Video Teleconference Options

Next Generation Solution

Conferencing Solutions

- Video conference
  - Designated physical rooms
  - High quality video
- Video conference with desktop add-on
  - Leverage video conference with desktop capability
- Web conference
  - Advanced collaboration
  - Internal and external participants
  - Mobile environment

Hosting

- On premise
  - Agency maintains infrastructure
- Cloud based
  - Vendor maintains infrastructure
- Hybrid
  - Combination of on premise and cloud

Options

- Maintain and enhance existing system
- Migrate to a regional cloud based system
- Provide limited support to existing system

Maintain and Enhance Existing System	Cloud Based System	Limited Support for Existing System
Public Safety Data Network – Internet not required	Internet connectivity required	Public Safety Data Network – Internet not required
Primarily room systems–can add desktop capability	Combination of room systems, desktop and mobile environment	Maintain room systems only
Infrastructure equipment reaching end of life – would be replaced	Infrastructure maintained by vendor	Infrastructure equipment reaching end of life–would not replace
Staff support required	Limited staff support	Staff support required
Requires City of San Diego and RCS support	County OES has offered to host for UDC members	Capability eventually up to local agencies
Estimated 5 year cost $705,000	Estimated 5 year cost $85–$150,000	Estimated 5 year cost $165,000

Next steps

- Investment proposed for FY15 UASI – $35,000
- Test and evaluate cloud based solutions during May exercise

Report for the

Video Teleconference Options

submitted to

San Diego

San Diego, California

March 2015 ©

CDI® L.R. Kimball

ARCHITECTURE • ENGINEERING • COMMUNICATIONS TECHNOLOGY

AVIATION | CIVIL | CONSTRUCTION SERVICES | DATA SYSTEMS | ENVIRONMENTAL

FACILITIES ENGINEERING | GEOSPATIAL | NETWORKS | PUBLIC SAFETY | TRANSPORTATION

TABLE OF CONTENTS

EXECUTIVE SUMMARY 1
BACKGROUND 2
SCOPE 3
1. METHODOLOGY 4
2. CONFERENCING SOLUTION OPTIONS 5
3. HOSTING OPTIONS 7
3.1 ON PREMISE HOSTING 7
3.2 CLOUD HOSTED SERVICES 7
4. FUNCTIONAL REQUIREMENTS 9
5. ESTIMATED COST COMPARISONS 11
6. OPTIONS 13
6.1 OPTION 1 – MAINTAIN AND ENHANCE THE EXISTING VIDEO CONFERENCING SYSTEM. 13
6.2 OPTION 2 – MIGRATE TO A REGIONAL CLOUD BASED VIDEO OR WEB CONFERENCING SOLUTION 13
6.3 OPTION 3 – PROVIDE LIMITED SUPPORT TO EXISTING SYSTEM 14
WORKS CITED 15

EXECUTIVE SUMMARY

This report is provided at the request of the Regional Technology Partnership (RTP). The RTP is an executive level advisory council consisting of representatives from law enforcement, fire services and emergency managers. The RTP provides recommendations to the San Diego Urban Area Working Group on investment strategies that support the San Diego Urban Area Security Strategy. The goal of the San Diego Urban Area Security Strategy is to improve the Regions capability to prevent, protect against, mitigate, respond to and recover from acts of terrorism and other disasters.

One of those capabilities developed using Urban Area Security Initiative funding is video teleconferencing (VTC). The video teleconferencing capability in the San Diego Region was deployed to approximately 75 different locations, including communications centers, emergency operations centers and department operations centers.

A significant portion of the equipment and software on this system is approaching the end of life cycle timeframe. As this equipment reaches its end of life cycle, the question of what form the next generation of video or Web conferencing collaboration will take has been raised. In addition to the existing equipment approaching end of life cycle, many technological advancements have occurred in the world of video teleconferencing, Web conferencing, mobile device development, wireless data connectivity and cloud based hosted solutions that should be explored.

The existing VTC system is a Tandberg room system with high quality video and audio capabilities. The system is hosted on the Regional 3C's public safety data network. This configuration provides a secure system on an internal network that does not require internet connectivity. In a wide spread disaster with degraded Internet services, this capability can be valuable. However, this level of system reliability comes with a significant cost.

