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WAINHOUSE Research

# Video Conferencing Cameras for Huddle Rooms

## Choosing the right camera for your application

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# Video Conferencing in Huddle Rooms

## *Understanding Huddle Rooms*

In the last few years, the AV and video conferencing industry has been all abuzz about huddle rooms. Yet many enterprises, and even some resellers and vendors, have yet to fully understand the true value of these spaces.

Appearances aside, huddle rooms are not simply smaller meeting rooms with fewer seats. Huddle rooms (or huddle spaces as we often call them) are places to go for an informal chat. To hold an impromptu work session. To dig in and solve a real issue in real time.

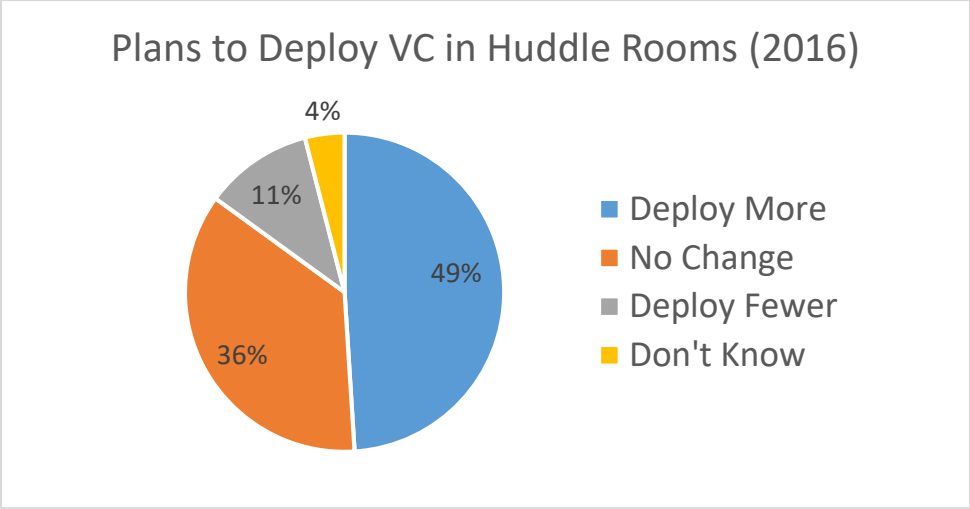
The team at Wainhouse Research (WR) has been in the AV world for more than 25 years, and we've spent considerable time researching the huddle room phenomena. Here's what we've learned …

- Huddle rooms are informal meeting spaces that can accommodate six or fewer participants
- Huddle rooms do not have a specific shape or even physical size. Huddle spaces can be found in the corner of a large room, in open spaces, and even on the back patio. Anywhere a handful of people can huddle and get work done might be considered a huddle room.
- Huddle rooms do not usually require room upgrades or other facilities work (e.g., window treatments, acoustic wall panels, special lighting systems, etc.)
- Huddle rooms are typically available for ad-hoc (unscheduled) use
- Enterprise workers typically expect three basic AV functions within huddle rooms:
    - Audio conferencing – the ability to make a phone call / dial into a conference call
    - Presentation – the ability to display content (e.g. PowerPoint presentations, Word documents, web sites, etc.) on a shared display
    - Video Conferencing – the ability to conduct two-way video, audio, and content sharing sessions with other users / meeting rooms
- Unlike traditional meeting rooms, huddle rooms are NOT about video or audio performance or flexibility. Huddle rooms are focused on low cost, ease of installation, ease of use, and availability.

Huddle rooms are basically the watercooler for the next generation worker, and organizations are finally starting to see the benefits of long-standing, but underutilized spaces.

## *Video Conferencing in Huddle Rooms*

An August 2016 WR survey of more than 300 enterprise decision makers shows that ~ 50% of organizations plan to deploy video conferencing (VC) in more huddle rooms in the future. Note that this figure is up from 37% only one year earlier! [1]




The above data is supported by the dozens of discussions we have with enterprise IT / AV managers each year. In other words, there's no doubt that organizations are investing in their huddle rooms.

However, deploying video conferencing in huddle rooms brings a new set of challenges in many areas – especially as it relates to choosing a camera system.

In some cases, organizations will use dedicated (hardware-based) group video conferencing systems within their huddle rooms. Such solutions can provide an exceptional user experience, but are often too expensive for basic huddle rooms. In addition, these solutions may not support the various conferencing applications (e.g. Skype for Business, Zoom, WebEx, GoToMeeting, etc.) preferred by the user community.

