An Introduction to Videoconferencing

A Guide for New Users

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Who to Contact

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24 Hour Bridging Support	United States International	866-758-7064 Opt 2 706-643-4170 Opt 2

We all remember George Jetson being tracked down by his boss over a video phone at the click of a button. Videoconferencing is not a technology concept that belongs to a future era. Videoconferencing has been available and deployed throughout many government and commercial organizations since the late 1980's. It is a tool that has continued to evolve into a standards-based method of improved communication over the past 20 years.

Did you know that when President Bush is at his Crawford, TX home, he receives his morning briefings via videoconferencing? Videoconferencing permits President Bush to reliably and effectively participate in a meeting with federal, state, and local disaster management officials in preparing emergencies or critical situations at a moment's notice.

Why the push for more effective communication tools such as videoconferencing?

- **Eliminate wasted time with travel, transportation and money for brief meetings**
  - 56% of business professionals waste an estimated 30 minutes a day using inefficient communication methods
- **Eliminate the Communication Gap**
  - Poor communication costs businesses an est. $297 billion annually
  - 60% of communication is non-verbal
- **Have a direct impact on your organizations' bottom line**
  - 72% of people believe the efficiency of conferencing will give them more free time

Before you begin to learn how videoconferencing can help your organization and understand its' positive impact, you should first understand its basic functions.

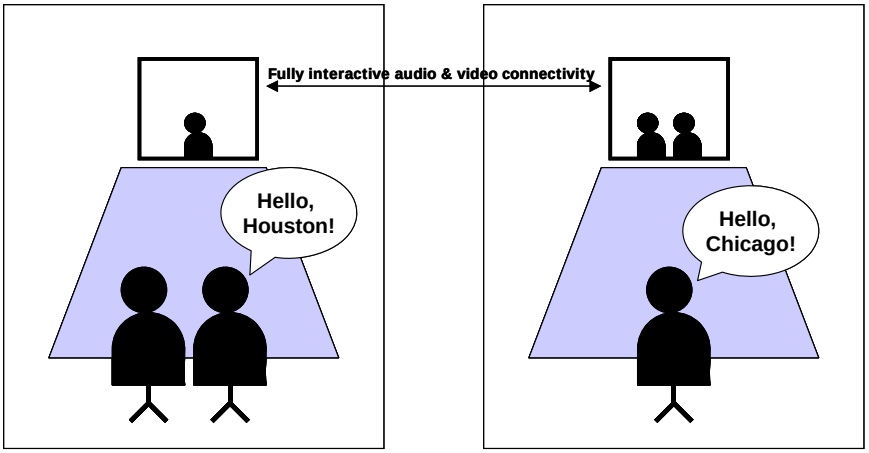
The definition of Videoconferencing	Videoconferencing transmits video, audio, and data across a communications network enabling geographically dispersed participants to meet synchronously.

Elements of explaining videoconferencing further include:

- How Videoconferencing Works
- The Picture Quality of a Videoconference
- The Sound Quality of a Videoconference
- The Types of Videoconferences

