Q-SYS™

Designing for VisionSuite

Best practices for creating intelligent High-Impact Spaces

CONTENTS

SECTION

1. Introduction to VisionSuite

About VisionSuite

Q-SYS VisionSuite delivers best-in-class experiences through two complementary types of intelligence:

Speaker Spotlight:

Intelligent speaker switching that dynamically points cameras at active speakers with shots created in real-time based on audio coordinate data, further sharpened by vision detections

Presenter Spotlight:

Autonomous presenter tracking that creates responsive presentation environments thanks to computer vision identification and vision-based triggers

Leverage the full pan-tilt-zoom capabilities of NC Series cameras for optimal shot composition for any high-impact space, enabling flexibility even when room layouts change and dynamic use cases emerge.

This is all delivered through VisionSuite Designer's unified graphical interface and powered by the VSA-100 VisionSuite AI Accelerator, so that you can deploy intelligent high-impact spaces with unparalleled simplicity.

A VisionSuite 'VS-AI-P' perpetual license is required per room, and a VisionSuite 'VS-AI-3YR' three year update & support license is required per VSA-100. Software updates are no longer available after three years (security patches only), but the solution will keep functioning perpetually for the lifetime of the hardware.

Speaker Spotlight

Speaker Spotlight delivers close-up, immersive experiences for remote participants by automatically framing active speakers in the room.

Unlike preset-based systems that force fixed seating layouts and pre-defined shots, Speaker Spotlight creates shots in real-time based on the active speaker's location, ensuring the far-end can follow the conversation with immersive and engaging close-up shots.

Combined with Voice Activity Detection, VisionSuite mitigates false camera switches by differentiating ambient noise from speech, eliminating unnecessary distractions.

NOTE:
VAD operates as a speech-activated gate, preventing camera switching from noises only during periods of silence. Once speech is detected and the gate opens, it cannot prevent camera switching from ambient noise that occurs simultaneously while a person is speaking.

Active Speaker Framing

Speaker Spotlight transforms audio data into intelligent camera control through real-time coordinate processing.

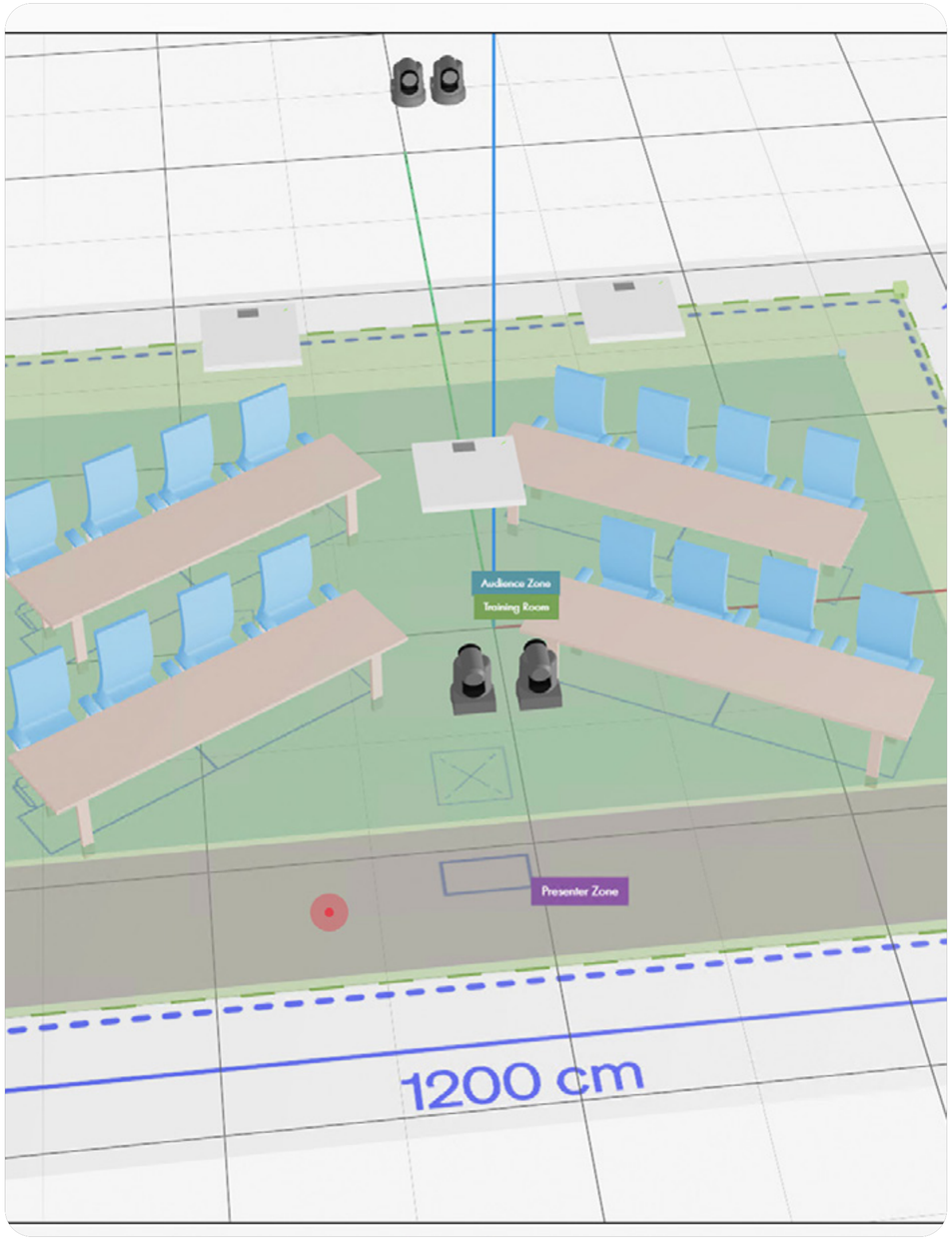
Using the coordinates sent from beamforming ceiling microphones, VisionSuite pinpoints speaker locations in 3D space, automatically moving cameras to frame the active speaker.

When multiple microphones are in use, VisionSuite consolidates audio data into a single unified understanding for the entire room, improving accuracy by triangulating coordinates from multiple sources. When combined with an overview camera's vision stream, audio coordinates are matched with the visual locations of participants for enhanced framing and persistent speaker localization.

VisionSuite then translates these coordinates into optimal camera shots, to frame the active speaker without the need for pre-configured presets.

With the addition of Voice Activity Detection, VisionSuite requires speech to initiate camera switching so that incidental noise doesn't trigger camera movements. Configurable logic then allows for smooth transitions that follow the conversation naturally.

VisionSuite also implements Frame Verification (beta). After a camera has 'landed' on an active speaker, it can use vision to verify if a person is indeed in the frame. If the shot has no people, it will suspend the camera switch and show the 'home' position instead.



Presenter Spotlight

Presenter Spotlight enables truly hands-free presentations, following presenters autonomously.

Thanks to computer vision algorithms, VisionSuite delivers predictive and robust presenter tracking that keeps up with the presenter's movements, even in complex use cases where presenters may face away, cross each other, walk behind furniture, or move quickly.

With full-body recognition and adaptive shots, VisionSuite creates unique IDs for every person based on facial features, hair, clothing, height, and more; making sure the 'VIP' is always kept in frame. Visual detections can also be fused with audio detections for advanced room awareness.

Trigger Zones and Tracking Zones enable responsive spaces that can automatically switch cameras, adjust lights, or power on displays as presenters enter and leave zones.

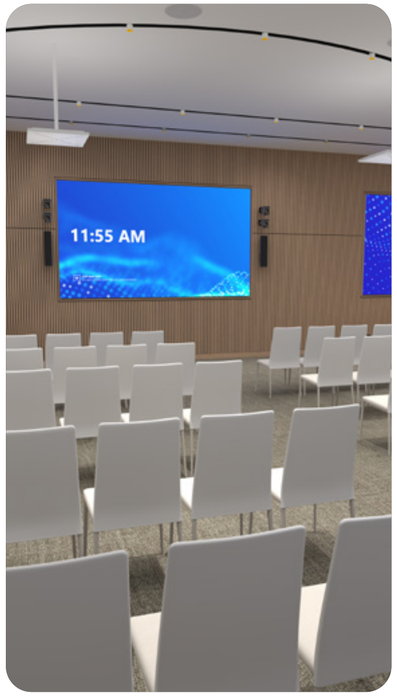
SECTION

2. Room Design

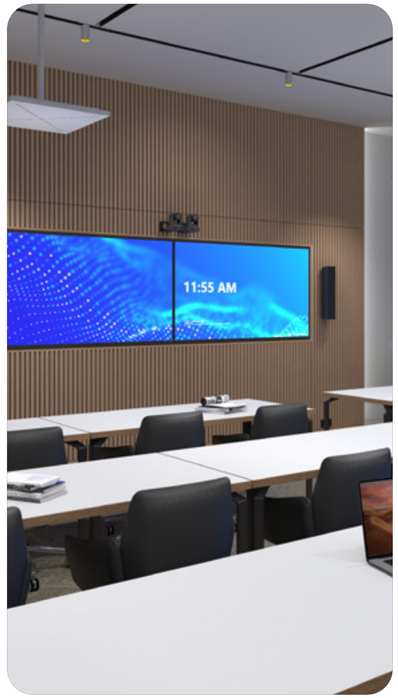
Intelligence for High-Impact Spaces

VisionSuite is perfect for medium and large high-impact spaces with requirements for multiple cameras, where closer camera shots and an immersive hybrid collaboration experience are a must-have.

Our flexible solutions can meet the needs of any complex use case and room type with requirements for active speaker framing, presenter tracking, and room automation.

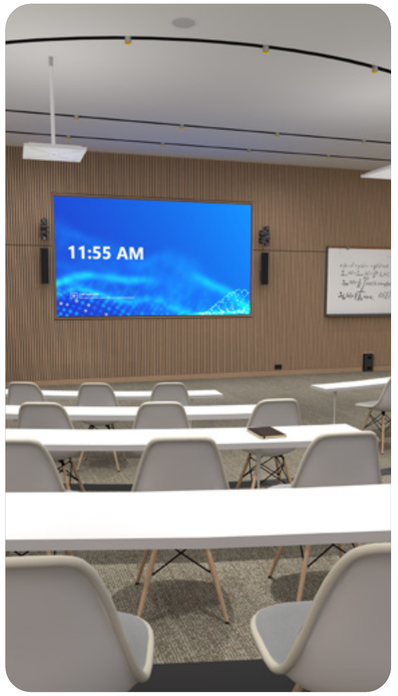


ALL-HANDS SPACES



TRAINING ROOMS

BOARDROOMS



LECTURE HALLS
(tiered seating not supported)

DIVISIBLE ROOMS
(coming soon)

VisionSuite Quick Facts

These are the current VisionSuite specifications as of 10.4.1

Number of cameras supported: 14 Speaker Spotlight and 2 Presenter Spotlight/Conductor cameras

Number of ceiling microphones supported: Up to 8 (Shure MXA920 / Sennheiser TCC2) per room

Number of VisionSuite rooms supported: 1 VisionSuite room per Core / Q-SYS Design

Maximum presenter tracking distance: 23m / 75ft (NC-20x60 at Half Body shot)

Minimum camera distance: 2m / 6.5ft

Recommended active speaker distance from mic: 3m / 10ft

Recommended Core: Core 24f or better

NOTE:

The recommended maximum distance from the microphone to the active speaker is measured as a direct diagonal line, not the horizontal distance shown on a floorplan. Therefore, at the maximum mounting height of 3.6m / 12ft, you can lose close to 20% of the effective floor coverage.