For these reasons, many organizations are deploying PC-based video conferencing solutions within their meeting rooms – and especially their huddle spaces. In those situations, customers need to choose the proper video conferencing camera to address their needs.

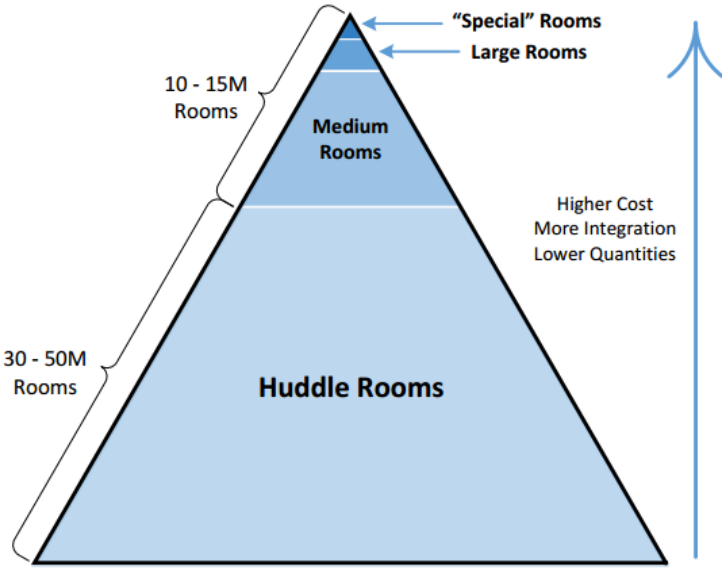
This study, sponsored by Altia Systems, provides information and insight into six areas to consider when researching and selecting video conferencing cameras for your huddle rooms.

[1] Source: Wainhouse Research – 2016 Video Conferencing End User Survey (http://cp.wainhouse.com/content/2016-video-conferencing-end-user-survey)

# Consideration #1: Cost

There are approximately 40 million huddle rooms around the world. [2]

And, unlike integrated AV or VC meeting rooms, the typical organization might have dozens or hundreds of huddle rooms. In fact, WR is aware of several large enterprises with several thousand huddle rooms each.




Given the large volume of rooms to be "video-enabled", cost becomes a huge factor for the organization. And the cost analysis should consider not only the price tag, but also the value (in terms of features, functionality, the overall experience provided, etc.) of the spend.

Fortunately, organizations today have many options to choose from with prices ranging from < $100 for a basic webcam, to thousands of dollars for motorized pan / tilt / zoom cameras, and even more for multi-camera systems offering advanced features (e.g. face detection, speaker tracking, etc.).

# Consideration #2: Image Quality

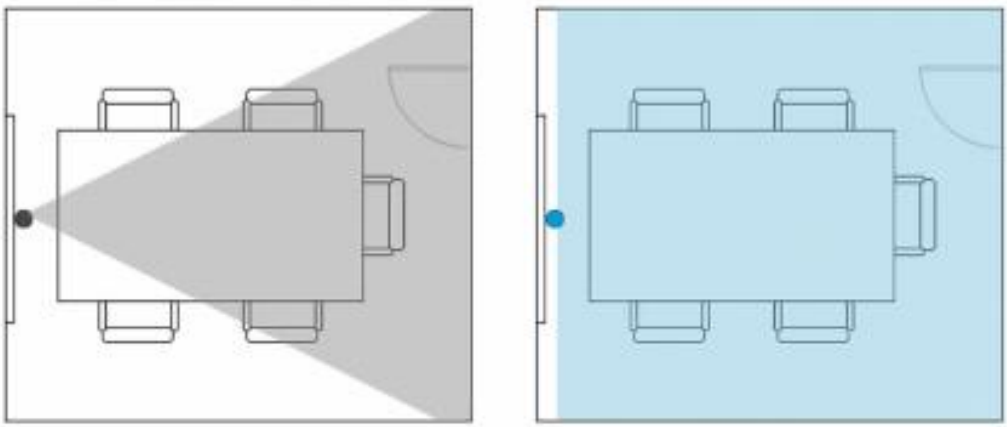
While image quality may seem like an obvious consideration when it comes to a video camera, there's more here than meets the eye. Within this context, image quality includes numerous items such:

- Video resolution (e.g., 4K, 1080p, etc.) and frame rate (e.g., 30 fps) supported
- Pixel utilization – video cameras are often measured by the number of pixels on their image sensor, but one should also consider how those pixels are used. In this context, using pixels to capture people's faces brings more value than using pixels to capture the ceiling, the floor, etc.
- Zoom quality – for solutions that support digital (not optical) zoom, it is important to consider whether the image quality remains acceptable when zoomed-in to capture a specific person.
- Light compensation – the ability for the video camera to compensate for difficult lighting conditions such as too much or too little light or back-lighting. Remember, huddle rooms don't include special lighting systems or expensive drapes / shades.

