

The University of Alabama System

**INTERCAMPUS INTERACTIVE
TELECOMMUNICATION SYSTEM
(IITS)**

**A PARTNER IN VIDEOCONFERENCING IN ALABAMA NETWORK
(VIANET)**

**Videoconferencing
Standards**

(REVISED MAY 7, 2004)

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Forward

Since its inception in 1991, Intercampus Interactive Telecommunication System (IITS) has been involved in videoconferencing endeavors that have lead to face-to-face interaction for everything from business meetings to the completion of a college degree. IITS sites have expanded from four initial sites to over 130 video-conferencing locations comprised of IITS and ISD members through the formation of VIANET, Video-conferencing In Alabama Network. VIANET is a collaborative working group providing network infrastructure resources in the state of Alabama.

Recent advances in technology, cut backs in educational funding, and minimization of travel costs has brought about an increased utilization of videoconferencing in Alabama. To meet this growing usage, IITS has implemented network infrastructure changes to support the expansion of H.323 endpoints also known as IP based video-conferencing into the present phone line based system H.320. Through the use of these new video-conferencing capabilities, IITS has become the State of Alabama's primary source for video-conferencing technology and expertise.

In keeping with the mission of IITS and the growing usage of videoconferencing, the campus / organization must provide a suitable environment for videoconferencing. The following information is provided to assist the campus / organization in establishing videoconferencing facilities.

The IITS staff will be happy to review your communication requirements and assist you in addressing the preceding questions. Once IITS understands your videoconferencing needs, we will assist you in custom designing a videoconferencing system that is compatible with your videoconferencing needs.

IITS Contact Information

Phone (205) 975-6854
Fax (205) 974-4677
Email iitscal@uasystem.ua.edu
IITS Website www.uasystem.ua.edu

I

Basic Guidelines for A Videoconferencing System

A. The Main Components of a Videoconferencing System

Videoconferencing Codec Unit

The codec unit takes the video and audio from the local camera and microphone and compresses it to transmits over the network/digital phone line and expands the incoming video and audio signal so that it displays correctly on the receiving TV monitor.

Camera

Most conferencing systems include a video camera with zoom lens, pan/tilt and remote control capabilities. The camera captures your video image and sends the picture to the codec.

Microphone

Typical videoconferencing systems include a standard push-to-talk conference table-type microphone. This captures the audio and sends the information to the codec.

TV Video Monitor, XGA Computer Monitor, Plasma Display, LCD/DLP Projector...

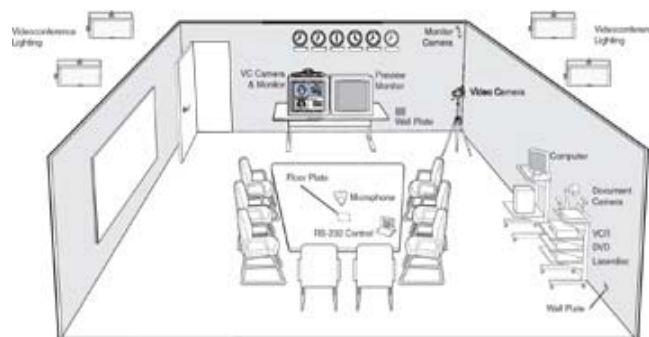
These display devices show the images received from the videoconferencing codec.

Stands and Equipment Carts

Typically, a stand or equipment cart with a bottom cabinet is required to house all videoconferencing equipment, i.e., TV monitor, codec and camera would be placed on top of the stand and the cabinet would hold other equipment, like a computer or VCR, etc.

Network Connection

The network connection is the pipe that carries data between video-systems. The size of the pipe and the ability to access it in a consistent manner will determine both video performance and quality of service. The pipe can be almost any type of network connection from an ISDN phone line to a dedicated PRI/T-1 connection.



B. Planning your Videoconferencing Room

There are a few general rules to keep in mind when planning a videoconferencing room. When getting started, the primary focus should be the number of people who will be participating in the videoconferences. The size of the group will dictate the size of the room, the kind of furniture to use and the type of system that is required.