TIP:

As the VSA-100 tends to produce a high-pitch noise and requires adequate ventilation, ensure to place the VSA-100 in a purpose-built server room instead of inside a credenza rack or lectern in the room.

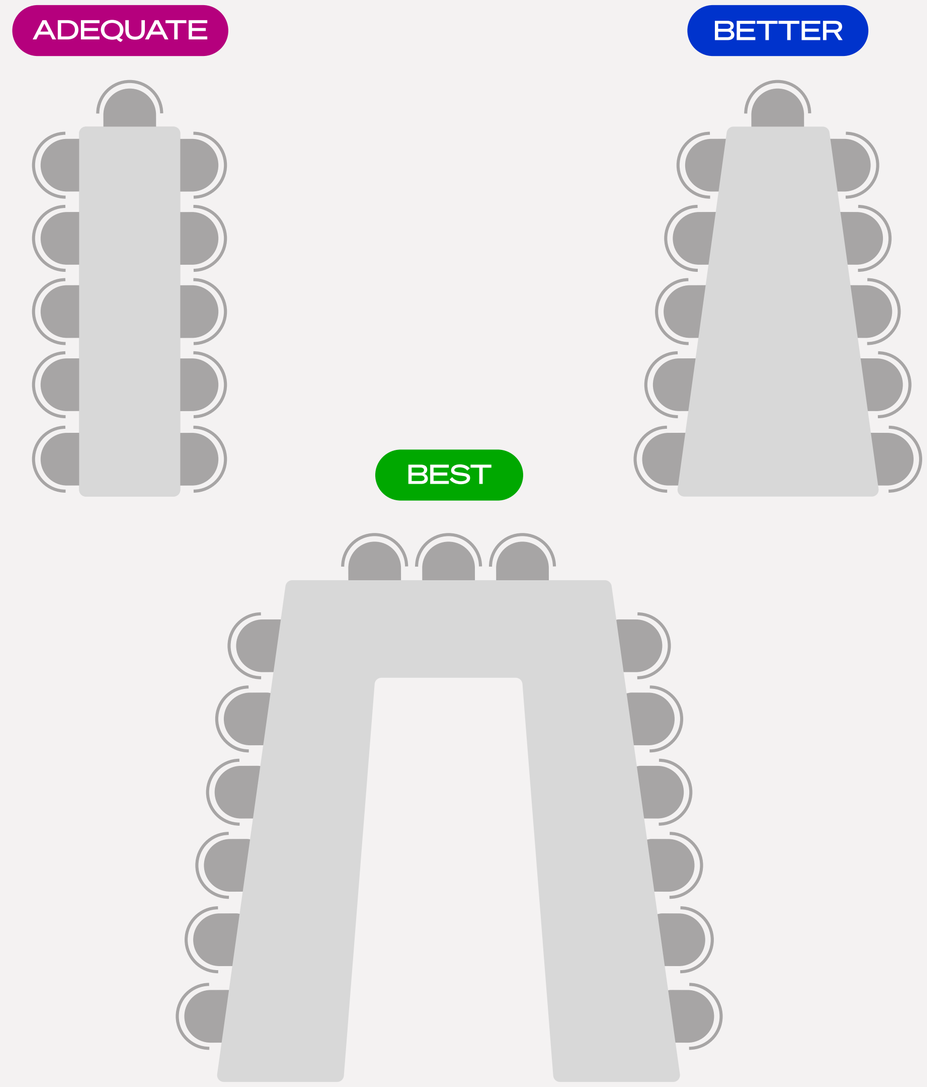
Layouts and Furniture

Always start by understanding the user’s needs and the use case within a given room. This will help to dictate the room dimensions and the furniture layout to optimize it for the desired experience.

In conference rooms, trapezoidal, V-shaped, or U-shaped meeting tables that allow for optimal viewing angles and better interaction with far-end participants can go a long way in aiding camera placement decisions.

These layouts help to orient participants around the screen, especially when tables are tapered to facilitate camera angles.

When choosing meeting tables, we recommend **80 cm / 30-in** of seatway between each user around a table. This way, the audio coordinates of different participants will be easier to distinguish.

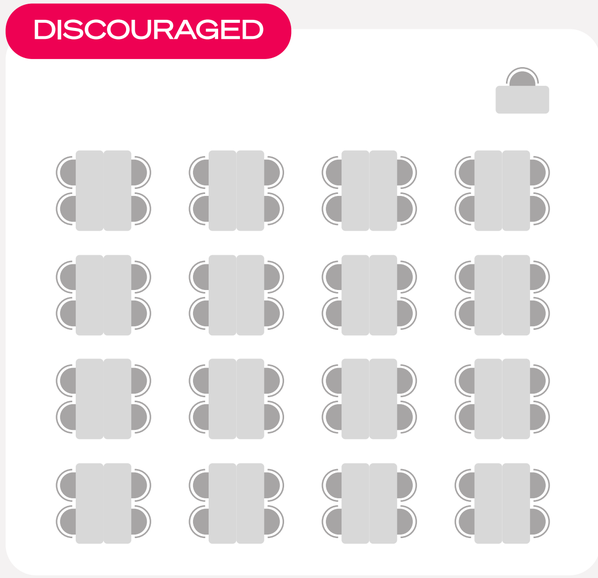


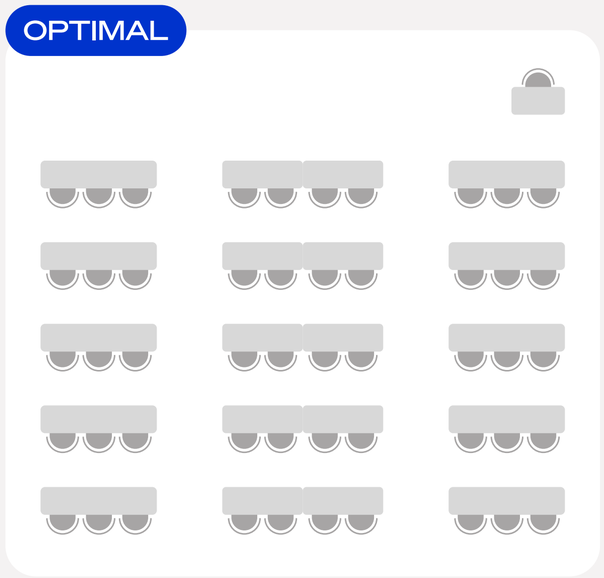
Layouts and Furniture

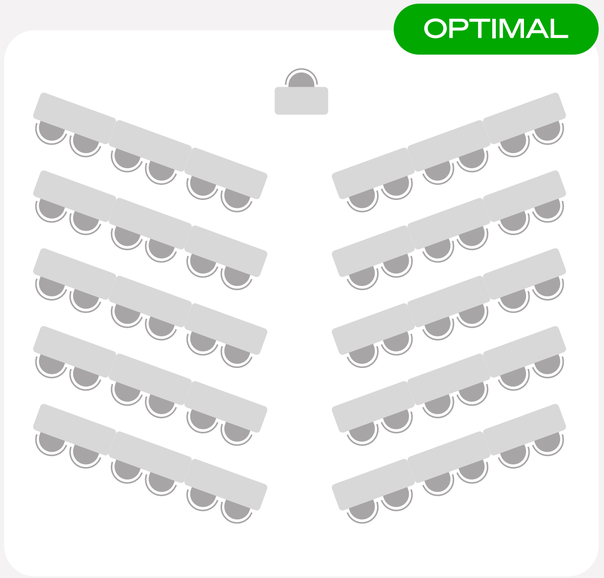
In classrooms, lecture halls, and auditoriums, seating density and orientation also matter. In these room types, expect Speaker Spotlight shots to capture 2-3 adjacent participants when framing audience questions.

Forward-facing arrangements (e.g. theater style, chevron) will help to naturally direct participants toward frontal cameras. In contrast, pod-style layouts or group tables are discouraged as they'll often result in back-of-head or side-profile shots.

In multipurpose spaces with flexible seating, you'll want to leverage furniture on wheels to make it simpler to change layouts. For these spaces, camera and microphone placements should be optimized for the primary use case and most frequent layout, not compromised in an attempt to serve all scenarios equally.







Room Control

The primary native control mechanism for VisionSuite is done via room configurations.

Most control needs can be met by creating different configs (e.g. for different layouts/use cases) and exposing a config selector on a UCI to switch between them.

CONTROL CAPABILITY	NATIVE CONTROLS INTERFACE	LUA SCRIPTING
Switch between Room Configurations	✓ Control pin available	✓
Global manual bypass (stop all automation)	✓ Toggle in Controls Interface	✓
Change camera Roles (e.g. Presenter to Speaker Spotlight)	✗ Change via Configs only	✗
Recall a shot or camera position	✗ Change via Configs only	✗
Stop tracking on a specific camera	✗ Change via Configs only	✗
Enable/disable individual zones	✗ Change via Configs only	✗
Enable/disable individual rules	✓ Input control pins available	✓
Receive zone activity events or rule states	✓ Control pin LED available	✓

Limitations of VisionSuite

As of Q-SYS Designer 10.4.1 VisionSuite does not support:

More than one VSA-100 per Q-SYS Design/ Core or more than one VisionSuite Designer component per Q-SYS Design. Redundant Cores are also not supported.

Core 24f or better is recommended for running VisionSuite. Core Nano, Core 8 Flex, NV- 32 (Core Mode) and Core 110f are not recommended.

To ensure optimal performance, avoid using the Core's built-in USB bridging as it will introduce additional system load.

More than one VisionSuite room per Q-SYS Design (e.g. divisible rooms).

Multiple layouts (configs) per room are supported.

Divisible Rooms or multiple VisionSuite rooms per design can be delivered via the Legacy VisionSuite plug-ins (ACPR and Seervision).

Other microphones beyond the Shure MXA920 or Sennheiser TCC2.

e.g. Sennheiser TCCM, AudioTechnica ATND1061, Discrete Microphones, etc are not supported with VisionSuite Designer.

These are still compatible with the Automatic Camera Preset Recall (ACPR) plug-in.

Voice lift or voice reinforcement is generally not recommended in combination with VisionSuite as shot accuracy may degrade. If used, additional considerations will be necessary to ensure it is properly configured to avoid unwanted camera switching.

SVs1 and SVs4 are not compatible with VisionSuite Designer.

The Legacy VisionSuite solution must be used.

Q-SYS Reflect integration is limited to observing system health statuses. It does not yet support pushing designs nor accessing VisionSuite Designer via Reflect.

Tiered seating room layouts or microphones placed at different heights on sloped ceilings.