[2] Source: Wainhouse Research

# Consideration #3: Room Coverage

Unlike formal, larger meeting rooms with long, bowling-alley-style meeting room tables, huddle rooms come in various shapes and sizes. And in many cases, huddle room meeting participants are seated very close to the front of the room (see left image below). This presents a unique challenge for huddle room cameras, and often results in people sitting off-camera.



Organizations seeking to video-equip their huddle rooms should seek solutions with a horizontal field of view (FOV) that is wide enough to capture all of the meeting participants on camera. The right image above shows a 180-degree FOV "panoramic" camera capturing all meeting participants.

After all, what good is a video call if some of the participants are off-camera? At WR, we refer to this concept as "tele-absence."

# Consideration #4: Connectivity and Interoperability

At WR, we're fond of saying that the best thing about industry standards is that everybody has their own (a little video conferencing industry humor).

Today's customers have various camera connectivity options to choose from including:

- **HDMI** – commonly found on professional and consumer camera systems, these solutions require the host device (e.g. PC / notebook) to offer an HDMI input. However, this is not standard on most PCs / notebooks. As a result, in order to use an HDMI camera, additional equipment / adaptors will be required, which adds cost and complexity. For this reason, we do not view HDMI cameras as being ideally suited for typical huddle room environments.

- **Ethernet / IP** – these cameras offer exceptional cost-effectiveness and form factor flexibility. However, they require the host device, and perhaps more importantly the host software, to support an IP-based video source. Unfortunately, while commonplace in surveillance applications, support for IP-based cameras is not common in the video conferencing world.

- **Proprietary –** such solutions can provide an exceptional experience and streamlined workflow. However, by their very nature they can be used with specific solutions only – typically from a single vendor. While acceptable in some situations, given the volume of rooms to equip, WR believes non-proprietary solutions make more sense for huddle rooms.

- **USB** – commonly found on webcams and stand-alone camera units, USB cameras offer a compelling combination of performance and low cost. USB cameras are natively supported (no need for special drivers thanks to the USB video device class or UVC specification) on Windows and Mac PCs and notebooks, and are supported by all PC-based conferencing software and applications. As a result, they have become the de-facto standard within the PC conferencing world.

To be clear – all of these connectivity methods are absolutely viable. The question is what type of camera makes the most sense – both for today and for tomorrow.

Based on the above, WR believes that in most situations, USB cameras are best for huddle rooms.

# Consideration #5: Flexibility and Control

Within this context, flexibility means the ability to direct the camera capture area, either physically or digitally, to capture specific parts of the room.

As stated above, huddle rooms come in various shapes and sizes, and they include different types of seating arrangements including standard tables, couch seating, and more. Huddle room cameras should be flexible enough to adapt to different room shapes and sizes.

In general, there are two types of cameras suitable for use in huddle rooms:

- **Fixed cameras** (e.g. webcams) – such cameras typically support digital pan / tilt / zoom (ePTZ)

- **Motorized cameras** – such cameras offer motorized pan / tilt with either digital or optical zoom

There are pros and cons of each approach. For example, fixed cameras offer exceptional simplicity. Once installed, the fixed camera captures the space. The disadvantage is that fixed cameras may capture less important areas of the space, and digital zoom may impact image quality.

Motorized cameras, on the other hand, allow meeting participants to pan, tilt, and zoom the camera to capture specific parts of the room. And systems with optical zoom can maintain image quality even when zoomed-in tight on a specific person (see left image below). However, such solutions tend to be more expensive than fixed cameras – which is a challenge in the huddle room.

In addition, motorized cameras require an operator (support person or meeting participant) to actively manage and control the camera, which is distracting for that person and takes away from the informal, laid-back mindset of huddle sessions.

And finally, when the camera is zoomed-in on a specific person, the other meeting participants are off-camera, which impacts the remote participant's experience by removing visual context (see below).

*(L) Tight Shot of Participants (others are off camera), (R) Wide-Shot of Room Capturing Ceiling (wasted pixels, poor experience)*

<u>Author's Note re: Visual Context</u>

Human beings are fortunate to have panoramic vision. In fact, our two eyes combined provide more than a 180-degree forward-facing horizontal field of view (see image).

This panoramic vision allows us to see what's in front of us, and also see the things we're looking at in proper context.