Today, the commercial VTC market has significantly expanded to provide low cost, cloud based video and Web conferencing systems. These types of solutions have evolved to provide a host of collaboration features that are available on any device, anywhere there is Internet connectivity. If public safety stakeholders are comfortable with a resource being hosted in a cloud based service, this approach deserves serious considerations for the enhanced capabilities and lower cost.

The San Diego Region has three basic options to consider for the next generation of video teleconferencing. The first option is to replace the existing equipment when it reaches its end of life cycle, enhance the current capabilities, maintain the system and provide technical staff support. While this option does provide a video teleconference system on a public safety data network, the cost associated with this approach is high. As reliability on commercial broadband services has improved, the benefit of utilizing a public safety network for video conferencing has diminished. The estimated five year cost to maintain the existing system is $705,000.

The second option is to utilize a cloud based solution to provide video teleconferencing or web conferencing. The development of cloud based services and software has provided many new capabilities at a relatively low cost. A cloud based solution shifts the responsibility for maintaining the network, replacing the server equipment and keeping the software up to date to the provider. Many of these providers have built systems that can support multiple devices and operating systems, providing a high level of interoperability, improved access and the ability to leverage existing

equipment. The estimated five year cost for a cloud based solution ranges from $85,000 to $150,000. This range varies due to the variation in functional capabilities of cloud based solutions.

The third option is allow the existing system to function through its end-of-life cycle. On average, the current equipment is likely to function for the next three to five years. As the equipment reaches the end of life cycle, the responsibility for providing video teleconferencing capability would transfer to the local agencies. The disadvantage of this approach is the risk of individual agencies purchasing systems that have a low level of interoperability. This approach would still require some funding to keep the existing systems functioning. At a minimum, the five year cost for keeping the system maintained is $165,000.

Background

In 2005, the City of San Diego Police and Fire Departments and San Diego County Sheriff's Department partnered in an effort to develop a regional public safety data network. The project became known as the Regional 3Cs (Command, Control and Communications) network. The Regional 3Cs network is a secure Public Safety only communications network that directly connects public safety agencies and encourages inter-agency collaboration. The network includes law enforcement, fire-rescue, dispatch centers, emergency operations centers and critical infrastructure sites across San Diego County, as well as neighboring jurisdictions. The network includes more than 26 agencies at all levels of government, as well as key critical infrastructure sites.

Video conferencing is one of the primary capabilities built to support regional collaboration through the 3Cs network. Each of the sites in the network was provided a Tandberg room system and connected to the data network. Connectivity between the various end points was accomplished through a centralized multipoint control unit, hosted and supported by the City of San Diego. The result was a robust internally hosted video conferencing system on a secure public safety data network, not dependent on outside resources such as the Internet.

The system has had mixed results on the intended use. Some users were regular users of the system. It has been utilized for conducting video enhanced meetings along with the phone conferencing ability. During actual wide spread events, the use has been somewhat limited. This is probably a result of a variety of factors that include limited knowledge of system use, limited initiative to include VTC in emergency operations practices, the requirement to be in a certain physical location, technical issues and the use of more common means of communicating such as email or phones.

The existing system has portions of equipment that have reached or will soon reach their life expectancy limits. The majority of room systems vary in age from five to eight years. The expected life expectancy of a room system is 10 years. The original purchase cost for each room system was approximately $25,000. As part of the acceptance of the equipment, agencies understand that future replacement of room systems would be absorbed by the agency. Replacement of rooms systems with current technology range in price from $2,500-$10,000, depending on capabilities and features.

The infrastructure that supports room systems includes a multipoint control unit. This equipment is approximately seven years old. Assuming a life expectancy of 10 years, this hardware will likely need replacing in 3-5 years. The original cost for this hardware was approximately $195,000.

As this equipment reaches life expectancy, the San Diego Region needs to determine if and how this capability will be maintained, replaced, enhanced and supported.

The current transition proposed by the 3C's Operations Advisory Board is for the 3C's data network is to be absorbed by the City of San Diego and Regional Communications System to primarily support the radio system infrastructure. The transition recommends that the VTC system continue to be available to all agencies through June 2016. The City of San Diego staff will work with the SDUA to prepare a recommendation to transition support of the current VTC infrastructure to another agency(s) or to move to other methods of VTC in the SDUA.