SECTION

3. Microphones and Acoustics

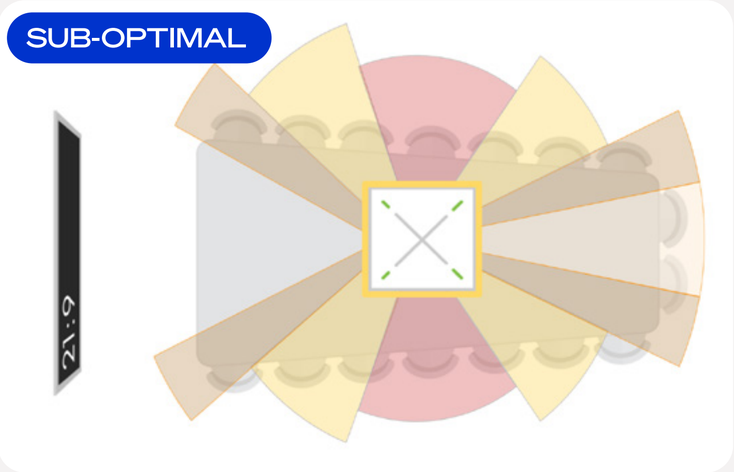
Microphone Placement

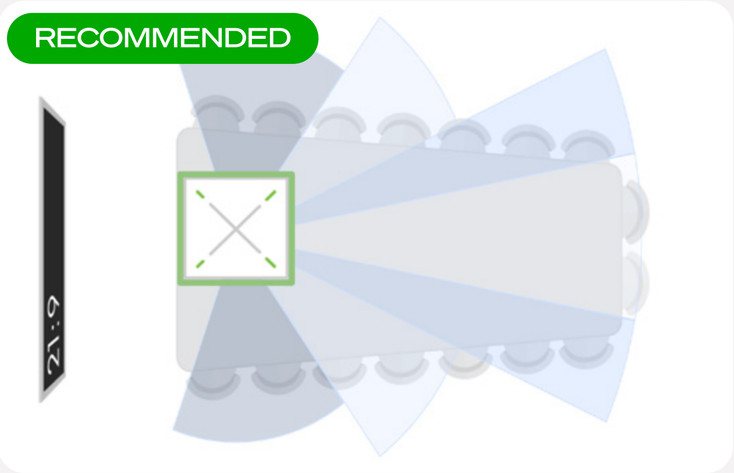
Correct microphone placement ensures full coverage and minimizes false-positive audio triggers.

The Shure MXA920 and Sennheiser TCC2 that VisionSuite supports both have a coverage area of 9 x 9 meters (30 x 30 ft). However, audio coverage and coordinate accuracy are not the same thing. A microphone can pick up a voice at the edge of its coverage zone without reliably knowing the coordinates of where that voice is coming from.

Talker localization accuracy will degrade sharply toward the edge of the coverage area. While a speaker at 9m / 30ft may still be heard clearly, their reported coordinates will not be precise enough for a reliable shot. For VisionSuite deployments, plan microphone placement around accurate localization range, not maximum audio range.

Microphones should ideally be placed in the front third or two-thirds of the room; where in-room participants speak toward, which is usually where the presenter or displays showing the far-end are located. This also avoids situations where the nearest microphones to a talker could be behind them.





Microphone Distance

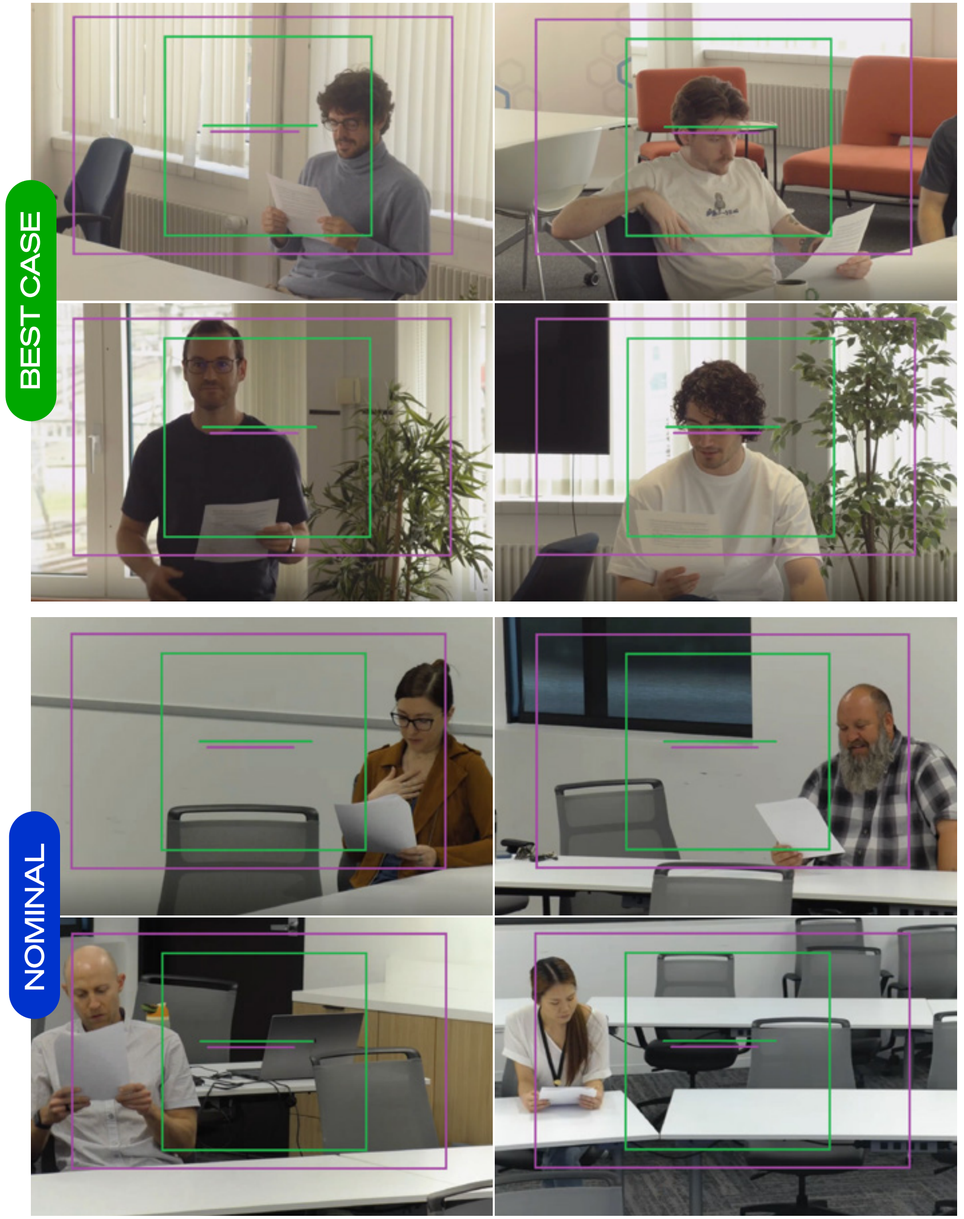
Talker localization accuracy degrades with distance from the microphone, and VisionSuite's Speaker Spotlight framing is only as precise as the coordinates it receives. Microphone distance from the active speaker is one of many variables including acoustics, reflections, and the direction active speakers face affecting talker localization accuracy.

The distances below are measured as the diagonal distance from the talker's mouth to the microphone, not the horizontal floor projection. Plan your microphone placements around these figures.

	Recommended Maximum Distance[1]	Maximum Microphone Distance[2]
SHURE MXA920	3m / 10ft	5m / 16ft
SENNHEISER TCC2	3m / 10ft	5m / 16ft

[1]The distance within which talker coordinate accuracy is reliable and camera framing performs as expected.

[2]The furthest distance at which usable coordinates can still be resolved without significant degradation.



Microphone Height

Keep in mind that the higher a microphone is mounted, the closer the talkers will have to be to the microphone to get accurate framing. For Speaker Spotlight, make sure to follow the recommended floor-to-microphone mounting heights for accurate speaker locations. A higher mounting height will mean that locating talkers further away from the mic will be more difficult and result in more framing inaccuracies.

	Recommended Microphone Height	Maximum Microphone Height	Minimum Microphone Height
SHURE MXA920	2.7-3.3m / 9-11ft	3.6m / 12ft	2.3m / 7.5ft
SENNHEISER TCC2	2.5-3m / 8-10ft	3.6m / 12ft	2.5m / 8ft

NOTE:

Round microphone models are supported but don't perform on-par with square models. The round chassis tends to amplify data inaccuracies like reflections, positional drift, and localization inaccuracies.

TIP:

Both models offer various mounting options to lower the microphone in rooms with high ceilings. For example, the Sennheiser TCC2 can be suspended up to 5m / 16ft from the ceiling using the optional suspension kit.

Microphone Differences

It’s important to note the differences in functionality between the MXA920 and TCC2.

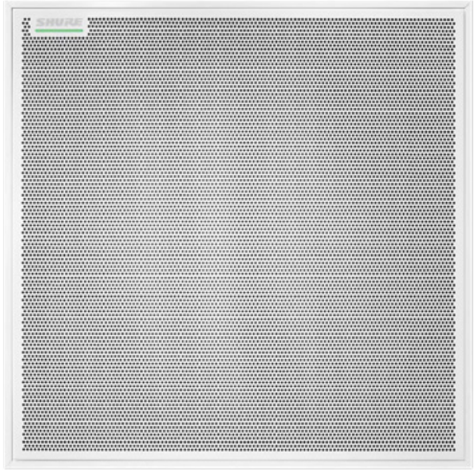
The Shure MXA920 provides 8 dynamic beams that can independently report speaker positions. This allows it to send multiple speaker locations simultaneously and quickly switch between active speakers, allowing VisionSuite to keep up even in lively group discussions.

The Shure MXA920 also reports talker height data in the Z axis, helping VisionSuite to aim the cameras for standing participants speaking. Since Z axis data is oftentimes still unreliable, we nevertheless recommend fixing the speaker height within VisionSuite Designer (even when using the MXA920) to achieve the best results.

The Sennheiser TCC2, by design, uses a single dynamic beam which automatically aligns to the position of the person speaking. This means that when multiple participants speak simultaneously, the TCC2 will report the position of the loudest speaker, instead of reporting multiple speaker locations. This also means the TCC2 takes longer to identify and report a new speaker location, as it has to finish moving its beam first before publishing a speaker’s location.

The TCC2 **does not** provide height data in the Z axis. This means that in VisionSuite Designer, users must configure a fixed height (e.g. seating height ~1.4m). With an audience-facing conductor camera, setting a fixed height is not necessary.

RECOMMENDED



Microphone Differences

Make sure to follow the manufacturer's latest active speaker framing guidelines for improved accuracy. For example:

SHURE SOURCE

If you need to frame 1 active speaker at a time, set things up so that the microphone is no more than 3 meters (10ft) from the different speaker positions. The MXA920 performs with active speakers that are up to 4.9 meters (16ft) from the microphone, but moving closer is necessary for coordinate accuracy if single-talker framing is desired.

Also, position participants so that they talk no more than 60-90 degrees off-axis facing away the microphone.