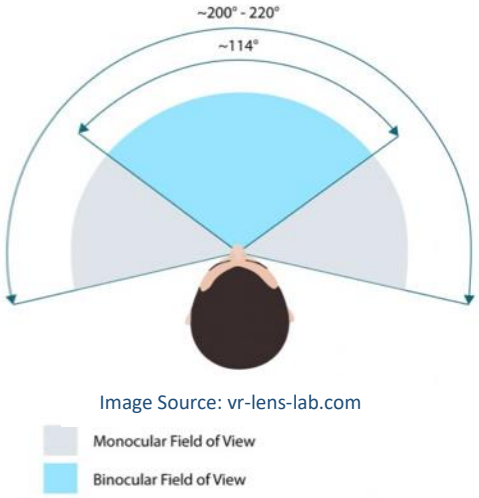



Image Source: vr-lens-lab.com

For example, instead of just seeing one person in a meeting room, we see the person we're looking at, the other people in the room, and the rest of the space (floor, ceiling, walls, etc.).

When zoomed-in enough to provide an image that feels natural (vs. a tiny view of a person), pan / tilt / zoom cameras are unable to provide the remote participants with a panoramic view of the space. They provide a narrow view instead. As a result, the participants lack visual context, and the remote participants tend to lose the sense of proximity of the space. So instead of seeing a people sitting in a room with other people, the PTZ camera sends an image of one or two people in isolation – almost like they're floating in space.

This lack of physical context feels unnatural to the virtual participants in the session.

## *Speaker Tracking Systems*

In the last few years, several vendors have released camera control systems, often called speaker tracking systems, which automatically pan / tilt / zoom the camera to focus on the active speaker. Some such solutions include several motorized PTZ cameras or a combination of fixed and motorized cameras. These solutions eliminate the need for a user to manually control the camera, but they tend to be very expensive (between the tracking system and the required cameras), and require the customer to commit to a specific vendor's camera and/or video conferencing platform.

### *Room Framing Systems*

Recognizing that speaking tracking systems are beyond the budget of many customers and situations, some vendors have released a new breed of solutions called room framing systems.

Instead of tracking active speakers, these solutions detect where people are sitting in the room and adjust the camera to ensure that all participants are captured on camera.

Some framing solutions leverage motorized PTZ cameras, while others use fixed cameras.

While not offering the same "in person" effect as speaker tracking systems, the room framing solutions are more cost effective and solve an even bigger problem – making sure people are on-camera at all times, even if they don't know how to initially set the camera.

# Consideration #6: Integration

Back in the day, meeting room video cameras did just one thing – capture images of the people in the room. Today, however, thanks to their application program interfaces (APIs), these devices can do much more.

For example, depending on the type of meeting room camera installed, it can provide notification when a person enters the room. This "in use" notification can be sent to:

- **Local AV System** – when the camera detects motion in the room, the in-room AV / VC system can automatically be powered-up.
- **Corporate Security** – to inform the security team that someone has entered the room. This eliminates the need to install separate motion sensors.
- **Enterprise Calendars** – when a person enters the room, the room can automatically be tagged as "in use" within the enterprise calendar system.
- **Analytics Engine** – the in-use message allows the IT team to track the actual usage of the room (e.g., total number of meetings, duration of meetings, etc.).
- **No-Show Tracking System** – many organizations suffer from a high percentage of no-shows for scheduled meetings. The camera's in-use notification, or more accurately a lack of notification from a room, would allow the IT team to detect no-shows in real-time, and automatically make the room available to others.

In addition, the meeting room camera can potentially provide information about the number of people in the room (via face-detection or tracking), and perhaps even the names of those in attendance (via face recognition).

These are just a few of the possible ways that an in-room camera can add more value. Organizations looking for huddle room video conferencing cameras should consider whether such capabilities would be useful within their environment.

# Solution Spotlight


The sponsor of this study, Altia Systems, offers an innovative meeting room camera solution called PanaCast 2 that is well suited for use in enterprise huddle rooms.

The PanaCast 2 is a multi-camera array solution that stitches together the real-time, full motion, HD-quality (2.1 MP cameras) images from three (3) cameras to provide a single panoramic video image. PanaCast 2 offers:

- Real-time, in-device video stitching with ultra-low latency (delay)
- Panoramic image capture (180-degrees wide, 54 degrees high)
- High quality images (4K pixel density)
- Full motion images (3840 x 1080p at 30 fps)
- Small footprint (see image of PanaCast 2 on a stand)
- Stand-alone functionality (no external processing needed for video stitching)
- UVC compliant (no driver required on Windows and Mac systems)
- USB 3.0 and 2.0 compatibility

Installing PanaCast 2 requires only a USB connection between the compute platform (in-room PC or user's laptop, etc.) and the camera, and a power connection. From the collaboration software's point of view, the PanaCast 2 looks like a standard webcam – except it provides a full (panoramic) view of the meeting room as shown in the image below.