The best choice for wall color is a light blue or light gray. The worst wall color to use is white as it creates too much of a contrast and can erase the faces of participants with dark skin tones from the camera's view. Avoid patterns that are large or repeated on furniture, walls or clothing. The room does not have to be monochromatic, but keep it simple.

Logos can be placed behind the users as long as they do not reflect or detract from the participants. Artwork or plants are acceptable as long as they are not placed on the table or in the camera's view. Additional wall clocks are an excellent idea to hang in the room to display alternate time zones.

C. 7 Questions You Should Ask Before Choosing a Videoconferencing System

- 1) What is the intended use for your system?**
 - How do you wish to use the equipment?
 - To whom are you going to talk?
- 2) What number of sites?**
 - How many sites will be participating?
 - What resources will each site have at their disposal?
- 3) What number of participants per site?**
 - How many people do you want to participate in videoconference courses/meetings at participating sites?
 - If designing two or more sites, do you want the same videoconferencing set-up for each?
- 4) What size is your room(s)?**
 - Where do you want to put the equipment? For example, is your current conference or meeting room large enough to add a system?
 - Does your current meeting environment offer sufficient size, lighting and ancillary resources to accommodate an appropriate videoconferencing solution?
- 5) What type of connectivity will you need?**
 - What connectivity best suits your internal communication requirements; ISDN, BRI, PRI, T-1, Fractional T, ATM, Frame Relay, xDSL, Cable-modem, IP?
 - What connectivity will the remote site be using?
 - Will the connection be dedicated to the conferencing system?
 - What types of communications do you plan? Voice, video, data? (The type of communication will determine bandwidth requirements.)
- 6) What type of systems or formats will you be calling?**
 - An ISDN system typically sends and receives voice and video data using the H.320 standard.
 - An IP based (network) system typically communicates using the H.323 voice/video standard.

- If mixing H.320 and H.323 sites, gateway devices are available through the IITS hub that will allow you to translate calls between the common standards. (Standards are defined by the International Telecommunications Union and are the same worldwide.)
- 7) **Do you need data capability in addition to video and audio?**
- Are you planning to only see and talk to the other people, or are you going to require the ability to do collaborative computing and share data?
 - Do you want to share computer files and documents on screen? Will you need to show PowerPoint presentations?

D. 7 Questions You Should Ask Before Choosing a Videoconferencing Room

1) **What is the best room shape? Where should entrances be located?**

- For smaller meetings, a square room is acceptable.
- For meetings with four or more people, a rectangular room is best.
- Two entrances to the room are ideal so participants are able to enter the room and sit down without walking in front of the camera.
- Ideally, entrances should be situated on the camera wall or the walls perpendicular to the camera.
- The wall behind the participants should not have any doors or windows.

2) **How are acoustics controlled?**

- Pay close attention to the ventilation system in the room. Does it create a lot of noise that could muffle the participants' voices? If the vent is directly over the microphone, the sound will amplify and sound like a hurricane. Try placing a cover over the vent that re-directs the airflow in a different direction rather than straight down.
- If a large room has a lot of exposed wood or high ceilings, pad as much in the room as possible to prevent echoed or amplified voices. Upholstery on chairs, carpet and ceiling tile will absorb most of the reverberations in the room.
- The room should be located in a remote area away from gathering places in the office. A red light or a sign outside the room is recommended to warn others that a conference is in process.

3) **What kind of furniture is recommended?**

- Use tables that taper to allow the camera to see all participants' faces. Tables should have modesty panels and provide access to power and data.
- A light- to medium-colored conference table will reflect light upward and make shadows disappear from users' faces. Do not use white or black laminate or other high intensity colors that could reflect too much light and wash out participants' faces. The pattern on the laminate should be camera-friendly.
- Chairs should be padded and comfortable, and should not rock or roll. Wheels squeak when they roll, and the rocking motion provides a distracting activity for camera-shy users.
- Carts or cabinetry for the video equipment should provide power, cord management and rear access to fix technical difficulties. This cart should lock and have wheels for easy storage when not in use.

4) **What kind of lighting is recommended?**

- The room should have indirect fluorescent lighting.
- Light should shine upward and reflect evenly off of the ceiling. Lights that shine downward create shadows on the participants' faces.
- Supplemental lighting may be required for the instructor/presenter area of the room.