When using multiple MXA920s and wanting to leverage Shure's 'Optimize Tracking' feature, install microphones no further away than 3.6m (12 ft) from each other, ensuring the status LED is in the same position on each mic.

SENNHEISER SOURCE

For larger spaces requiring multiple TCC2 units, the distance between units should not exceed 7 meters (23 ft) to ensure proper coverage overlap. This creates approximately 1-2 meters of overlap for continuous coverage.

NOTE:

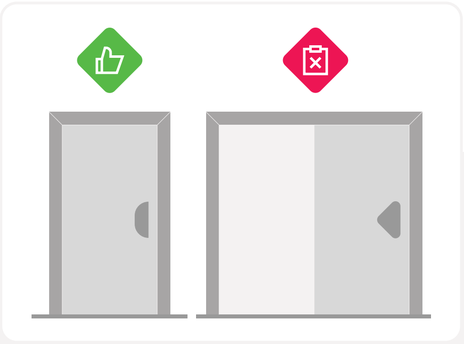
Do not mix and match microphone models in VisionSuite rooms. Mixing different models (e.g. TCC2 and MXA920 in the same room) will cause unpredictable performance due to different coordinate reporting methods.

Optimizing Audio Coordinates

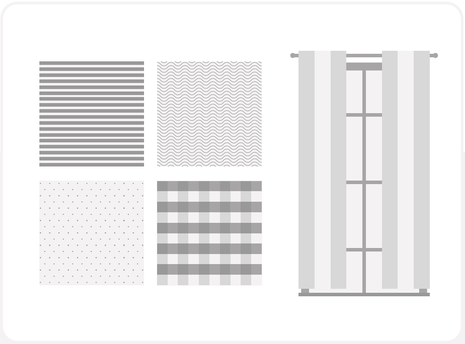
Room acoustics play a critical role in ensuring the audio location information is as accurate as possible.

The better the quality of the positional data received from the ceiling microphones, the fewer errors will occur when triangulating coordinate positions of active speakers.

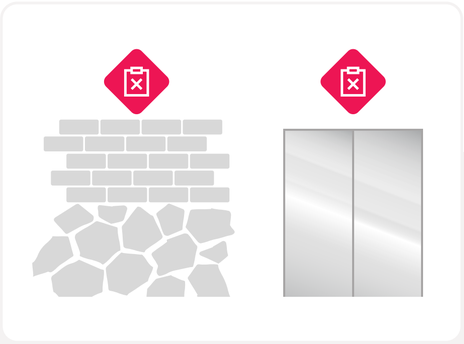
Below some recommendations to optimize reverberant rooms with echo, reflections, and other noise sources:



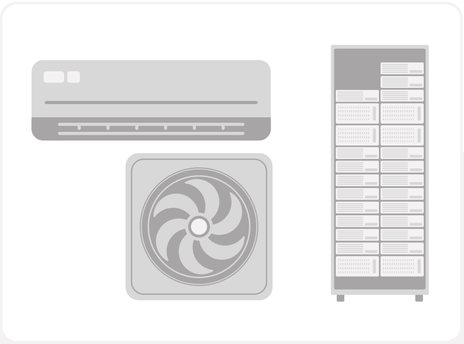
avoid sliding doors and close all windows



use acoustic panels, carpeting, and curtains



minimize acoustic reflections from glass, metal, and hard wall surfaces



minimize static noise from HVAC or server racks

NOTE:

While the VAD built into VisionSuite will differentiate between speech and noise to mitigate false switches, it will not perform noise suppression, nor will it enable VisionSuite to function reliably in environments with continuous high ambient noise levels or persistent acoustic interference.

Optimizing Audio Coordinates

The interpretation of direction of arrival (DoA) data provided by beamforming ceiling microphones is more sensitive to the acoustic performance of the space. The room itself may sound great, but as these microphones are installed in the ceiling, we need to consider what impact that may have on the DoA data.

Minimizing acoustic reflections is critical for accurate coordinate detection. Reflective surfaces interfere with precise speaker localization and should be treated appropriately. We strongly recommend engaging with an acoustical consultant to properly assess and address acoustic reflections in VisionSuite rooms.

To ensure accurate coordinate audio data, reverberation time (RT60) should not exceed a maximum target level of 0.6-0.8s. Aiming for an ideal range between 0.3 to 0.5 seconds will however provide the best performance.

Background noise should also not exceed NC-35 or 35–45 dBA SPL to ensure optimal microphone performance and accuracy in speaker tracking, assuming a normal speaking voice is about 70dB SPL A-weighted.

An optimal signal-to-noise ratio to aim for is 30dB, with a minimum target being 20dB. This is measured from the microphone's perspective.

RECOMMENDATIONS:

Minimum microphone distance from loudspeakers: 1.2m / 4ft or 3m / 10ft from high SPL loudspeakers
Minimum microphone distance from HVAC: 1.2m / 4ft

SECTION

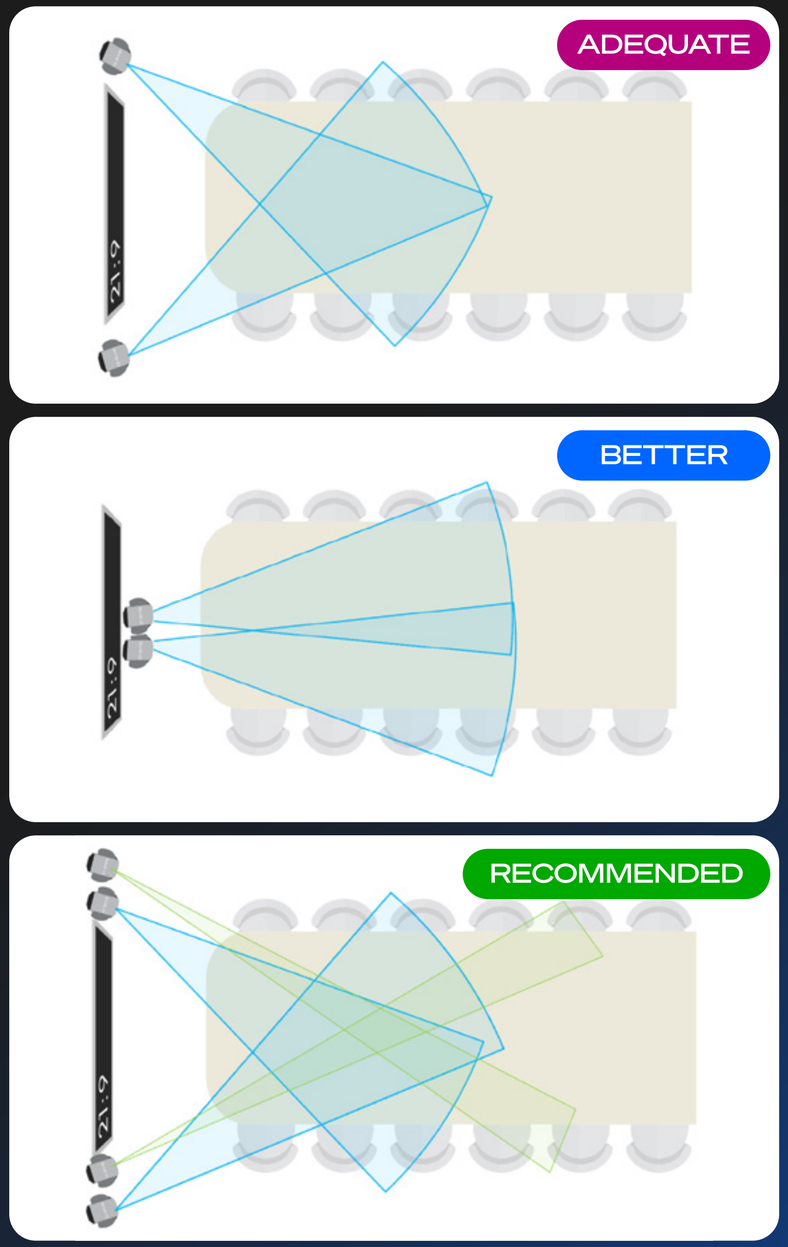
4. Camera Guidelines

Camera Placement

For VisionSuite Speaker Spotlight, a rule of thumb is to have at least one PTZ camera dedicated to each seating area where participants are positioned. In the case of a conference room, this would mean at least a camera dedicated to each side of the table, preferably covering participants diagonally to achieve more frontal shots.

To eliminate distracting camera movements between adjacent speakers on the same side of the table, we recommend using at least two NC Series PTZ cameras per ‘Speaker Zone’. This enables the secondary camera to move before switching the feed, ensuring smooth transitions.

Make sure primary and secondary cameras are as close to each other as possible for a consistent far-end shot experience.



NOTE:

Cameras must be placed in static locations. Mounting them on furniture with wheels, or moving them in any way will undo the calibration.

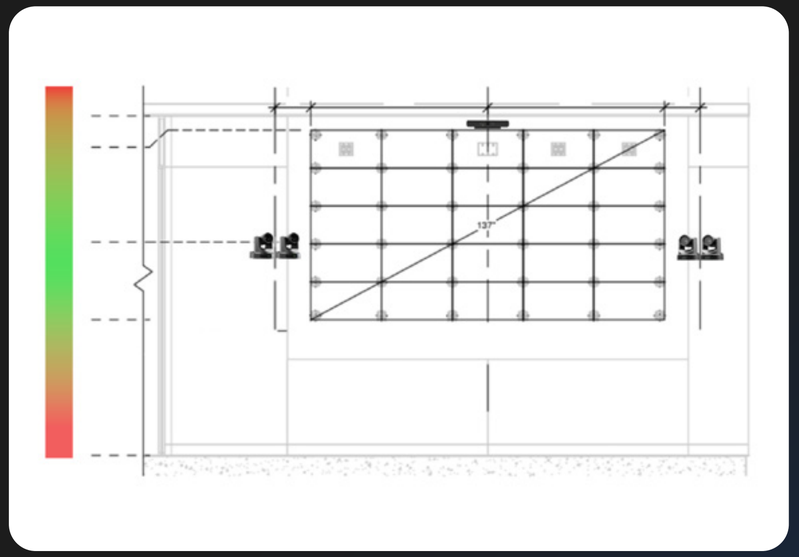
A notable exception are motorized lifts, which are fine as long as the cameras always return to the exact same position in which they were originally set up and calibrated.

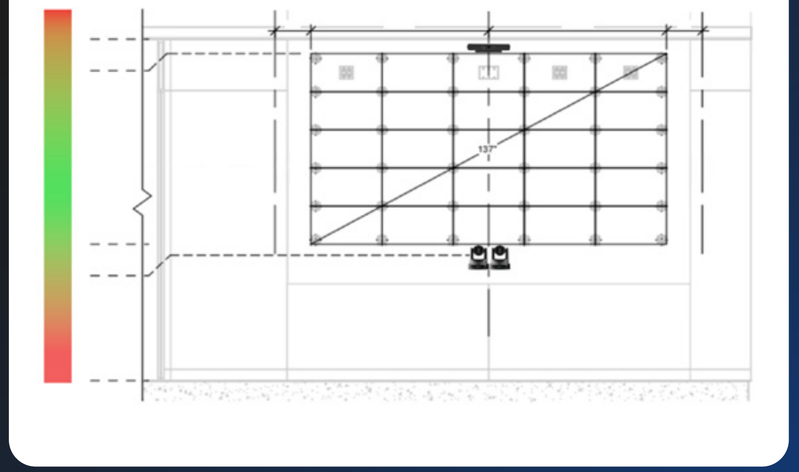
Camera Placement

Placing cameras in the direction where participants look is fundamental. We recommend placing cameras below or next to displays so that participants naturally look in the direction of the cameras when they speak to the far-end participants.