In an effort to maintain some type of regional video conference capability, the County Office of Emergency Services has offered to consider potentially hosting a solution that could support the members of the Unified Disaster Council and other stakeholders.

Scope

This report is provided at the request of the Regional Technology Partnership. The RTP as an advisory body to the Urban Area Working Group understands that the current video conferencing capability will reach an end of life cycle in the near future. Given that factor, the region will need to decide if it should maintain the current capability and the most effective approach. The primary goal of this report is to provide information on options for future video conferencing capability.

The key questions addressed in the report are:

1. What technology solutions are available to provide VTC capability?
2. What are the desirable functional requirements?
3. What are the costs associated with a sample of options?
4. What technological improvements are offered by the next generation of video teleconferencing?

The balance of this page is intentionally left blank.

1. METHODOLOGY

The information for this report was collected through a combination of contact with current system support personnel, system managers, system end users, system research and demonstrations from system vendors.

This report focuses on types of solutions, their advantages and disadvantages, desirable functional requirements and an estimate of long term cost for a sampling of solutions. The sample solutions discussed do not provide an exhaustive comparison of vendors or solutions.

This report is not intended to supersede any required procurement process or serve as a scoring mechanism for selecting a preferred vendor.

The balance of this page is intentionally left blank.

2. CONFERENCING SOLUTION OPTIONS

Over the last few years, the development of technology solutions has provided many new choices on conferencing solutions. The traditional video teleconferencing capability has been duplicated at some level by Web conferencing technology. The result of this blended solution has been a blurred line between the traditional VTC and Web conferencing solutions.

The following is a description of the primary conferencing solutions available today.

The primary focus of a video teleconferencing (VTC) system has been to broadcast video from one organizational location to another location and to provide improvements over an audio only telephone conference call. Dedicated systems with high definition video and high quality audio enable close up views of meeting participants. When an organization is primarily focused on enhancing internal meetings by adding video into the meeting environment and can regularly leverage the conference rooms where the technology resides, a VTC solution might be appropriate. VTC solutions often require a substantial upfront investment due to the necessary infrastructure. Bandwidth requirements are high, a dedicated network is required and onsite support staff is often needed to manage the infrastructure. Video teleconferencing systems can quickly become outdated and necessitate architecture overhaul or upgrades. (Weinstein 2012)

Some VTC systems can provide add-on software that extends video teleconferencing functionality to personal computers to provide basic conferencing capabilities. Sometimes these systems are bundled with propriety VTC system purchases. Functionality can include two-way or multipoint video, advanced audio, and screen sharing. However, advanced meeting features, as well as most training, event, and on-demand presentation creation capabilities, are not included. (Weinstein 2012)

While the desktop add-on software works well for presenters and participants who have the licensed technology available on their computers, use of the software is typically limited to these individuals, and users cannot engage in on-the-fly meetings with people outside the organization. Additionally, because the desktop add-on is tied to the VTC solution, customers must continue to use and invest in the proprietary VTC system to enable use of the desktop add-on software. (Weinstein 2012)

Web conferencing is a contemporary Internet-based approach that includes video and audio components and also extends to a variety of features that enable more enhanced interaction through the desktop environment. If the main goal of a meeting is to facilitate teamwork, partnership, and collaboration among users both inside and outside of the organization, Web conferencing provides a good solution because of its interactive meeting features. Web conferencing also runs on a variety of platforms, including desktop, laptop, and mobile devices, so it offers ease of use from any location. (Weinstein 2012)

More-advanced Web conferencing solutions have tools and features for live and on-demand training, which can include participant testing, grading, and tracking, as well as capabilities for large-scale online events and Webinars. A Web conferencing solution is generally less costly than VTC systems because it is software-based and leverages existing technology investments in computer hardware, laptop computers, and mobile devices. Some web conferencing solutions also enable integration with room based VTC solutions, allowing users to considerably broaden the reach of their core technology investments. (Weinstein 2012)

The following graphic provides information that can assist the user in deciding what type of conferencing solution would best meet their business need.