- If there are windows in the room, use light-blocking shades. If sunlight is shining directly into the camera, participants will look like silhouettes.

5) How many cameras are needed and where should they be placed?

When planning a videoconferencing room, the most important factor to consider is where the camera is placed.

- You will require one camera, however three are recommended for some room configurations.
- The first camera focuses on participant's faces. The second camera provides an alternate view of participants. If it is not possible to get everyone in the view of one camera, place one camera on each side of the room. A button on your remote control will alternate the views.
- A document camera is used to transfer images of documents or three-dimensional objects that the participants want to display to the other group in their presentation.
- The beginning of a meeting should show an overall view of all participants. The camera shouldn't be too close to the table or it will not be able to capture everyone.
- Place the camera between 36 and 60 inches above the floor.
- At 36 inches high your participants will be seen at eye level, but their feet also will be in the picture. (Make sure you choose a table with a modesty panel if you are placing the camera at this level).
- Place the camera directly on top or in front of the monitor. If the camera is too far away from the monitor, participants will seem as if they are not making eye contact with the alternate party.
- If someone is standing to make a presentation, adjust the camera height to his or her height. It also is a good idea to mark the floor with tape to emphasize the boundary of the camera's view. This will prevent a mobile speaker from accidentally walking out of the picture.

6) How many and what kind of microphones are needed?

Many choices must be made concerning sound transmission. For a small conference room site, a video system with built-in microphones that will track where a voice is coming from within a 12- to 15-foot diameter and direct the camera to capture the current speaker is applicable. For a classroom site, table push-to-talk microphone systems providing camera pan, tilt, zoom and focus to the speaker is recommended. (Hanging microphone systems are to be avoided and are not the standard for IITS support.)

- The best type of microphone for a conference room is a boundary microphone, which picks up voices from 14 feet away. It also can be daisy-chained from one microphone to another. Only one or two are necessary for the entire group.
- The best type of microphone for a classroom is a table push-talk system. This type of system provides better audio, eliminates ambient noises from having an open microphone. This type of microphone system is the most automatic and transparent.
- In a conference room setting when a participant is standing to give a presentation, the use a lapel microphone is recommended.
- In a classroom setting the presenter/instructor is encouraged to use a lapel microphone.

7) How many monitors are needed?

You will need one or two monitors. The first monitor displays the remote participants with whom you will be conferencing or to display documents or objects they want to share with you. The optional second monitor is to display your own picture, a useful option to show where the camera is spotlighting. Most monitors have Picture in Picture (PIP) to display both groups. Groups larger than four people will not be able to see the PIP box so an alternate monitor is recommended.

- When a group of two to five people will be meeting, use a 27- to 32-inch monitor.
- For a group of six to 12 people, use a 32- to 37-inch monitor.

- When a group of 13 to 20 will be meeting, use two 37- to 45-inch monitors.
- When a group of 21 or more will be meeting, use two projection screens with data projector ceiling mounts.
- Purchase a monitor, not a TV. Remember, monitor screens are measured diagonally on the glass portion only.
- Offer an additional monitor or screen whenever a document camera, DVD, VCR, data projector, white board or other display equipment will be used.

E. Room Environment and Equipment

The following are minimum standards for the videoconferencing environment, three sample conference room configurations and three different ClassStations® packages offered by Polycom®. *The space designated for videoconferencing must be dedicated to that purpose and must always be available for videoconferencing.* Campuses / organizations have the option of using the videoconference rooms for non-video events if no videoconferencing is scheduled.