For Speaker Spotlight, camera height should prioritize two factors: approximating eye-level perspective when possible, and maintaining unobstructed sightlines to all participants. In collaboration spaces without a presentation area, this often means mounting cameras at the eye level of seated participants.

In larger presentation environments like lecture halls or all-hands spaces, cameras may need to be positioned higher to prevent presenters from blocking the audience view and to provide adequate coverage of different seating arrangements.





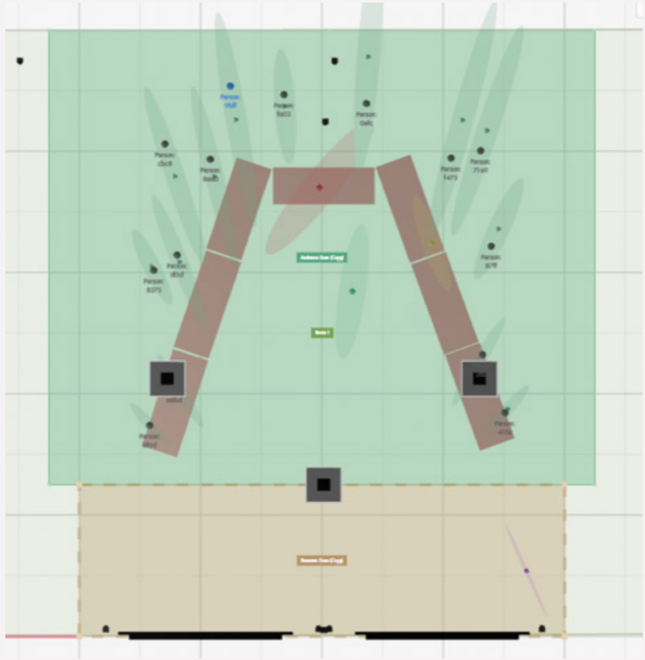
TIP:
Add an audience-facing overview camera (e.g. NC-90-G2) to provide a ‘silence’ overview shot.

Enhancing Speaker Spotlight

We **strongly recommend** using an audience-facing conductor camera in Speaker Spotlight applications.

This dedicated camera will aid in improving room awareness, providing a contextual understanding of participant's locations within the room, and enhancing speaker location confidence when fused with the audio coordinate data.

However, this conductor camera is limited by depth and only practical in rooms where participants are no further away than the max camera distance. The horizontal FoV should also be accounted for, as wider rooms may have participants sitting outside of the camera's periphery resulting in degraded performance for those at the edges.



NOTE:

Presenters will have to be excluded by Tracking/Exclusion Zones if their detections are in the FoV of the audience-facing conductor camera.

TIP:

There will be a noticeable difference in Speaker Spotlight performance of systems with and without an audience-facing conductor camera. Using Speaker Spotlight without it will mean that when a person stops talking, their detection will eventually disappear in VisionSuite, producing less centered shots and more frequent camera switches.

Maximum Room Size

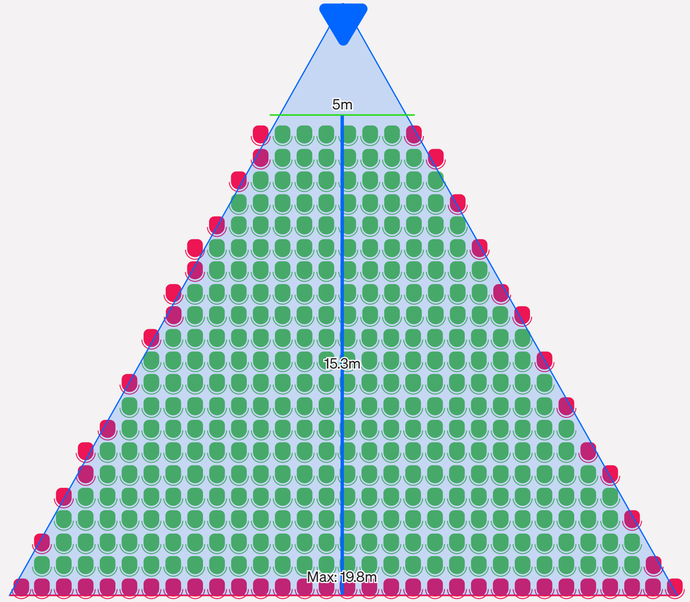
VisionSuite has no single maximum room size. Room dimensions are constrained by several interdependent variables, and a room can be unsuitable not because it is too large, but because a specific limiting factor has been exceeded.

Three constraints dictate whether a room can be reliably covered:

Microphone localization range
Every speaker/seat must fall within 5m / 16ft (diagonal) of a ceiling microphone. With a maximum of 8 microphones per room, this is the primary constraint on total footprint.

Distance from the camera
Every camera also has its unique focal length and can only zoom in up to a certain point. The maximum distance for a participant from a camera for accurate Speaker Spotlight detection is 30m / 98ft at most.

Conductor camera participant limits, FoV & depth
For optimal performance when detecting speakers, VisionSuite can fuse audio data with vision data to improve localization accuracy. However, the various NC Series cameras have different FoVs and different supported room depths at which people are no longer detected with vision. Audience participants seating outside of the camera's FoV or beyond its max depth will not benefit from vision-assisted localization.



CONDUCTOR CAMERA COVERAGE VISUALIZER

Audience Size & Participant Limits

Due to the vision resources consumed when identifying and matching participants across camera streams, at the moment, VisionSuite can only reliably detect and process a finite number of person detections simultaneously.

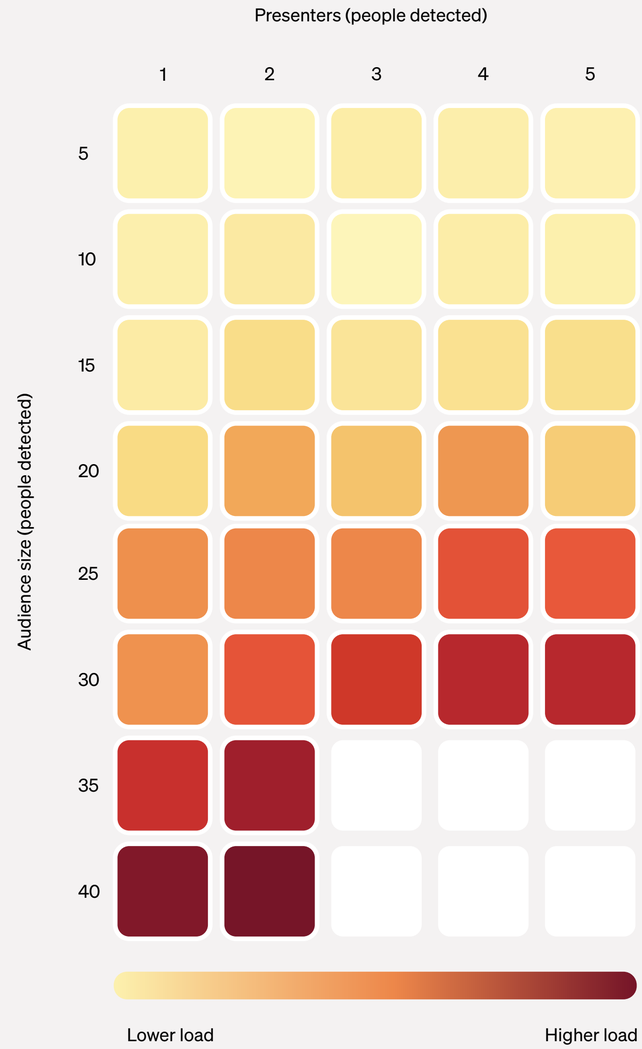
These limits apply when: 1) using a conductor camera or 2) a presenter tracking camera

Recommended Participant Limits

Conductor vision stream: up to 25 audience members
Tracking vision stream: up to 5 presenters on stage
Maximum: 30 people (up to 25 audience members and 5 presenters)

This limit pertains to valid detections only. Any detections ignored by Exclusion Zones or a Tracking Zone are **not counted** as part of the participant number limit.

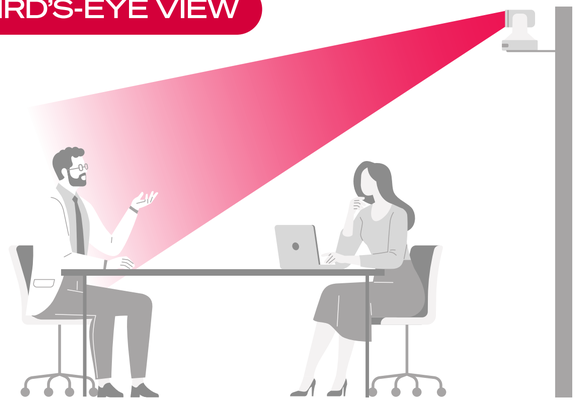
These zones can help to exclude back rows, participants on displays, glass walls, or any other area that with unwanted detections.



Camera Placement

It is important to strike the right balance in terms of camera height. The higher your cameras are mounted, the more unnatural their perspective will look. However, cameras need to be high enough to provide clear lines of sight for unobstructed views of participants.

BIRD'S-EYE VIEW



TOO LOW

OPTIMAL PLACEMENT

NOTE:

If there will be a presentation area at the front of a room, it is best to avoid:

- Positioning audience-facing cameras at hip-height to avoid the presenter blocking the camera's view when presenting
- Installing floor-to-ceiling displays, mirrors, or LED walls behind presenters to avoid false detections
- Having glass walls or open areas behind the presenter where background detections could interfere with tracking

Camera Roles

VisionSuite supports different camera roles within VisionSuite Designer depending on the automation functionality desired. Understanding each camera role is therefore essential to delivering a room's requirements.

Vision-Driven Cameras:

Their logic is controlled based on computer vision identification and/or visual event triggers. These cameras can host Trigger Zones, Exclusion Zones, and Tracking Zones.

Presenter Tracking Camera:
Follows a presenter autonomously using full-body recognition and predictive control. [1] [2] [3]

Conductor Camera:
A static camera that gives VisionSuite spatial awareness of a fixed area. It detects participants in its view and feeds that data to the rest of cameras, directing their behavior based on what they cannot see. [1] [4] [5]

Audio-Driven Cameras:

Their movement and switching is triggered by audio activity in Speaker Zones.

Speaker Camera:
Points at active speakers dynamically using the audio coordinates from ceiling mics. [1] [2] [3]

Static Cameras:

Can be triggered by vision events or audio events, and are not powered by any intelligence.