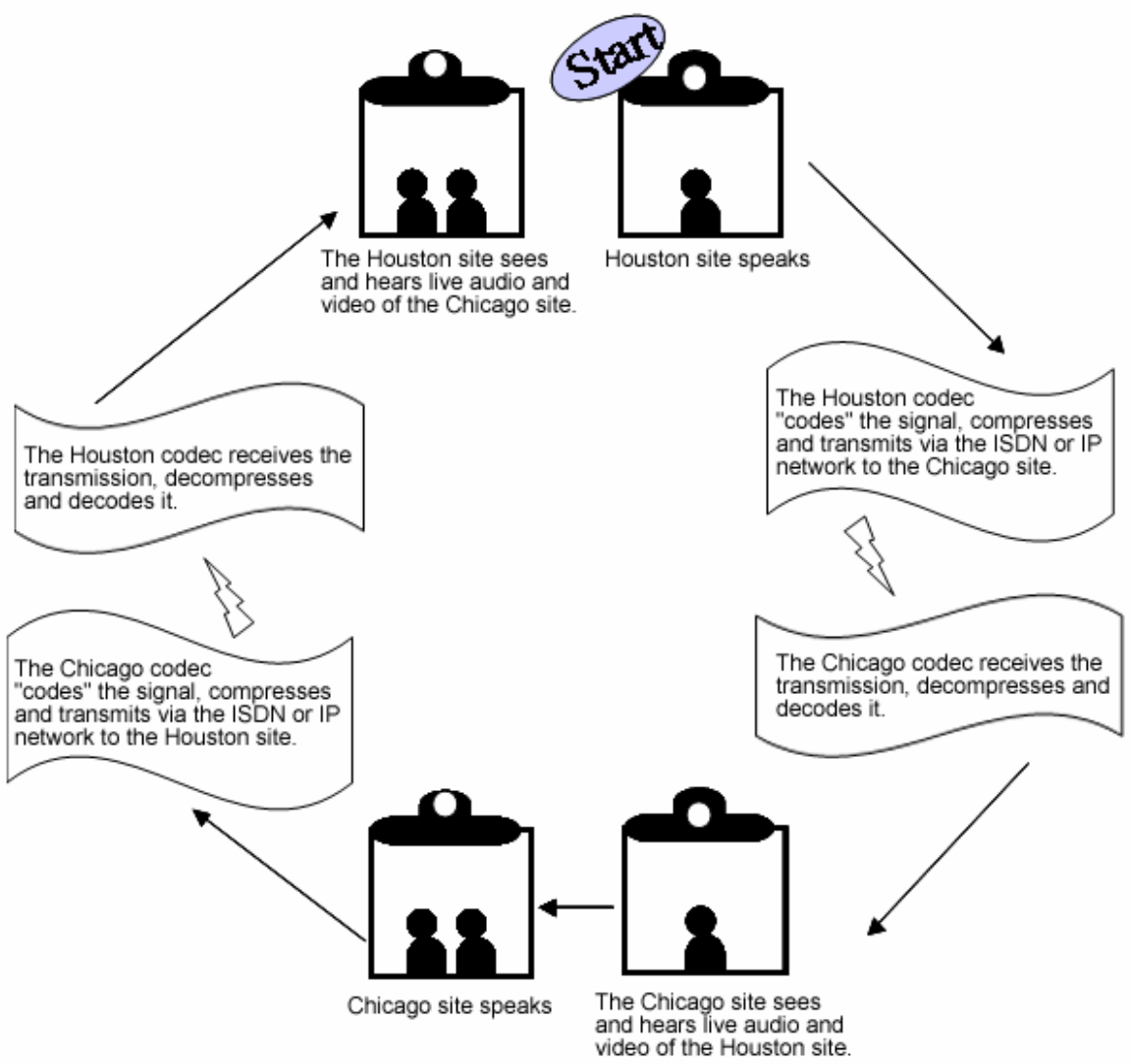
How Videoconferencing Works

The graphic listed below shows the basic video connection between two (2) sites. Each site has real-time interactive audio and video connectivity so that you can meet people from around the world face-to-face without leaving your office.



Videoconferencing functionality is a cyclical process. The process cycle below provides a basic explanation of how video and audio are compressed through the network. During a videoconference, video, audio and data are compressed and transmitted via ISDN or an IP network connection by a codec.

The codec will “code” the analog visual signal received from the camera, compress into the amount of bandwidth available and then “decode” or decompress once the video, audio and data have been transmitted to the other site. The connection is a 2-way synchronous connection between two or more sites.



The picture quality of a videoconference

The picture quality of a videoconference is dependent on 3 contributing factors: network bandwidth, frame rate and hardware selection. The more network bandwidth available, the faster and better the audio, video, and data packets can travel thus improving the picture quality. Most videoconferencing systems transmit at 30 frames per second (fps). This “refreshes” pixels within the picture 30 times every second to keep up with the movement. Lastly, business-class cameras and displays impact picture quality.