1) IITS minimum room standards

- Room size: 20' x 25'
- Room must accommodate at least 14 participants, however, a minimum of 25 is recommended
- Blinds / curtains must be on all windows (if any)
- Adequate lighting (60 to 80 foot candle illumination on task)
- Minimal acoustical noise
- Adequate hearing, ventilation and air conditioning for equipment and participants
- Appropriate furnishings preferably to include chair and table space for each participant
- A minimum of one main camera and one document camera (with switcher)
- A minimum of two (2) 25" television monitors
- Secured table push-to-talk microphones
- Campus / organization name identifiers behind participants

2) Three Sample Room Configurations

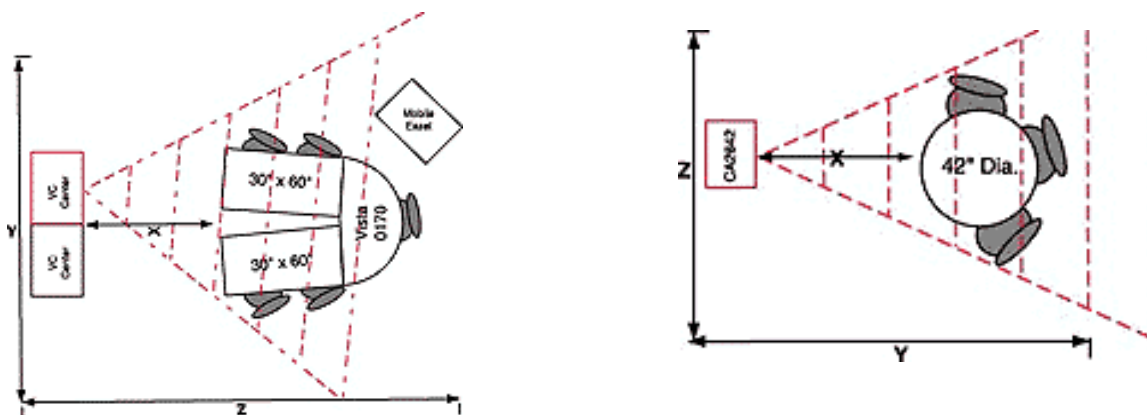


Figure 1: Videoconferencing Configuration for Five

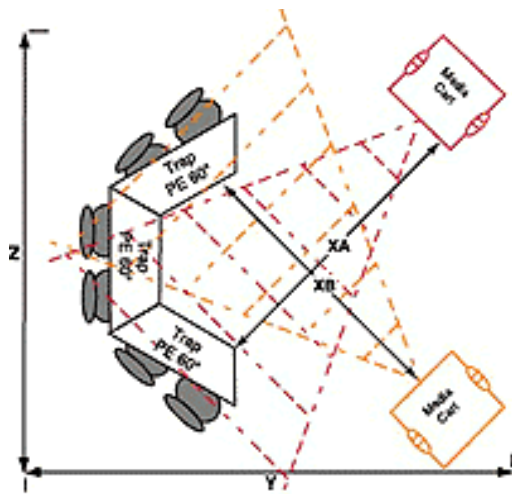


Figure 3: Trapezoid Configuration for Six

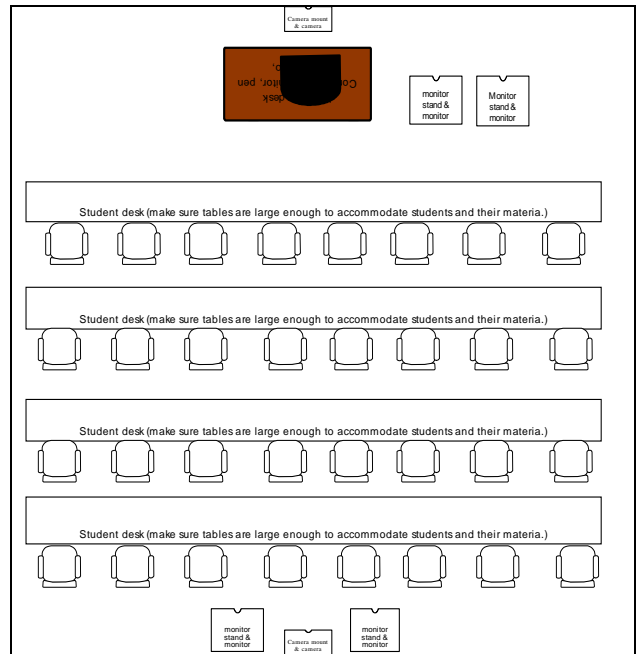


Figure 4: Classroom Configuration

3) **Polycom® ClassStation®: IITS supports/recommends the following videoconferencing equipment and required peripherals when establishing a classroom instruction site/location.**

