THORBURN ASSOCIATES INC.
Acoustic and Technology Consultants
Newsletter

Fall 1995

Happy Holidays from all of the staff at Thorburn Associates! We can't believe it's already that time when we once again start looking ahead toward another year. Some of our major accomplishments for 1995 include the expansion of our company to include a branch office in Southern California, numerous International projects, and our World Wide Web site at http://www.ta-inc.com. Our success in 1995 can be attributed in part to all of you…thank you for your support!

Video Conferencing – What Does It Mean For You?

Canon saved about $200,000 during 1993-94...the US Navy's distance learning network saved over $4 million over a four-year period...and Norfolk Southern Railroad saved $1,080,000 over an 18-month period. How?

By video conferencing! A number of our clients are upgrading their systems, or reconsidering video conferencing. To paraphrase one of our clients, "...a person needs to be there to facilitate the work, not to have a meeting". With the increase in travel costs and expansion of offices, companies are forced to fully utilize their time and available resources. At the same time, system and communication costs are falling and quality is improving. This is helping video conferencing expand.

New applications, opening in many different fields, are also proving the cost effectiveness of video conferencing: educators use it as a convenient means for interactive access to classes, meetings and learning resources from remote locations, physicians use it to provide consultations, courts use it to increase security of prisoners and conduct video arraignments.

Video Conferencing System Types

There are several different types of systems now available:

- *Desktop Systems* are the least costly of the three basic types and are now being promoted by Intel and Apple. In its simplest form, this system involves setting up a camera, monitor, microphone, and loudspeaker in two rooms and connecting them together on a computer network. The limitation of this system is that it is designed for use by one person at each end, as opposed to larger groups.

- *Roll About Systems* can be moved from room to room. Built at a manufacturing facility and shipped to the site, installation teams are usually on-site for less than one day. There is no need for local inspections or approvals and if the client plans to upgrade in the future, the components of this system can typically be integrated into a larger system.

- *Fixed Systems* are built into a dedicated video conference suite, which houses all of the necessary equipment. This is generally the most expensive option, especially if an existing shell space is being modified. Inspections and approvals are needed and installation and construction teams are usually on-site for extended periods of time.

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Image Quality

One of the first things a new user will notice when viewing a video conference for the first time is the relatively low quality of the picture compared to normal TV. Many people do not realize that the actual picture will not necessarily be in real time, either. Companies are upgrading their systems for these very reasons...to obtain better image resolution and faster transfer of video images. As occurred in the computer industry, much of the video conferencing technology is quickly outdated and surpassed by the quality and speed of new equipment.

The perceived picture quality in a video conference is affected by 4 major factors:

- *Frame Rate* is the number of individual video "pictures" that are displayed on the screen in a given time period. Frame rates are expressed in frames per second (fps). With higher frame rates the participants look more real and movements are less choppy. Frame rates in video conferencing systems can vary from 5 fps to the 30 fps used in standard TV.

- *Resolution* is the number of individual picture "information dots" displayed horizontally and vertically in each frame. The number of horizontal lines that are displayed per frame is a fixed display television standard. The number of information dots displayed in each of these lines is what differs. Similar to a fax machine, video conferencing systems break the video information down into digital data by sampling it many times per second. The higher the sample rate, the more information dots are gathered for each frame and the clearer the picture.

- *Motion Handling* is a function of each individual CODEC. To increase performance and reduce the amount of information being transmitted between sites, CODECs do not transmit the whole picture, only the changes in a picture between two frames. This means that pictures with very little movement have only small packages of information to transmit. As the amount of movement increases, the amount of information to transfer from site to site increases.

- The *Data Rate* is the number of bits of information that can be transmitted per second. In other words, the data rate is the size of the information pipeline. Determined by cost and availability of equipment, the data rate is a fixed number established at the start of a conference.

Because the CODEC has no control over the data rate or the movement of the participants during a conference, the frame rate and resolution must be adjusted to accommodate the amount of information being transmitted through the information pipeline. In most systems, the resolution is fixed at the lowest usable value and the frame rate is adjusted accordingly. Higher data rates allow either better frame rates or higher resolutions (these can be "traded off" depending on the requirements of the CODEC).

What's the Bottom Line?

Despite their costly beginning, video conferencing systems have now become more affordable. This can be attributed to the significant drop in cost of ISDN data lines. In fact, they now cost about one fifth the amount they were a few years ago. As a result, clients can increase their number of ISDN lines for a reasonable cost, and obtain higher transmission speeds and a more natural image. Our clients have found that three ISDN lines provides an acceptable level of quality.

Video conferencing has become a cost-effective media which is proving both profitable and worthwhile in many industries. It provides clear, enhanced communications, reduced travel expenses, and a competitive edge in the technology-driven business climate that lies ahead.

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Important Video Conferencing Terms	
Analog	A method of sending signals — voice, video, data — in which the transmitted signal is analogous to the original signal. Analog technology uses continuously changing electrical waves to generate voice or low-speed data signals.
Bandwidth	The range of frequencies over which signal amplitude remains constant (within some limit) as it is passed through a system.
Broadband	Digital services at rates greater than 1.544 Mbps.
CODEC	Acronym for COder/DECoder. A video and/or audio bandwidth digital compression device.
Digital Transmission	A method of sending and receiving information coded with on-and-off pulses of electricity or light.
Encryption	Code conversion of digitally coded signal values, performed, in general, without any increase of bit rate, in order to prevent unauthorized reception of a signal.
ISDN	Integrated Services Digital Network. International Standard for digital services on the public switched telephone network.
MCU	Multipoint Control Unit. A switching device commonly used to switch and control a video conferencing network allowing multiple sites to conference simultaneously.

If A Tree Falls In the Woods...

…Yes, it will make a sound. A big thank you to all of those who responded to the question posted in our Summer, 1995 newsletter. The correct answer is: based on the definition of sound (a physical disturbance in a medium (air)), this process of moving air does not rely on anybody being present to hear it.

Our lucky winners were Eugene Lew from Eugene Lew + Associates, Bob Kinsella from Kern Medical Center, Mike Crosbie from Progressive Architecture and Douglas Bailey from Integrus Architecture. Thanks for participating!

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