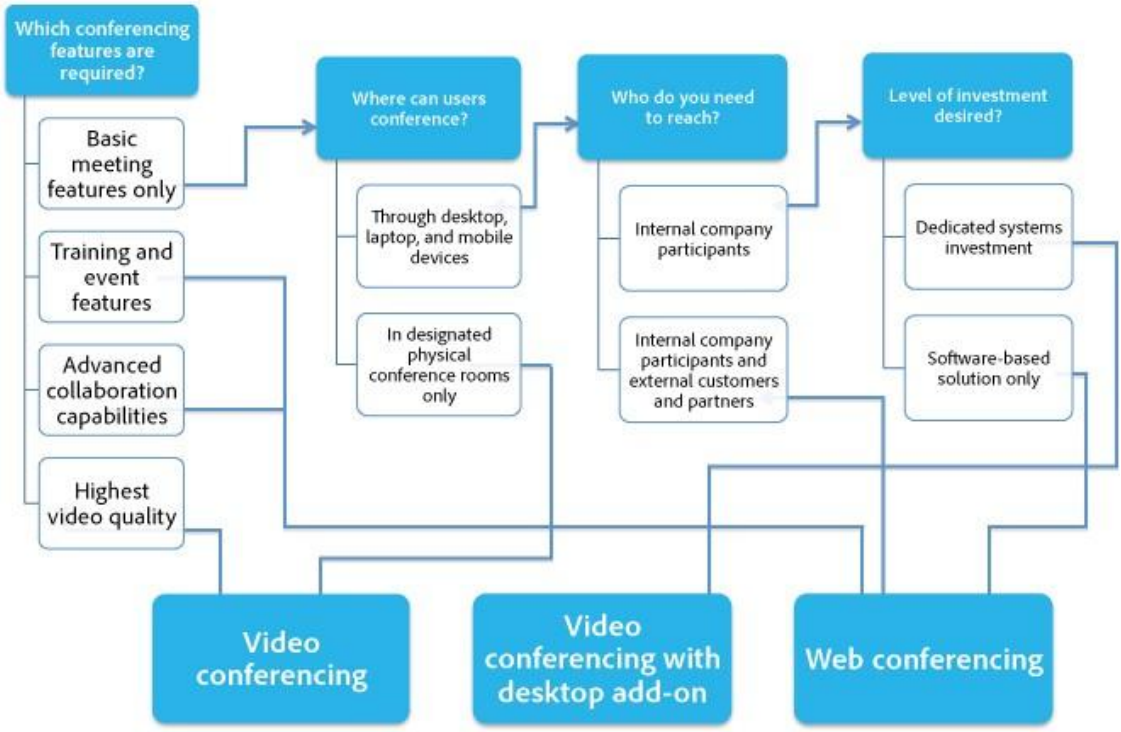

Figure 1—Which Conferencing Solution Best Meets Business Needs

(Weinstein 2012)

3. HOSTING OPTIONS

There are many different approaches to providing video conferencing. For the purpose of this report, the focus is on the two broad categories of on premise solutions and cloud-based solutions.

3.1 On Premise Hosting

The on premise solution for multipoint video meetings or Web conferencing involves the purchase, installation and management of centralized equipment and end point devices to create an internal system. A good example of this type of solution is the current 3C's system. This type of system typically resides on the organizations premise and behind their network firewall.

The key components of this type of system are:

1. A centralized multipoint control unit that controls the video distribution.
2. End point devices for conference rooms (room systems such as the currently deployed Tandberg)
3. Data network to carry the video signal
4. Software application to manage the system
5. Technical support to maintain, troubleshoot and support users.

Key advantages

- Can have multiple ports
- High quality video
- Good feature set
- Very secure network solution
- Can be designed to be independent of internet service to function

Key disadvantages

- Upfront equipment cost can be high
- Requires high level of bandwidth – not a problem on 3C's network
- Equipment replacement cost can be high – multi point control unit and room systems
- Can be difficult to use – requiring technical support
- Internal support staff cost to maintain and manage

(Weinstein 2012)

3.2 Cloud Hosted Services

Cloud hosted services or software as a service involves the use of bridging platforms owned, managed and hosted by an external service provider. The use of a hosted bridging provider offers the following key advantages and disadvantages.

Key Advantages:

- Lower up front cost
- Technology kept up to date by provider
- Reduced management burden
- Reduced risk of technology obsolescence
- Reduced staff support cost

Key Disadvantages

- Recurring service fees
- Shared bridging platform – could be security concern
- Requires internet connection
- May experience firewall or IT restrictions
- Quality of experience may be dependent on internet bandwidth.
- Bandwidth availability may be negatively affected during large scale disasters

(Weinstein 2012)

The balance of this page is intentionally left blank.