Polycom® ClassStation® ¹		
Small Polycom ClassStation ²	Medium Polycom ClassStation	Large Polycom ClassStation
Suggested list price: \$32,350 Part # - 2230-20307-001	Suggested list price: \$46,250 Part # - 2230-20308-007	Suggested list price: \$62,500 Part # - 2230-10900-001
Polycom VS4000 platform with network interface, BRI, V.35 or PRI	Polycom VS4000 platform with network interface, BRI, V.35 or PRI	VS4000 platform with network interface, BRI, V.35 or PRI
Polycom remote control user interface	Polycom remote control user interface	10.5" touch screen system control including sizable; color video window to display incoming video motion

¹ Following price and package information is from the Polycom Office™ Catalog 2002

² Items in packages can be purchased individually.

Polycom® ClassStation®¹		
Small Polycom ClassStation²	Medium Polycom ClassStation	Large Polycom ClassStation
Two 32" S-Video monitors (one is for the receive motion for students in the front of classroom, one is for display for slides, computer graphics or computer applications in the front of the classroom)	Three 32" S-Video monitors (one is for the receive motion for students in the front of classroom, one is for display for slides, computer graphics or computer applications in the front of the classroom and one is for motion receive on the rear of the classroom)	VCR for playback or record controlled by the system controller
Six touch-to-talk microphones. When a microphone is activated, the room camera will pan, tilt, zoom and focus to speaking student	Eight touch-to-talk microphones. When a microphone is activated, the student camera will pan, tilt, zoom and focus to speaking student. Additionally, when a student microphone is activated an automatic switch from the instructor camera to the student camera will occur. This process is the most automatic and transparent technology in the market segment.	Electronic Board and mimio XI electronics
Two Polycom digital microphones	Two Polycom digital microphones	Two 32" S-Video monitors (one is for the receive motion for students in the front of classroom, one is for receive motion for the instructor in the rear of the classroom)
One room camera, Sony EVID-30	Two room cameras, both student and instructor, Sony EVID-30	One 32" XGA monitor (this is the student display for slides, computer graphics or computer applications in the front of the classroom)
Polycom Vortex 8 port advanced audio mixer	Polycom Vortex 8 port advanced audio mixer	One 15" VHA monitor (this is for instructor control, preview or display courses)

Polycom® ClassStation®¹		
Small Polycom ClassStation²	Medium Polycom ClassStation	Large Polycom ClassStation
Two 42” locking educational cabinets	Three 42” locking educational cabinets	Eight touch-to-talk microphones. When a microphone is activated, the student camera will pan, tilt, zoom and focus to speaking student. Additionally, when a student microphone is activated the control system creates an automatic switch from the instructor camera to the student camera. This process is the most automatic and transparent technology in the market segment.
System documentation	System documentation	Two room cameras, one for instructor and one for the students, Sony EVID-30
One World Center Channel Speaker	Three World Center Channel Speakers (two in front and one in the rear of the classroom)	Polycom Vortex 8 port advanced audio mixer
Integrated automatic camera and microphone control	Integrated automatic camera and microphone control	Three 42” locking educational cabinets, two in the front of the classroom and one for the rear of the classroom
	Document camera	Document camera
	VCR for playback or record	System documentation
		Visual concert FX
		One video scaler
		Three World Center Channel Speakers (two in front and one in the rear of the classroom)
		Special Integrated Instructor Podium / Station
		Special integrated picture-in-picture generator, controlled by the system controller

4) Conference Room System

IITS recommends/supports either PolyCom VSX7000 or Polycom FX videoconferencing units for conference room settings. (These units are not recommended for classroom instruction.) Either of these units will deliver top-quality video, state of the art audio, and innovative ease of use and manageability into any small, medium or large conference room setting. In addition to the videoconferencing unit, 2-3 television monitors and a visual concert pod will be required. (Number of monitors will depend on the size of the room.)