Content Camera:
Dedicated static camera used for close-up shots of whiteboards or other content [1] [2] [4] [5]

NOTE:

Recommended models per camera role: [1]NC-12x80, [2]NC-20x60, [3]NC-Pro15x, [4]NC-90, [5]NC-110

Supported Use Cases

VisionSuite supports a wide range of automation scenarios. The examples below cover the most frequently deployed VisionSuite use cases. Most rooms will likely combine two or more use cases, with the use cases below representing the most common starting points:

	Single Presenter	Multi-Presenter[1]	Vision Triggers	Room Automation
VISION-DRIVEN	**Presenter Tracking** When a presenter enters a pre-defined Trigger Zone, the camera follows the presenter autonomously using full-body recognition.	**Multi-Presenter Handover** A conductor camera monitors the stage. When 2+ people are detected, the tracking camera zooms out to a wide view. When one presenter remains, tracking resumes.	**Content Switching** The presenter enters a defined (e.g. whiteboard) zone and the feed switches to a dedicated content camera, then back to the tracking camera when the presenter leaves the zone.	**Cameras as Sensors** Presence in Trigger Zones can control connected systems such as spotlights, lecture recordings, turning on displays, voice lift, or unmuting microphones.
	Single Camera	**Primary/Secondary**	**Preset-Based**	**Cross-Talk**
AUDIO-DRIVEN	**Active Speaker Framing** One camera dynamically points at the active speaker using real-time coordinates, showing movements live. Shots are created based on the speaker's location.	**Speaker Spotlight** Pairs of cameras cover each zone, masking live movements. Cameras dynamically point at the active speaker using real-time shots based on audio coordinates.	**Audio-Triggered Presets** Audio activity in a zone triggers a predefined preset rather than a dynamically framed shot, perfect for the chairman seat or for fixed, predictable layouts.	**Multi-Speaker Framing** When multiple participants speak simultaneously, VisionSuite can widen the shot to frame the cluster. Also, during silence or far-end speech, an overview shot can be triggered.

[1]Not supported at 10.4.1 yet

Camera Placement

When placing cameras for presenter tracking with Presenter Spotlight, ideally they should be centered on the presentation area, and not skewed to one side. This will help to provide frontal shots and simplify Trigger Zone, Tracking Zone and Exclusion Zone shapes. Also make sure that no columns, pillars, or large furniture are in the way, blocking the view of wherever the presenter might move.

Our maximum and recommended camera distances for accurate computer vision identification are below:

	Recommended Distance for Presenter Tracking (HALF BODY SHOT OR WIDER)	Recommended Distance for Conductor (NO OPTICAL ZOOM)	Maximum Distance for Computer Vision
NC-12x80	10-15m / 33-49ft	3-15m / 10–49ft	16m / 52ft at 100% zoom
NC-20x60	15-20m / 49-65ft	3-20m / 10–65ft	23m / 75ft at 100% zoom
NC-Pro15x [1]	12-17m / 39-55ft	3-17m / 10-55ft	18m / 59ft at 100% zoom
NC-90-G2 (CONDUCTOR CAMERA ONLY)	N/A	3-10m / 10-32ft	13m / 42ft at 100% zoom
NC-110 (CONDUCTOR CAMERA ONLY)	N/A	2-7m / 7–23ft	9m / 29ft at 100% zoom

[1]Not supported at 10.4.1 yet

TIP:
VisionSuite supports software-definable dynamic camera roles across configurations. This means a camera's role can change from audio-driven to a vision-driven tracking camera when the room config changes.

Lighting Essentials

VisionSuite's computer vision technology works reliably in standard office lighting conditions. However, following these recommendations will maximize camera image quality and optimize the far-end experience.

Illumination

400-500 lux vertical illumination on participants' faces

Color Temperature

4000-5000K for natural appearance

Color Rendering

CRI ≥ 85 for accurate skin tones

Uniformity

Target 0.6 Uo for consistent coverage across the space

Choose flicker-free LED lighting to prevent visual artifacts. Maintaining uniformity ensures all participants appear evenly lit, eliminating distracting bright/dark spots that can affect auto-framing and tracking performance.

Also try to avoid mixing different light sources (i.e. fluorescent lights and LEDs) as their color profiles may vary, and it could diminish the camera's ability to accurately represent colors.

Optimizing Image Quality

To optimize the camera's performance, we also recommend that shades are used on all external-facing windows to stabilize the room's light levels and prevent backlighting or glare, which can affect the image quality.

Bear in mind that current generation of NC Series cameras do not support HDR. As a result, cameras may experience worse tracking performance in front of bright displays or LED walls. Users must decide whether to expose for the presenter's face or expose for the display content, but not both simultaneously.

Consider also using curtains or frosting the glass on any internal windows that may face corridors in order to mitigate Auto Framing inconsistencies, avoid distractions for the far-end, and improve the overall acoustics.

Insufficient lighting also degrades camera image quality significantly. Dimly lit spaces force the camera to increase gain, introducing visual noise and grain that diminishes video quality. Refer to our recommended illumination levels in the previous page to minimize sensor noise and maintain image quality.

In stage applications, ensure that the stage wash cancels any shadows caused by spotlights to prevent false vision detections or triggers that may not be addressed with Exclusion Zones.