The sound quality of a videoconference

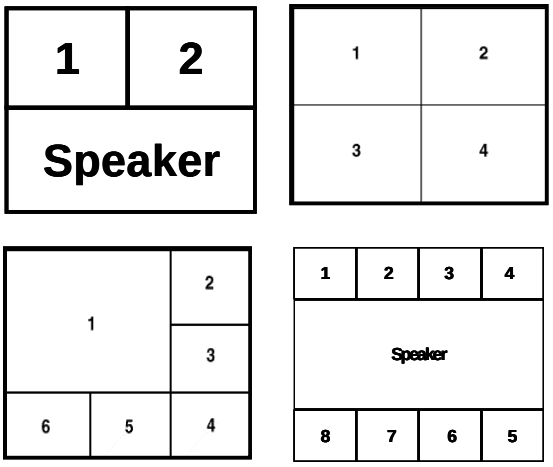
The audio stream in a video call is actually delayed to arrive simultaneously with the video to maintain lip synchronization. The audio quality is dependent upon network bandwidth and business-class hardware as well. Proper placement and selection of speakers and microphones for a particular room environment can greatly impact audio quality.

The Types of Videoconferencing

Compressed videoconferencing can take place in a point-to-point (2 sites) or multipoint (3 sites or more) configuration. All sites participating in a videoconference require a codec. All sites participating in a multipoint call must be "bridged" using embedded multipoint capability or a Multipoint Control Unit (MCU). Many codecs have embedded capability to "bridge" up to 4 sites - 3 other sites and their own. The codec initiating a multipoint call may also need additional network bandwidth to call or "host" a multipoint call.

The utilization of an MCU is typically required for multipoint conferences of 4 or more sites. An MCU is a hardware solution, which provides connectivity of multiple sites for video, audio and even web connectivity. During a multipoint conference, all participates can hear one another at all times. What participants see is dependent upon how your conference is set up via the MCU:

- Voice Activated: Participants see the site that is currently speaking or last spoke on the monitor.
- Continuous Presence: Participants see all sites in various window layouts on the monitor. Examples of possible multipoint window layouts include:



Many features of videoconferencing systems function as algorithms ratified under ITU-T standards. This provides users with seamless connectivity between different manufacturers products or networks eliminating any interoperability issues.

Network Choices

ISDN:	Connects sites utilizing the H.320 standard
IP:	Connects sites utilizing the H.323 standard

The first consideration is how to transport the video call. Decision criterion on network selection includes estimated usage, network speed, picture quality requirements and budget. The most cost effective speed for typical videoconferencing meetings is 384Kbps or 512Kbps. Most videoconferencing systems can support speeds up to 1.544Mbps for ISDN or 3Mbps for IP connections.

An ISDN connection incurs monthly recurring charges and long distance charges similar to a typical phone bill. The long distance usage charges are incurred in the same fashion as a long distance call. Participants dial a 10-digit number and usage charges begin. An ISDN configuration will also require a network interface device to connect the network into the videoconferencing system.

An IP connection incurs the same flat monthly charge despite usage. This monthly fee is higher than the average ISDN monthly fee but high usage can justify this network selection. Participants dial a standard IP address and connect immediately to the other site. An IP connection requires a different Quality of Service (QOS) than standard data transmissions. Potential users should review their infrastructure (routers, etc.) to ensure video can be supported properly.

Equipment Requirements

- Codec
- Display
- Camera
- Microphone
- Speaker

Videoconferencing hardware is required at each site participating in a video call. Additional options should be considered, but at a minimum, the equipment listed above in a standards-based system is required.

The picture at the left includes a settop codec, camera, dual monitors and stand, tabletop microphone, as well as a tabletop device enabling laptop connectivity.

Codecs

Codecs provide the primary processing power connecting your videoconference. Most features are embedded into the codec and accessible via a remote control or touch panel. Codecs are available as a settop (sits directly on top of a display) or in a rack-mounted version.

Displays

Depending on the room size and viewing requirements, users may choose from a variety of displays including monitors, plasma screens, and projectors.

Cameras
Most settop codecs include a high-end business-quality 1-chip camera. Rack mounted codecs require the separate selection of a camera. Color cameras used in videoconferences should have full pan/tilt/zoom capability. For meetings or applications requiring a higher resolution, 3-chip cameras are also available. Most codecs also support the use of 2 or more cameras for larger rooms. Cameras may be placed facing a speaker/teacher and participants/class.