- PolyCom VSX7000
- PolyCom FX

5) Desktop System

IITS currently recommends/supports the Via Video II USB Desktop System for personal use. (Desktop units are not recommended or supported for classroom instruction.) This unit brings quality video communications into the office in a package designed specifically for personal use. This sophisticated integrated multimedia processor delivers near full-screen full-motion, up to 30fps business-quality video without sapping processing power from the users PC. Plus, it provides the conference room quality audio with no add-in boards to install or bulky hardware to place on the users desk. Depending on room/office environment, a headset microphone may be required to optimally with remote sites.

6) Videoconferencing Equipment currently supported by IITS

- Vtel ESA System
- Galaxy
- Media Max
- PolyCom 128
- PolyCom FX
- PolyCom VS4000
- PolyCom ViaVideo

7) Videoconferencing Equipment established as H.320/H.323 platform standard by IITS

- PolyCom VSX7000
- PolyCom FX
- PolyCom VS4000
- PolyCom ViaVideo

8) Videoconferencing Equipment compatible with IITS H.320/H.323 platform infrastructure but not technically supported by IITS staff

- All Tandberg products
- All Vcon products

- All Zydacron products
- All Sony products
- All desktop videoconferencing equipment with the exception of the PolyCom ViaVideo

In Summary

IITS recommends and supports POLYCOM videoconferencing products. IITS uses the PolyCom MGC-100 Multipoint Control Unit for bridging multiple codecs in a videoconference. The MCU can connect to most videoconference systems that use the accepted industry standards (ITU H.320 and H.323).

Focusing on a specific type of hardware allows IITS to effectively train technical staff to support and troubleshoot problems. Brands and models not on this list will be supported to the best of our ability.

II.

IITS Technology Capabilities

The state's VIANET video teleconferencing standard is "compressed" video using the international standard communications protocol of H.26X along with ISDN (H.320) and Internet (H.323) network protocols combined with audio standard of G.7XX.

A. Basic Components

- Videoconferencing System (ISDN, IP, or combination)
- Connection via dedicated circuit or IP link
- Networking / Bridging Services if multi-sites are needed

B. H.320 (ISDN) Connectivity

- Videoconferencing system with H.323 capability
- Dedicated circuit to an ISDN switch (public or private)
- Multi-conferencing requires connection to a bridging service

1) Advantages

H.320 is the traditional videoconferencing standard aimed at digital communication lines such as ISDN. Since H.320 uses these lines it shares the advantages of digital switched services: quality of service and familiar dialing. To the user, H.320 conferencing seems more like a live experience because its low delay video is very interactive, and the high, guaranteed bit rate allows the video to be smooth and natural. Familiar dialing methods mean that H.320 seems like a phone; you dial a phone number and you're connected to the person you wish to see.

Furthermore, since H.320 has been around for a while there is a wide selection of equipment that can be purchased to augment videoconferencing capabilities. There are also auxiliary functions [such as Multipoint Control Units (MCUs)] when there are more than two people in a conference. Lastly, as an established protocol, much H.320 interoperability testing has been performed and thus one vendor's terminal is likely to work with another vendor's terminal.

2) Disadvantages

The primary disadvantages of the H.320 standard are related to the accessibility to the network. In the office environment, current PBXs (the telephone system in the back room) do not support sufficient bandwidth or features for H.320 terminals. While a user may be able to get a digital phone call to the desk there is no transfer or hold, no three-way conferencing, no voice mail, etc. For the home environment, there are not enough ISDN lines to service everyone, and pricing is prohibitive in some areas. As a result, H.320 systems cannot be installed in all of the places users might want a videophone. Another disadvantage of H.320 systems is that they are inherently point-to-point; this means that in order to do conferences with more than two people, users need an expensive MCU, whereas we have come to expect at least three-way conferences at the push of a button on our telephones.

C. H323 (IP) Connectivity

- Video teleconferencing system with H.323 capability
- Link to a LAN / ISP switch (public or private)
- Multi-conferencing requires connection to a bridging service

1) Advantages

The key advantage to the H.323 standard is accessibility to the network. H.323 was invented specifically to solve the problem of getting H.320 wire to the desk. As a result H.323 terminals are easy to get to the network, as most business computers are already connected through Ethernet.