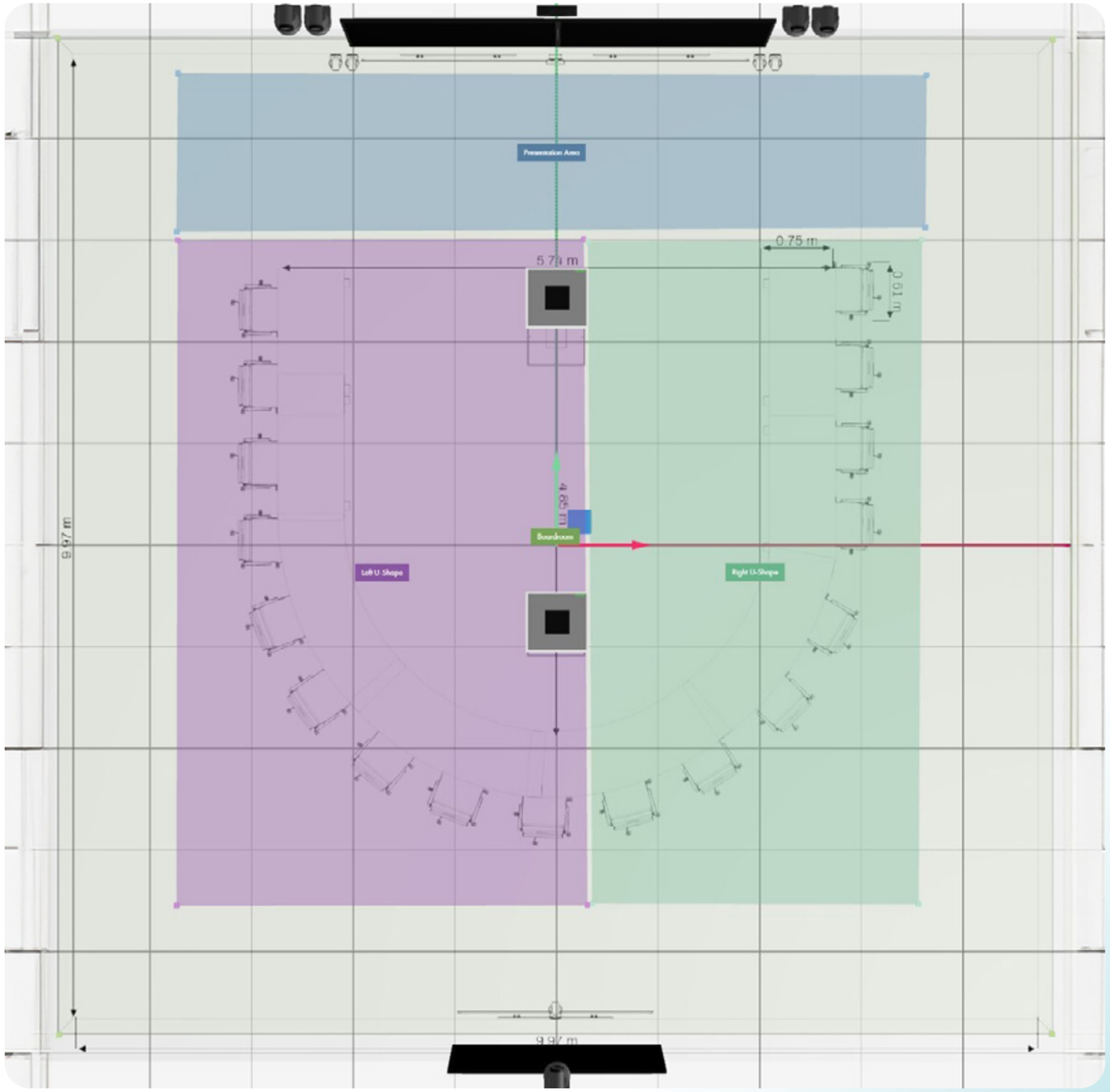
SECTION

5. Room Examples

EXAMPLE

U-Shape

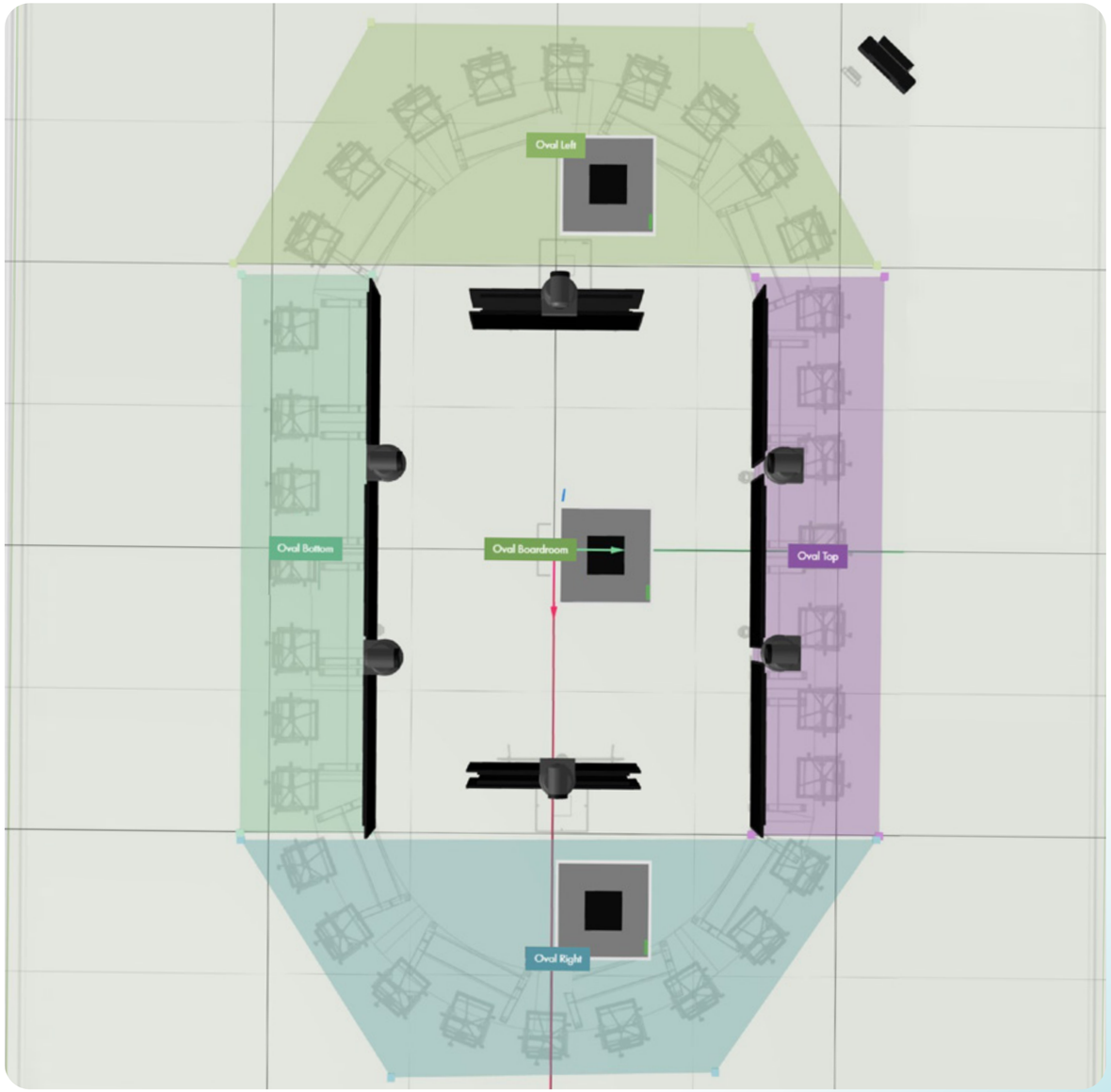
- **Choose the MXA920** if mixed sitting/standing meetings will be frequent (TCC2 lacks Z axis data)
- **Aim for 80cm / 30-in** minimum spacing between seats for accurate speaker coordinate detection
- **Place microphones in the front 2/3rds** of the room where participants naturally speak towards
- **Install cameras covering the table diagonally** for optimal frontal participant shots
- **Place cameras in pairs** to eliminate distracting movements when switching between speakers
- **Add an overview camera** as a ‘home position’ during periods of silence.



EXAMPLE

Oval Boardroom

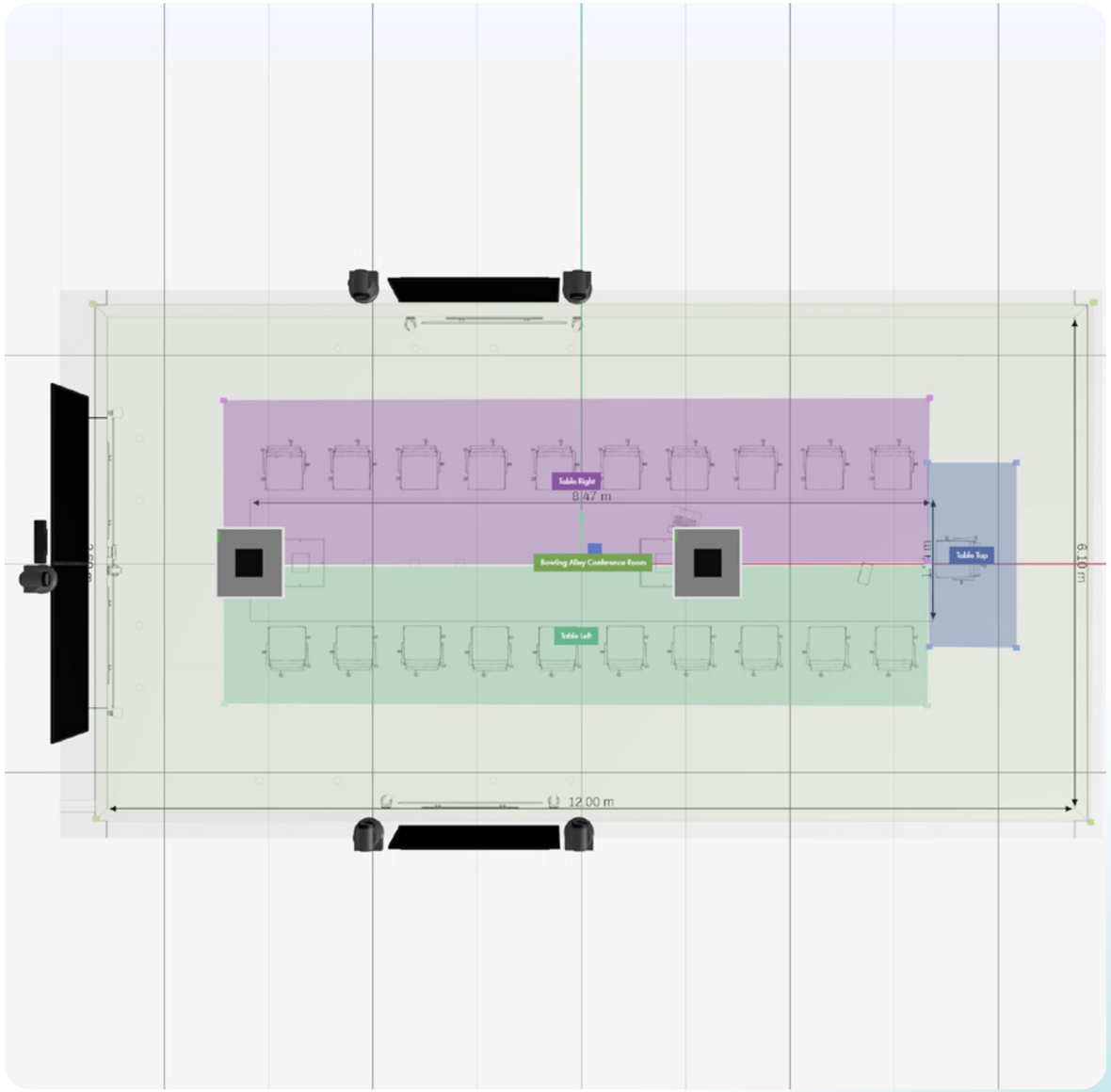
- **Position screens and cameras centrally** in a “campfire” arrangement for direct eye-level contact with the far-end and natural sightlines to all participants
- **Create large speaker zones per table side** rather than small zones for each group of seats to prevent detection jumpiness that delays camera switching
- **Deploy a dedicated microphone for the center** to maintain coordinate accuracy as central speakers can pivot which way they’re facing during conversations
- **Configure fixed zoom values for all cameras** since all cameras share the same distance to participants
- **Mount an overview camera in the room corner** to provide an establishing shot during silence or far-end speaking periods



EXAMPLE

‘Bowling Alley’ Meeting Room

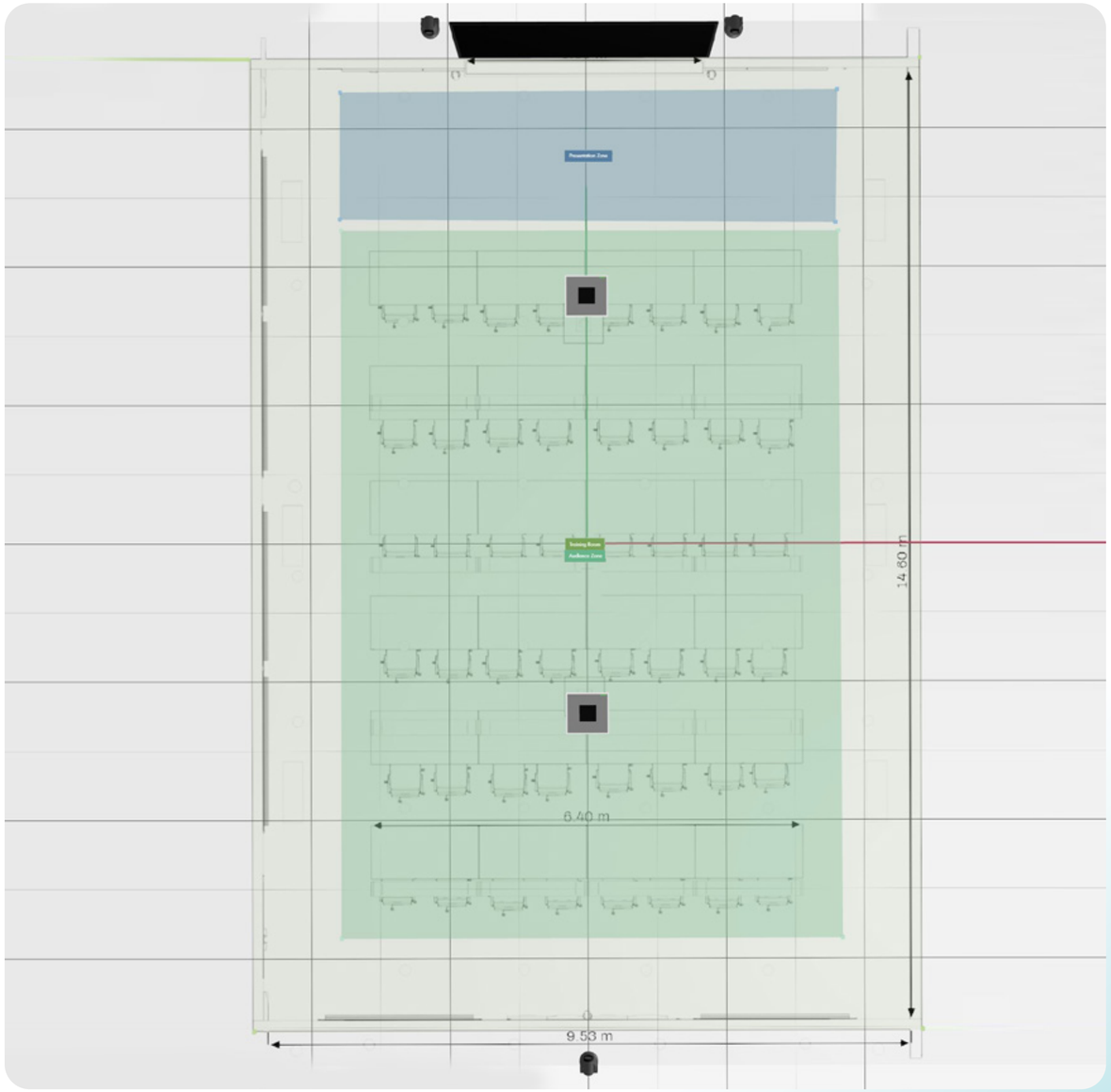
- **Avoid glass walls and control reverberation** to prevent acoustic challenges with audio coordinates
- **For longer spaces, place a dedicated NC-20x60** for framing executive leadership at the head of the table
- **Mount side cameras along long walls** for when participants speak across the table
- **Place side displays next to cameras** to ensure frontal shots when participants speak to the far-end
- **Mount cameras in pairs** to eliminate distracting movements when switching between speakers
- **Choose the MXA920** if mixed sitting/standing meetings will be frequent (TCC2 lacks Z axis data)