4. FUNCTIONAL REQUIREMENTS

Based on the business requirements for a regional deployment of a video or Web conferencing system, the following functional requirements should be considered.

System Security – This includes the ability to control who can participate in a video teleconference of Web conference. In a primarily internal only system, security is fairly easy to control because participants for the most part have to show up at specific location or can only access from within the network. The exception to that is when a user uses a desktop add-on or calls into a telephone access. Some Web conferencing systems do have the ability to control the entry of users when they attempt to join a meeting.

Internet bandwidth – A cloud based solution should not exceed the typical available Internet speed for the participating members. Any system that requires a high bandwidth is likely to result in a poor user experience.

System end-point devices – In order to leverage existing hardware such as room systems, desktop computers, mobile tablets and mobile phones, a system should be able to utilize any of these types of devices or operating systems.

Number of Users and Participants – The proposed deployment assumes creating 25 users who are able to create and manage meetings. While the typical conference may be small, the ability to invite up to 100 participants is recommended.

Email system plugins – The ability to add scheduling to an email system is an important feature. This function allows the end user to schedule a meeting directly from their native email system, taking advantage of their contact list and calendar function.

Screen sharing – The system should have the ability for any participant to share their screen to the group. This can be especially useful in providing briefings or training material to the meeting.

Voice activated switching – This function allows the system to recognize when a specific person is speaking and can place them into the primary position of the video viewing. This is especially useful when there are many participants in a meeting and the screen viewing of multiple video feeds at once can be difficult.

Chat – This feature can be useful for asking questions during a meeting.

Recording – The ability to record and archive meetings can be a useful tool for record keeping or for users to revisit or view a session after the initial presentation. This can be especially useful for training purposes.

High definition video and audio – The ability for a video or Web conference system to utilize high definition video and audio improves the user experience. This is primarily driven by the available bandwidth, type of end point equipment and how the system is optimized.

Telephone – The system should have a telephone bridge that allows users who do not have other means of access to join a meeting. Some services provide the telephone bridge as part of the core services, while others have added costs.

It is recommended that any procurement or selection process of a solution should first clearly define the required functional requirements of a VTC or Web conferencing capability for the SDUA. Once these requirements are defined, a comparison of solution capabilities and their cost can be performed.

The balance of this page is intentionally left blank

5. ESTIMATED COST COMPARISONS

The following comparison chart is a sampling of solutions that provide VTC or Web conferencing capability. The table is a mixture of the current system, cloud based on on premise solutions. There are many choices available on the commercial market and any procurement process should not be limited to this sampling. The sampling of solutions have varying levels of capability and are not designed to be an exact side by side comparison of capabilities.

	3C's Tandberg On-premise	Adobe Connect Cloud	Adobe Connect On-premise	BlueJeans Cloud	Lifesize Cloud	PolyCom RealPresence On-premise
Software						
Subscription for Software as a Service		11,970	11,970	30,000	17,000	334,000
Software Purchase			19,152			
Equipment						
Multipoint Control Unit	150,000					
Server Equipment			5,000			103,000
Services						
Line Fee Connectivity Cost	78,000					
Telephone Line Cost		10,000	10,000			
Staff Support						
Technical Staff Support	Unknown		Unknown			Unknown
Maintenance						
Annual Maintenance Cost	33,000	21,970	6,225	30,000	17,000	66,000
1 Year Cost	111,000	21,970	46,122	30,000	17,000	437,000
5 Year Cost	705,000	109,850	111,022	150,000	85,000	701,000
10 Year Cost	1,260,000	219,700	198,372	300,000	170,000	1,402,000

Estimated Cost Notes

3C's Tandberg Room System:

- Equipment costs assume current equipment will reach end of life cycle within three to five years and require replacement. Replacement cost included in five year cost.
- It is assumed some level of technical staff support will be required to maintain the system. The cost associated with providing this staff support is unknown and not captured in the cost.
- Assumes that the line fees would still be paid by the users ($3,000 per agency) to support the system connectivity cost.
- Does not capture any cost associated with enhancing the system capability or licensing capacity.