The second major advantage flows naturally from this computer and network-centric design. For people who are using their computers to access the World Wide Web or access multimedia information such as film clips, H.323 fits perfectly into their existing setup. Users who are accessing Web pages can connect to help on the other end without dropping their connection. In an H.323 call, if multimedia information such as an x-ray needs to be sent it can go over the same connection.

Lastly, H.323 has an advantage that has yet to be widely capitalized upon, but is potentially very useful. Because of the inherent multipoint nature of the network, it is much easier to create H.323 terminals, which can handle three (or more)-way calls without needing an expensive MCU. This means that the three-way conference function that we are so used to in our regular phones can be created in the H.323 video terminal as well.

2) Disadvantages

The fundamental disadvantage of H.323 is quality of service, but this will improve over time. First of all, there is an inherent extra delay because of the buffering (i.e., storing) of data required to smooth out the patchy nature of transfers on the network. This cannot be avoided, but it can be minimized. This effect, however, is made much worse by the current lack of quality-of-service based networks; today's packet networks have no way to eliminate patchiness, delays, and lost packets. As a result, H.323 calls on normal networks have interrupted sound, jerky video, and large delays. The good news is that this issue is being attacked by vendors on many fronts and, over the next six to 18 months, ways of requesting and delivering (and charging for) higher quality services will be implemented.

A second drawback to H.323 systems is the current lack of PBX and connectivity services to the outside world. While it's easy to get the wire from the network to the desktop, devices to transfer calls within the network and connect the network to outside terminals are not yet proven. Again, the good news is that this will be fixed over the next year or so.

A third problem is that the standard, and therefore the equipment, is also new and unproven. Bugs and interoperability problems between vendors will be common until there is more experience using H.323. In fact, even the standard has "bugs" which are being corrected by the standards committees as this is being written.

A fourth issue is security. Since every computer on the network can see the packets of a sensitive phone call going by, security measures such as encryption must be implemented, and these are not yet defined or in place.

Lastly, a minor disadvantage of H.323 is that dialing is rather unfamiliar to some users. At the moment Internet addresses or user names are used to dial in. However, as computer-literate users become more familiar with such conventions, dialing by using a long multi-digit phone number will seem arcane compared to clicking on a link on a web page, and this will become an advantage for H.323.

D. Enhanced Capabilities

- VIANET offer users the ability to hold conferences between most brands of videoconferencing equipment, using ISDN or Internet communications protocols at a variety of audio and video transmission rates.
- Using the VIANET, you may conference with any compressed video room in the world that offers the international standards base and dial-up capabilities.
- You may also hold simultaneous multi-point conferences between any number of VIANET rooms and other rooms outside the VIANET network.
- VIANET offers you the highest quality audio and compressed video rates available (may be limited by the capabilities of the far-end equipment).

III.

Services To Be Provided

A. Maintenance

- First tier maintenance and technical support is an individual campus / organization responsibility, however each campus must guarantee that their videoconference equipment will not be down more than one (1) business day.
- The IITS Hub will provide limited second tier phone support.

B. Software / Hardware Upgrades

- Software and hardware upgrades will be recommended on a periodic basis by the IITS.
- Campuses / organizations are required to provide such upgrades to maintain interoperability and remain part of the system wide videoconferencing system.
- Upgrades will be implemented on a system wide schedule to assure system integrity and compatibility.

C. Technical Contacts

- Each campus must designate at least one (1) trained person as the technical contact for videoconferencing.
- Each campus must also assure that a technical contact will be immediately available whenever the campus / organization is participating in a videoconference and will always perform pre-conference setup as scheduled. *Pagers and cell phones are strongly recommended for technical contacts to avoid time wasted leaving messages in voice mail.*

D. Resource Services

- Each campus / organization must designate a site coordinator who will coordinate and schedule conferences, open the room, turn on equipment, instruct participants in the use of controls, and provide copy services and fax retrieval. *The person must also be available during the entire setup time.*
- Distance learning applications may require additional services such as exam proctoring, assignment collection, classroom monitoring, etc. These services should be negotiated on a case-by-case basis by participating campuses / organizations.