PanaCast 2 can also be used with existing group VC systems or other devices by using a USB to HDMI converter (e.g. a compute stick) available from various third parties.

Additional noteworthy features include:

- A free ePTZ application for Windows or Mac that enables local control of pan, tilt, and zoom using familiar multi-touch gestures on a touch display or notebook touch pad.
- Optional "Intelligent Zoom" feature that allows the PanaCast 2 to act as both a camera and a sensor simultaneously. Intelligent Zoom brings several key benefits including:
    - Auto image framing using face detection (and without need for manual camera control)
    - Automatic counting of people (faces) in the meeting room provides third-party applications with insight into room usage and room-in-use information.
- Centralized management of PanaCast 2 cameras (important for multi-PanaCast deployments)

In addition, Altia Systems offers an API to the PanaCast 2 camera so that partners and customers can access PanaCast 2 features from within other applications. For example, conferencing provider Zoom (www.zoom.us) supports PanaCast 2 camera control (pan, zoom, brightness, contrast, and intelligent zoom on/off) within the Zoom Rooms application. Altia Systems also offers integrations with other vendors and solutions including Intel Unite, Skype for Business, Slack, and others.

PanaCast 2 can be purchased directly on the Altia Systems website or from a network of global partners for a base price of US $995 (MSRP). The Intelligent Zoom feature is available for an additional US $149.

The table below highlights how the PanaCast 2 addresses each of the key areas of consideration covered within this study:

| **Area of Consideration** | **Altia Systems PanaCast 2** |
|---|---|
| Cost | With a list price of US $995, PanaCast 2 is more cost-effective than most motorized PTZ cameras, and less expensive than speaker-tracking systems. |
| Image Quality | PanaCast 2 offers 4K pixel density and video resolution of 3840 x 1080p (4K width, half height) at 30 fps |
| Room Coverage | With its 180-degree horizontal field of view, PanaCast 2 can capture all of the participants in the room. |
| Connectivity and Interop | PanaCast 2 is a UVC-compliant USB device which makes it compatible with basically all PC-based collaboration applications. |
| Flexibility and Control | As a fixed-camera solution, PanaCast 2 does not require an operator to move the camera during the meeting. In addition, the optional Intelligent Zoom automatically frames the people in the room. |
| Integration | Altia Systems offers a full set of APIs, which allows PanaCast 2 to act as an in-room motion detector and to provide data to 3rd party applications. |

# Conclusion

Organizations around the world are discovering the strategic importance of supporting video conferencing within their huddle rooms. For many organizations, traditional hardware-based group video systems are too expensive for mass deployment in these smaller spaces. Instead, many companies are deploying PC-based video conferencing within their huddle rooms. This has driven increased interest in video camera solutions optimized for use in small meeting rooms.

Organizations conducting research into huddle room camera systems should consider numerous factors including cost, image quality, room coverage, connectivity and interop, flexibility and control, and integration capabilities.

Given the large number of huddle rooms in the typical organization, it is important to choose the right camera system for the job.

The sponsor of this paper, Altia Systems, offers a 180-degree panoramic USB camera solution that offers a compelling combination of low cost, high quality, automated framing and face detection, and the ability to capture all of the participants in even the smallest meeting room.

# About the Authors

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# About Wainhouse Research

**Wainhouse Research**, www.wainhouse.com, is an independent analyst firm that focuses on critical issues in the Unified Communications and Collaboration (UC&C). The company conducts multi-client and custom research studies, consults with end users on key implementation issues, publishes white papers and market statistics, and delivers public and private seminars as well as speaker presentations at industry group meetings.

# About Altia Systems

(copy provided by Altia Systems)

Altia Systems, www.getpanacast.com, a Cupertino-based technology company, is the creator of PanaCast 2, the world's first Panoramic-4K plug-and-play camera system that delivers a 180° wide field of view which replicates the natural human visual perspective. Funded by Intel Capital and other leading investors, Altia Systems' products and technology deliver real-time stitching of panoramic video from multi-camera systems, enabling a unique experience in immersive video collaboration. In addition to PanaCast 2, Altia Systems is the developer of PanaCast 2s, the first software-defined 7.4 Megapixel 180° camera system, Intelligent Zoom and other industry-first products.