Microphones
There are many microphone options available including tabletop, ceiling, and wireless. Most codecs are provided with a single tabletop microphone, which typically picks up 4-6 people around a medium-sized table. Microphones are available in uni, or multi-directional formats.

Speakers
Most monitors or plasmas are equipped with speakers that are sufficient for videoconferencing. For larger or more complex requirements, additional speakers should be considered for adequate audio output.

Equipment Options

Codecs can be integrated with most standards-based audio / video components. Examples include:

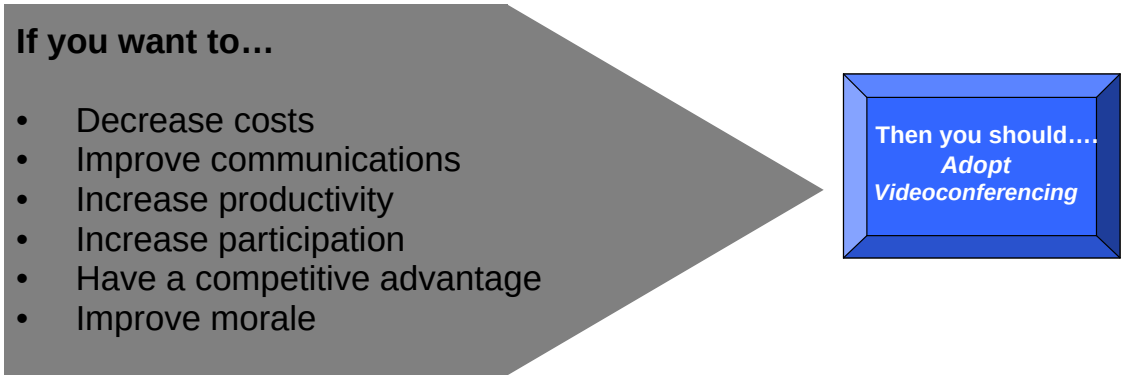
- DVD/VCR
- Document Camera
- Projection Systems
- PC/Laptop
- Additional microphones or audio system
- Additional Cameras
- Control Touch Panels
- Electronic Whiteboards

Additional functionality can be reached for participants who want to collaborate during a videoconference. Below is a brief list of ITU-T Sub-standards and the resulting benefit of each feature. Most standards listed below are available in both H.323 (IP) and H.320 (ISDN) transport modes. A complete listing of all ITU-T ratified standards can be found at http://www.javvin.com/dictionary.html#H.

H.264 – High Quality Video Streaming	Provides better motion handling at typical videoconferencing speeds of 384Kbps and above
H.224/H.281 – Far end Camera Control	Allows local user to control the camera at the other site including pan/tilt/zoom
H.235 – Security	Provides government rated security for authentication, security and privacy
T.120 – Data Collaboration	Allows data collaboration and application sharing between sites
G.722 or G.711 – Audio Standards	Indicates the amount of bandwidth being utilized for the transmission of audio during a video call. G.722 operates under 7kHz taking up less bandwidth, while G.711 (older standard) operates under pulse code modulation (PCM) of voice frequencies on an 64 kbps channel

Government and commercial organizations have utilized videoconferencing since the late 1980's. With the standardization of network protocols and equipment standards over the past 15 years, users can now transparently "talk" to each other similarly to placing a regular phone call.

Videoconferencing can be used to either replace or compliment meetings being held between distant sites. Statistics show that busy professionals in American business today spend more than 37% of their time in meetings. Executives attend over 60 meetings every month. Now add the time wasted in airports including additional time for extensive security measures, post-airport transit, and hotel time. Time spent getting to and from a 2-hour meeting is often greater than the time spent in the meeting itself.



