is to adapt virtual meetings for effective operation of the organization across the following variety of activities:

Telepresence Activities	
Type of Activity	**Example of Activity**
Routine	Team meetings for project development, staff training
Planning	Meetings between managers and staff
Personnel	Interviews, performance reviews and announcement of organizational changes
Socializing	Promoting a corporate culture and cohesion

Personnel functions traditionally depend on private meetings with many non-verbal cues and interactions. Proponents of telepresence report success even for these activities.

Additional applications of telepresence proposed by equipment vendors include:

- Virtual executive administrators and lobby attendants.
- Remote delivery of personal services by physicians, brokers, bankers, and retailers.
- Virtual arraignment and deposition.
- Customer service and support.

The overall benefits of telepresence are:

- → Quick connections with customers, partners, and coworkers that is almost "in-person."
- → Faster time to market and faster decision making.
- → Efficient use of scarce resources by making the right resource available at the right time in the right location.
- → Improved trust, understanding, and relationships across distances and cultures.
- → Greater productivity through more frequent interaction.
- → Gains in leisure time thereby improving the quality of life.
- → Enhanced green initiatives for the company by using technology more effectively and traveling less.

Reduction in travel is important as governments establish greening policies. Some companies are expecting telepresence to decrease their carbon footprint by reducing greenhouse gases as a result of less travel. Cisco Systems has estimated travel savings by U.S. employees category, as shown in the following table:

Expected Travel Savings	
Employee Category	**Average Monthly Travel Savings**
Executive	$2,000-2,999
Salesperson	$1,000-1,999
Headquarters staff	$1,000-1,999
Remote office staff	$1,000-1,999
IT staff	$500-999

From the Conference Room to the Office

To create the illusion of presence, conference rooms used for telepresence must be designed to look similar. They require layout, paint, and lighting that enhance the experience without distracting the participants. Today, telepresence is a premium technology costing hundreds of thousands of dollars for the room, the equipment, and the transmission facilities. Therefore, it is now used primarily for point-to-point communications to conduct internal company meetings at large companies over specially adapted Internet connections.

Figure 2 – Office Telepresence
(TelePresence Systems 500, courtesy of Cisco Systems, Inc.)

In the next few years, telepresence is projected to become a mainstream video product. Figure 2 shows an office-sized telepresence installation using a single 37" HDTV. Applications will expand from internal conferences to meetings with customers, partners, and suppliers.

As the impact on business performance is measured and reported, telepresence will be adopted by businesses of all sizes including small-to-medium businesses. Also, special Internet facilities will not be needed as the public Internet is enhanced to recognize video applications and to provide the appropriate service level.

Dr. Kenneth Wacks has been a pioneer in establishing the home systems industry. He advises manufacturers and utilities worldwide on business opportunities, network alternatives, and product development in home and building systems. In 2008, the United States Department of Energy appointed him to the GridWise Architecture Council. For further information, please contact Dr. Wacks at 781.662.6211; kenn@alum.mit.edu; www.kenwacks.com.