Adobe Connect – On Premise

- It is assumed some level of technical staff support will be required to maintain the system. The cost associated with providing this staff support is unknown and not captured in the cost.

Polycom – On Premise

- It is assumed some level of technical staff support will be required to maintain the system. The cost associated with providing this staff support is unknown and not captured in the cost.

All Options

- The cost for replacement of room systems for the individual agencies is not captured. A new room system can range from $2,500 to $10,000, depending on capability and features.

It is recommended that a clear concept of the business and functional requirements be developed in support of any purchasing or request for proposal process.

It should be also noted that the Adobe Connect capability is available to local government through the federally funded Homeland Security Information Network (HSIN). If a local government agency applies for the access to a community of interest in HSIN, the user has access to basic Adobe Connect services at no cost. This option would be managed by each individual agency.

6. OPTIONS

The options for the San Diego Region fall into three general categories.

6.1 Option 1 – Maintain and Enhance the Existing Video Conferencing System.

The San Diego Region has made a significant investment in infrastructure and equipment to provide a robust, secure video conference system that operates on a public safety data network. The benefit of that design is the system is on a secure network that can deliver high definition video and audio to approximately 75 room systems that are not dependent on external Internet support.

Most of the equipment and technology deployed for this capability will be reaching end of life cycle over the next three to five years. In order to maintain the existing capability, the San Diego Region would need to begin to plan for equipment replacement cost. Additionally, the existing technology will require software and equipment upgrades to provide capabilities such as multiple end point device choices and, improved collaboration tools.

This option would require the Unified Disaster Council (UDC) to garner support from the City of San Diego and Sheriff Wireless Division through RCS to utilize the microwave data network to transport the connectivity and identify a technical support solution.

There are several costs associated with keeping the existing system functional for more than five years. The estimated cost to replace the multipoint control unit and peripheral equipment is approximately $150,000 to $200,000. There is additional underdetermined cost associated with enhancements to the system that would provide more functionality and licensing. There may also be costs associated with providing program and technical staff support. The potential staffing or support services cost are not identified in this report.

The estimated five year cost for maintaining and replacement of infrastructure equipment for the existing system is estimated at $705,000.

6.2 Option 2 – Migrate to a regional Cloud Based Video or Web Conferencing Solution

There are a variety of cloud based video or Web conference solutions available on the market. These services vary in capability, ranging from a focus on video conferencing to a focus on web conferencing, with many providing a blend of video and Web collaboration capabilities.

This option would identify the desirable functional requirements and select a solution that would meet the business needs for a regional solution. The assumption for this report is the County of San Diego Office of Emergency Services would take the lead on behalf of the members of the UDC. The benefit of this regionalized approach is that members of the UDC would be on the same platform, have a high level of interoperability and benefit from cost efficiencies.

There are two models that could be explored. The first is software as a service model on a cloud based server. The second model is software as a service on premise. The second option would host the software on an internal network. Both systems have advantages and disadvantages. The cloud based server puts all of the responsibility of maintaining the server equipment and software on the provider. The on premise solution requires the host agency to support a server configuration. Hosting the software on premise may provide some additional functionality and could be hosted on a network not dependent on the Internet.

A third model that is a hybrid of the cloud and on premise solution would provide additional capability in the way of redundancy and access options.

The cloud based video teleconferencing or Web conferencing would provide an increased level of interoperability, allowing multiple types of devices and operating systems.

The estimated five year cost for a cloud based solution is between $85,000 -$150,000 depending on the functional requirements and capabilities.

6.3 Option 3 – Provide Limited Support to Existing System

This option would utilize the existing system until the equipment and software reach their end of life cycle. This option assumes that the equipment would function for another three to five years. The responsibility for identifying a replacement for the VTC capability would shift to the local agencies. During this transition period, there are some minimal costs associated with keeping the system turned on. The annual minimum cost is approximately $33,000. This cost does not include any staff support cost that may be associated with maintaining the systems.

This option would not utilize the County of San Diego Office of Emergency Services as a host to the UDC members. The risk with this individual approach is the possibility that local agencies may deploy a system with a low level of interoperability.

The estimated five year cost is to keep the minimum systems functioning is $165,000.

WORKS CITED

Weinstein, Ira. Real World Options for Multipoint Videoconferencing. Wainhouse Reserach, 2012.