EXAMPLE

Training Room

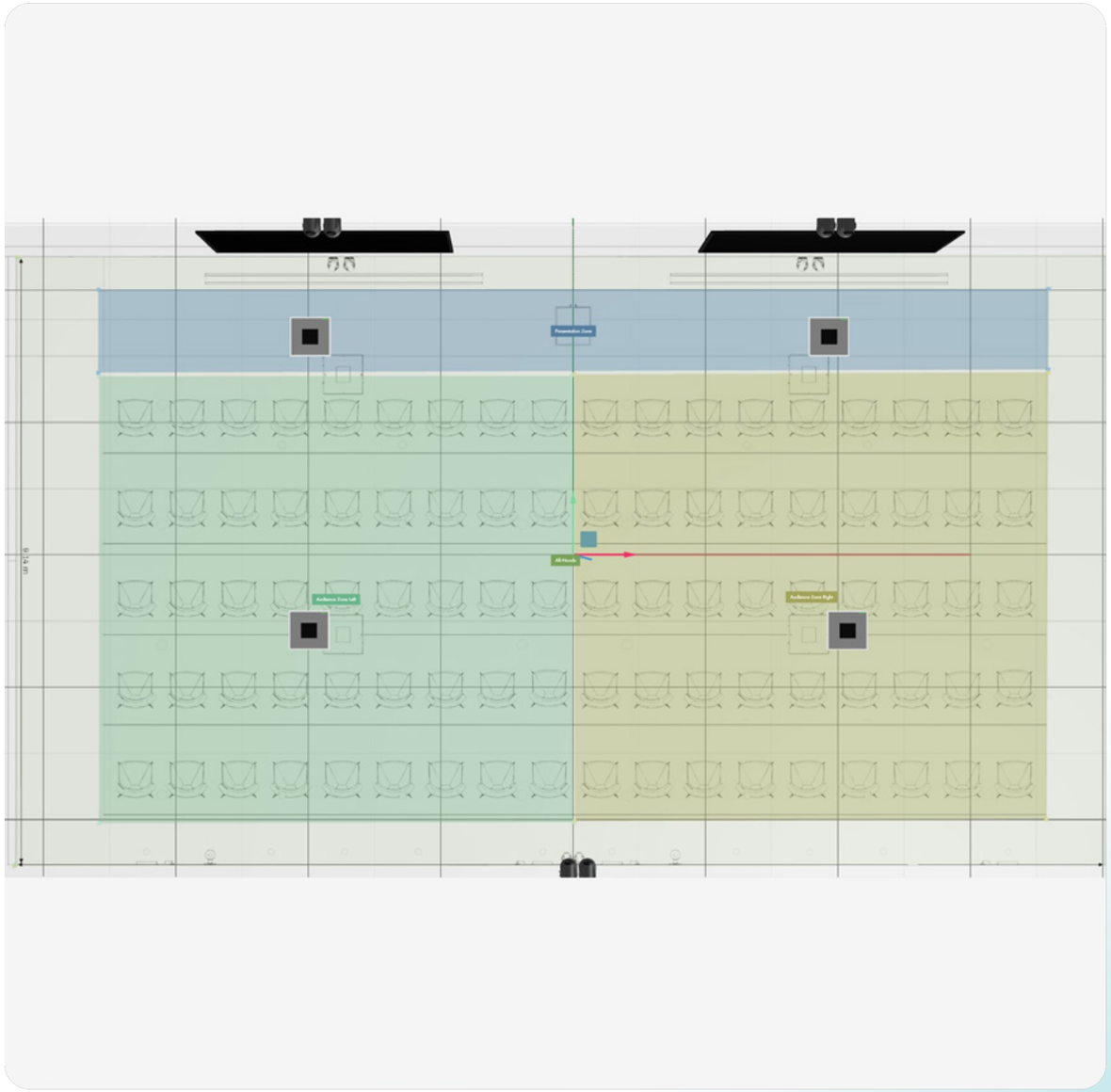
- **Create one large audience zone** to accommodate flexible seating layouts
- **Verify presenter tracking camera** stays within the maximum recommended distance
- **Switch between teaching modes,** defaulting to Presenter Spotlight for trainings, and activating Speaker Spotlight with a simple button press to open up for student Q&A participation



EXAMPLE

All-Hands Space

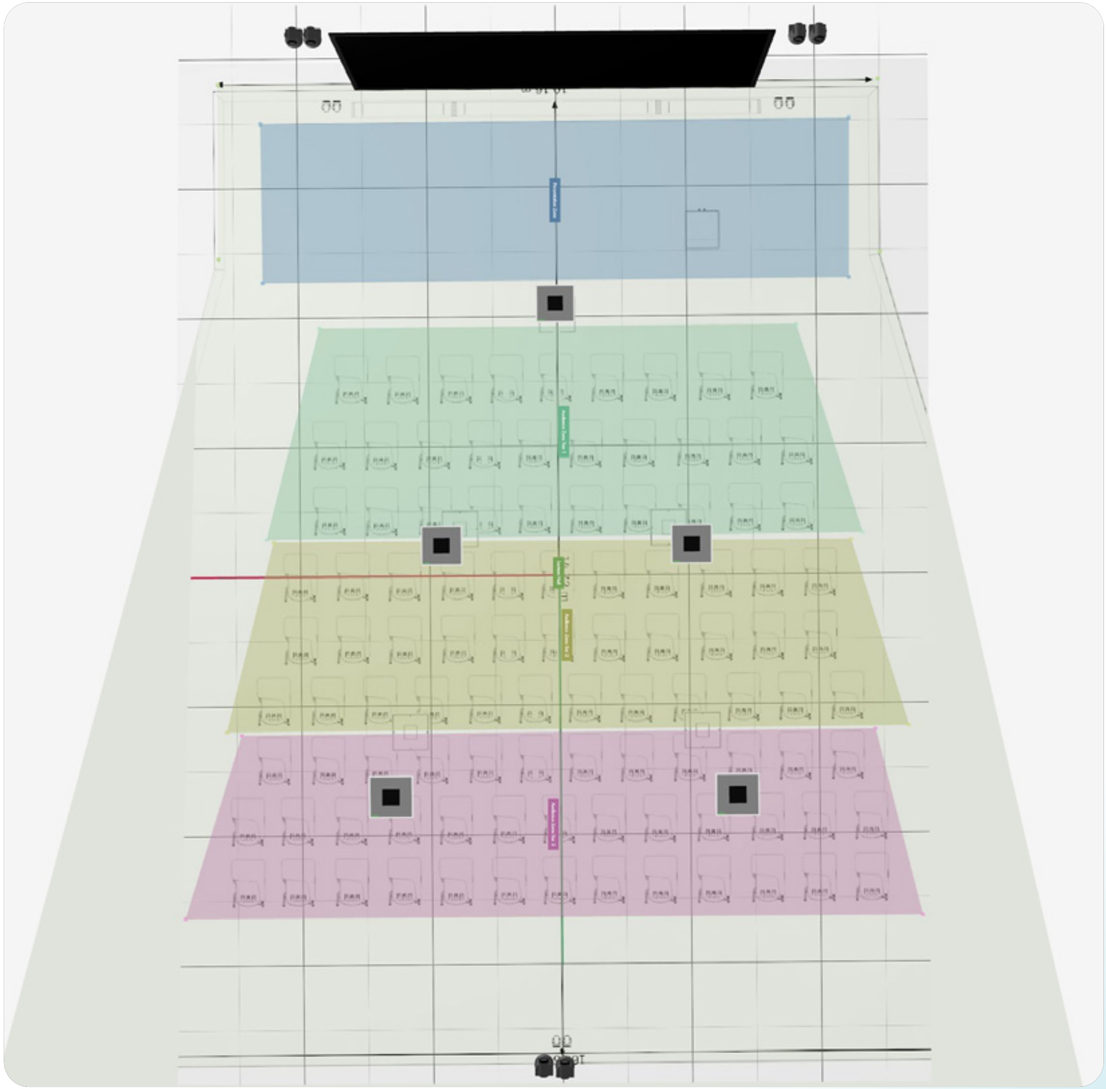
- **Avoid floor-to-ceiling displays** behind the presentation area to prevent false vision detections
- **Minimize having open areas behind presenters** where background activity could interfere
- **Handheld / lavalier microphones can be used for audio** but ceiling microphones will be needed to provide location data
- **Ensure to treat room acoustics** as large spaces often exceed 0.8s RT60 without treatment
- **Add stage wash lighting to cancel** any harsh shadows from spotlights that interfere with presenter IDs



EXAMPLE

Lecture Hall

- **Create dedicated audio zones** for each layer of seating to handle slight height variations [1]
- **Handheld / lavalier microphones can be used for audio** but ceiling microphones will be needed to provide location data
- **Verify presenter tracking camera** stays within the maximum recommended distance
- **Use a podium/lectern** as the defacto starting point for tracking where presenters naturally gravitate towards
- **Add a conductor camera** to accommodate for multi-presenter use cases (coming soon)
- **Add dedicated static cameras** for seamless content switching to whiteboards during lectures



NOTE:

[1] Tiered seating layouts or microphones placed at different heights on sloped ceilings are not yet supported.

SECTION

6. Appendix

VisionSuite Legacy vs VisionSuite Native Differences

The differences between VisionSuite Legacy (ACPR & Seervision plug-ins) vs VisionSuite Native (VisionSuite Designer) at a glance:

Feature	VisionSuite Legacy (plug-ins)	VisionSuite Native (VisionSuite Designer)
Speaker Framing	Preset-based. Mic audio angles recall fixed presets, the same fixed shots are recalled every time.	Dynamic. Live audio coordinates frame the active speaker. A fresh shot is created every time in real-time.
Participant Freedom	Speakers must stay in assigned seats, within the preset's assigned microphone audio angle range	Speakers can sit anywhere within a zone and be captured, even if standing (MXA920 only)
Max. Cameras	32 cameras total (ACPR), 2 of which for presenter tracking (Seervision)	14 Speaker Spotlight + 2 Presenter/Conductor cameras
Supported Microphones	Up to 10 ceiling or 90 discrete microphones Shure MXA920 / Sennheiser TCC2, TCCM / Audio-Technica ATND1061 / Yamaha RM-CG / Q-SYS NM-T1 All rely on angle-based microphone data	Up to 8 ceiling microphones Shure MXA920 (recommended) / Sennheiser TCC2 XYZ coordinate data is fused globally across microphones
Flexibility	Fixed camera roles. Supports multiple rooms and divisible rooms. Multiple VSA-100 / SVs1 / SVs4 supported per Q-SYS Design.	Dynamic camera roles (presenter and speaker cameras can swap responsibilities). One VSA-100 per Q-SYS Design only. Multiple rooms and divisible rooms not yet supported.
Hardware	ACPR on the Core. Seervision on SVs1/SVs4/VSA-100.	Supported on VSA-100. Core 24f or better.
Best For	Fixed seating, broad mic support, divisible rooms, simpler end-user requirements.	More flexible movement of participants, multi-layout spaces, and dynamic shots not bound to presets.