E. Videoconferencing Equipment compatible with IITS H.320/H.323 platform infrastructure but not technically supported by IITS staff

- All Tandberg products
- All Vcon products

IV

Glossary

algorithm - A step-by-step problem-solving procedure. Transmission of compressed video over a communications network requires sophisticated compression algorithms. Some videoconferencing systems offer both proprietary and standard compression algorithms.

analog signals - Audio/video signals currently used in broadcasting where the signal is represented by variable measurable physical quantities (such as voltage). Current TV and radio signals are analog, as are many telephone lines. (Contrast with digital.)

bandwidth - In telecommunications, the maximum frequency (spectrum) measured in Hertz or cycles per second, between the two limiting frequencies of a channel.

bit - **binary digit**. The smallest unit of information with 2 possible states. 1 or 0, yes or no, on or off.

bps - bits per second (lower case is significant)

Bps or BPS - (8-bit) bytes per second (upper case is significant)

broadband - A high-capacity communications circuit/path. It usually implies a speed greater than 1.544Mbps. (Contrast with wideband and narrowband.)

BRI - Basic Rate Interface (ISDN) - 3 digital signals over a single pair of copper wires: 2 voice (B) channels and 1 signal (D) channel. (e.g. voice and fax on a single pair of wires)

camera presets - Allows pre-defined camera angles to be programmed into a videoconferencing system.

codec - **Coder-Decoder**. Videoconferencing hardware that codes the outgoing video and audio signals and decodes the incoming signals. Prior to transmission, the codec converts analog signals to digital signals and compresses the digital signals. Incoming audio and video must be decompressed and converted from digital back to analog.

compressed video - When the vast amount of information in a normal tv transmission is squeezed into a fraction of its former bandwidth by a codec, the resulting compressed video can be transmitted more economically over a smaller carrier. Some information is sacrificed in the process, which may result in diminished picture and sound quality.

Digital signals - Audio/video signals represented by discrete variations (in voltage, frequency, amplitude, location, etc.). A digital clock, for example, displays the time as discrete numeric values rather than angular displacement of analog hands. In general, digital signals can be transmitted faster and more accurately than analog signals. As an example, music from digital cd's is usually more clear than music from analog records. (Contrast with analog signals.)

echo-cancellation - Process of eliminating acoustic echo in a videoconferencing room.

frame rate - Frequency in which video frames are displayed on a monitor, typically described in frames-per-second (fps). Higher frame rates improve the appearance of video motion. Broadcast TV (full motion video) is 30 frames-per-second.

full duplex audio - 2-way audio simultaneously transmitted and received without any interference or "clipping." A common feature of room-based videoconferencing systems.

full motion video - Full motion video is equivalent to broadcast television video with a frame rate of 30 fps. Images are sent in real time and motion is continuous.

H.320 standard - A widely-used video compression standard that allows a wide variety of videoconferencing systems to communicate.

ISDN - Stands for Integrated Services Digital Network. ISDN is essentially a digital network that will provide seamless communications of voice, video, and text between individual desktop videoconferencing systems and group videoconferencing systems. ISDN is expected to replace current telephone lines.

multipoint videoconference - Videoconference with more than two sites. The sites must connect via a video bridge. (Compare with point-to-point videoconferencing.)

point-to-point videoconference - Videoconference between two sites. (Compare with multipoint.)

room-based videoconferencing - Videoconferencing using a sophisticated system. Appropriate for large groups.

standard compression algorithm - An algorithm convention for compression of a video signal. Adherence to standards allows communication among a wide variety of videoconferencing systems. H.320 is the most widely accepted standard in use today.

video bridge - Computerized switching system which allows multipoint videoconferencing.

videoconferencing - Communication across long distances with video and audio contact that may also include graphics and data exchange.

wideband - A medium-capacity communications circuit/path. It usually implies a speed from 64Kbps to 1.544Mbps.

On-line videoconferencing glossaries:

<http://www.kn.pacbell.com/glossary.html> (the above vocabulary/definitions)

<http://www.videoconference.com/glossary.htm>

<http://www.vcon.com/glossary.html>

V

On-Line Videoconferencing Information

If you would like additional information about videoconferencing, the following sites are good places to start your search.

<http://www.kn.pacbell.com>

<http://www.isdesignet.com>

<http://www.vide.net>

<http://picturephone.com>