Decreased Costs

- Reduce travel budgets
- Allocate resources more strategically (budget and personnel)
- Leverage existing excess bandwidth and/or audio/video components

Improved Communications

- Eliminate weaknesses of traditional modes of communication including fragmented and separately performed meeting types
- Eliminate mis-communications. Meeting participants remember 20% of what they hear, 30% of what they see, but 70% of what they see AND hear.
- Include far-flung offices in real-time visual exchange

Increased Productivity	♦ Eliminate wasteful travel time in airports, transit, and hotels ♦ Return to normal workday minutes after the meeting adjourns ♦ Accelerate decision making cycles ♦ Run more efficient meetings
Increased Participation	♦ Include more personnel in meetings at no additional cost ♦ Participate in an ad-hoc meetings across the globe
Gain Competitive Advantage	♦ Shorten business cycles ♦ Improve time to market goals ♦ Accelerate research & development cycles ♦ Solve critical mission problems quicker ♦ Reach customers faster and with improved visual communications
Improve Morale	♦ Provide better balance between professional and personal life for traveling personnel ♦ Improve overall morale with increased employee participation ♦ Decrease employee stress from travel

Now that you understand the typical benefits of videoconferencing, most people ask, "How can I use videoconferencing?" The table below reflects the functional verticals within an organization and their application.

Executive and Management	♦ Board Meetings ♦ Operations Review ♦ Strategic Planning Sessions ♦ Staff Meetings
Human Resources	♦ Investor & Public Relations ♦ Press Conferences ♦ Interviews & Recruiting ♦ Benefits Rollout ♦ New Employee Orientation ♦ Company Announcements ♦ Employee Dispute Resolution ♦ Training
Sales & Marketing	♦ Team Building ♦ Forecasting & Staff Meetings ♦ Product Announcements ♦ Project Management ♦ Focus Groups ♦ Customer & Vendor Meetings
Customer Service & Operations	♦ HelpDesk/Call Centers ♦ Account Management ♦ Logistical and Strategic Planning
Finance & Accounting	♦ Budget Development ♦ Strategic Planning ♦ Audit Reviews ♦ Legal Consultation
Plant Management & Engineering	♦ Design Reviews ♦ Instant review of development hurdles ♦ Remote Technical Support or Management ♦ Customer reviews ♦ Eliminate lingual or translation issues with overseas operations
Legal	♦ Strategic Planning ♦ Mergers & Acquisitions ♦ Depositions or Remote Expertise ♦ Settlement Negotiations

Popular industries have been early adopters of videoconferencing:

- Law Firms/Legal Services
- Business Services
- Manufacturing
- Finance/Banking
- Architecture & Construction
- Real Estate
- Aerospace
- Entertainment & Media

There are other more specialized applications that have also realized a positive impact with the use of videoconferencing.

Distance Learning	Videoconferencing is used extensively in the delivery of educational programs to tens of thousands of students around the globe. Videoconferencing is not a method of instruction, but a medium for delivery instruction to an extended classroom.
Telemedicine	Videoconferencing tools offer medical institutions and personnel the ability to extend expertise into rural or underserved areas. Telemedicine applications also include remote expertise, continuing education and ad-hoc "second opinions" which continues to reduce insurance and malpractice exposure.
Judicial	Many federal, state and local entities use videoconferencing to enhance or compliment their judicial system. This includes improving public safety with video arraignments and visitation as well as depositions, legal briefs and other proceedings to facilitate a fair and speedy judicial cycle.
Secured or Deployable	The federal government was an early adopter of videoconferencing. Government entities now leverage rollabout systems in both secured and non-secured modes. Codecs can also be deployed quickly in a "suitcase" for emergency or tactical requirements

When you bought your first car or your first appliance, you relied on friends or family to help you understand “what to look for” or what questions to ask. Most professionals find themselves lost on where to start when deploying videoconferencing. VSGi has worked with international organizations to assemble a “Best Practices” Outline. These steps represent feedback from our customers on THEIR Best Practices, which resulted in a successful, and money-saving communication tool.

Step 1: **Determine Your Applications**	Identify and determine at least 1 or 2 applications that exist within your organization today. Your Return on Investment improves with each application. Understand the needs of all of your user groups so you can leverage your investment across several departments.
Step 2: **Accommodate or Integrate Traditional Media**	You should adapt technology to the user community – not the reverse. Do you have existing media or tools that you need to integrate into a videoconference? How does your user group meet today so that you can accommodate their personal presentation styles?
Step 3: **Roadmap Your Network Strategy**	Evaluate your bandwidth requirements, growth and future needs, as well as consideration of management of video traffic. Network is an already important component of any communication backbone. It becomes increasingly important with the convergence of voice, video, and data.

