

Introduction to Videoconferencing

Videoconferencing is a method of communicating between two or more locations where sound, vision and data signals are conveyed electronically to enable simultaneous interactive communication.

Uses for Videoconferencing

- **Meetings:** cost savings on travel, accommodation and staff time. Several sites can be linked together. Having a set time and duration for a meeting encourages punctuality and focused discussion.
- **Data sharing:** images from a PC, such as spreadsheets, PowerPoint illustrations etc. can be shared to enhance a presentation.
- **Interviews:** cost savings can allow more candidates to be interviewed. With data sharing, CVs can be viewed and discussed online.
- **Teaching:** access to remote expertise. For example, Scotland and Wales both use their Educational Video Networks extensively for teaching to remote rural areas where travelling to a lecture can be difficult.
- **Remote diagnosis:** in rural areas specialist medical help may not be on hand. By linking to a regional centre, cottage hospitals and GPs can receive help in diagnosing patients' disorders.
- **Legal work:** reduced intimidation of vulnerable court witnesses. Particularly sensitive cases involving children or rape can be made more acceptable by separating the victims physically from the court.

Components of Videoconferencing

Videoconferencing has three essential components:

1. The equipment at each site that captures the voices and pictures of the participants and converts them to a form that enables transmission over suitable networks.
2. The intervening network that carries the signals between sites.
3. The conference environment or room.

1. Videoconferencing Equipment

A basic conference requires three components: a television camera to capture images and convert them into an electrical signal, a microphone to do likewise with the sound, and a CODEC (Coder/Decoder). The Coder accepts the vision and sound signals (video and audio) and processes them into a suitable format for transmission through the network to the remote site. To receive information the Decoder does the reverse: it accepts the digital signals from the remote site over the network and decodes or converts these into video and audio. Finally this video and audio are fed to a television monitor and loudspeaker to display the pictures and reproduce the sound from the remote site.

2. The Network

Two network technologies are mainly employed:

- the Internet, using Internet Protocol (IP)
- the dial-up Integrated Services Digital Network (ISDN) over modified telephone lines.

With IP transmission the results can be variable as the videoconference data has to compete with other computing data. ISDN guarantees connections at the selected quality, giving more reliable conferences, but as call charges are levied it is also more expensive than IP.

3. The Conference Environment

The starting point for efficient conferences is an effective conferencing room. Normal rooms or offices will be unsuitable without modification. The human ear can adapt to ambient noise from traffic, heating and so forth, but microphones may emphasise it to the point where communication is impossible. The human eye can also adapt to wide variations in scene brightness, for example sunlight streaming through a window. Cameras are not tolerant of high contrast scenes and may even white-out completely.

Room acoustics, decoration and several other factors need to be tightly controlled for effective videoconferencing. See: <http://www.ja.net/services/video/vtas/rooms>

Videoconferencing is a form of television and has similar guidelines. High contrast or heavily patterned clothes should be avoided. Movement should be minimal. Conferences may suffer from a delay on the sound (up to 0.5 second) and this can be unnerving. Voice switched conferences demand discipline as another site interrupting will switch the picture away from the speaker to the new contributor.

Videoconference Options

- **Point-to-Point:** conferences are set up between two destinations so each site can see and hear the other simultaneously.
- **Multipoint:** conferences involves several destinations. This requires a Multipoint Control Unit (MCU), a switch that distributes audio and video to all participating venues. Options for multipoint conferences are:
 - **Voice Switched:** not all sites see other sites simultaneously. Instead the image of the site speaking takes precedence and is seen by all the other sites.
 - **Chairman Control:** one site assumes the chair and other sites only receive the chair's sound and vision. The chair site receives sound/vision from the site currently speaking.
 - **Continual Presence:** the picture is segmented to give a thumbnail image of each site in the conference, the sound being voice switched.

Possible Disadvantages

- The technology may degrade the received images and sound. Body language can be lost if image movement is jerky. There can be a delay on the sound that requires time to get accustomed to.
- The atmosphere of a face-to-face meeting is lost.
- For meetings, some say that videoconferences are more effective if the participants at each site already know each other.

Further Information

Introduction to Videoconferencing: Video Technology Advisory Service (VTAS) Website:
<http://www.ja.net/services/video/vtas>