Step 4: **Develop Metrics and ROI**	Capture current meeting and conference room statistics to determine current needs and future growth. Consider shared or separate resource deployment for both equipment and network.
Step 5: **Define Internal Procedures**	Start with getting "buy in" from top management. If they're approving the budget, they need to understand the benefits and ROI early to justify the cost. Determine training requirements and the internal marketing for the use of videoconferencing before deployment. Establish performance goals and reporting requirements to prove success or implement change. Determine where budget savings can be re-allocated.
Step 6: **Implement Scheduling, Service & Support**	Develop a scheduling procedure immediately. Can you utilize your existing program or should you consider a new network management tool? Determine prioritization of resources including conference rooms, systems, and support escalation. Determine what level of service and support is needed for each site and how the user community can access help.

Corporate Overview

A leader in visual collaboration and network solutions

Visual Systems Group, Inc. is a premier end-to-end voice, video, and web collaboration company with an 18-year history in the video conferencing industry. With its experience in product integration, network management, and high quality, on-site customer sales and service, VSGi delivers a seamless conferencing solution.

Our Solution
VSGi offers a unified portfolio of best-of-breed products and services. We provide a single source for:

- Network Solutions - traditional ISDN and a video-ready, open IP network
- Product Integration - quality product portfolio that includes hardware and software solutions
- Service Solutions - industry certified support staff providing premium installation, maintenance & integration services
- Conferencing Solutions - voice, video and web conferencing services that meet any type of meeting requirement

Our mission is to provide our clients tools that enable time-efficient decision practices that help shorten business cycles. How we do that: To promote successful communication practices, we learn how our customers currently communicate and show them they how they can communicate better in the future. We call this our "Best Practices" Implementation Methodology - these are strategies we have learned by working with companies who implement successful video networking.

Our Process
It takes more than best-of-breed products and a team of technicians to be successful. That is why we have developed an implementation cycle. Whether it's an installation of 2 video endpoints or a global network deployment, VSGi handles each implementation with the same level of care and professionalism. Our implementation cycle is comprised of six phases: planning, design, implementation, training, monitoring and maintenance. If you are a first or fifth time customer, we will manage the entire process to your satisfaction.

Our Customers
VSGi's customer base is comprised of Fortune 500 companies, multiple state contracts, federal government agencies, universities, and health care institutions worldwide. Commercial customers include: Clorox, E*Trade, Stanford University, Morgan Stanley, Cable & Wireless, Goodwill, Aspect Communications, Caterpillar, and many others. Our state contracts include: Florida, Georgia, and Delaware as well as a nationwide contract with MICTA. We also sell to the US Department of Health, US Navy, Army, Air Force, INS, Department of Justice, Department of Treasury to name a few.

Our Products and Services includes:

Video End-points
LifeSize
Polycom
Tandberg

Video Infrastructure
Codian MCU, IP VCR
Polycom MCU
RadVision MCU
Tandberg MCU
Cisco Routers
Adtran Access Devices

Network
vIPConnect - video-ready, open architected IP network for video, voice and data
Visual DialTone - traditional BRI/PRI ISDN network

Conferencing Services
V-Connect Video Bridging and Gateway Services
V-Connect Voice Conferencing Services
Meeting Visuals Web Conferencing powered by WebEx

Management Software Solutions
LifeSize Control
Polycom Global Management System (GMS)
Polycom Path Navigator & Polycom Web Commander
RadVision Gatekeeper
Tandberg TMS, Scheduler

Video Peripherals
NTSC/XGA/HD Plasma Monitors
LCD projectors
Interactive Whiteboards
Document Cameras

Streaming Solutions
Codian
Starback
Conferserv

Education, Service and Maintenance
VSGi University "Visual Collaboration and Professional Development Courses"
Installation
Maintenance
Network Engineering
Managed Services

You may also review our product and service offerings at www.vsgi.com, email sales@vsgi.com or contact one of our sales professionals toll-free at 1.877.402.VSGi (1.877.402.8744).

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