A USER'S GUIDE FOR CONDUCTING HYBRID MEETINGS

Dana G. Richard, DTM
ILC Nominated Candidate
for International Director from Region 7
Distinguished District 29 Director, 2019-2020

TOASTMASTERS INTERNATIONAL®

A User's Guide to Conducting Hybrid Meetings

Dana G. Richard, DTM
Colonel, USAF (Retired)
ILC Nominated Candidate for International Director from Region 7
District Director of Distinguished District 29, 2019-2020

May 2021

TOASTMASTERS INTERNATIONAL

A quick note about this guide…

It should pretty much go without saying that we've been through a very challenging year. You know that. You've lived it! But let's think back to the decisions that we all made when the pandemic began, and the decisions we will need to be making as it (hopefully) comes to an end.

When the pandemic began last year, my team immediately focused on moving on-line—club meetings, speech contests (we did four district contests on-line!), a district conference (over the course of four weekends!) the annual business meeting – everything. And we were highly successful—one of only 20 distinguished (or better) worldwide and one of only three in the Continental US. In many ways, it was an easy decision—do it or not, yes-no, on or off—traumatic perhaps, but simple--we either did everything on-line, or we didn't do it.

Now there is a new set of decisions looming. Continue to meet entirely on-line. Meet entirely in person. Or a combination of the two—hybrid meetings. Many clubs will choose to try to hold hybrid meetings with some members meeting in person and others joining them from on-line. This format offers several advantages, but it also has some disadvantages and should be approached with great forethought. This guide is intended to help you do that. First to decide if your club *should* have hybrid meetings, then to plan *how* to do them if you do. As you look at it, you will see that conducting *high quality* hybrid meetings is a complex undertaking that requires some degree of technical expertise and an investment in equipment beyond just a laptop or two. If it looks too hard, maybe it is. Large organizations spend lots of money to create this capability. But again, this is for a high-quality meeting that creates an immersive experience for the on-line participants. You don't have to do that, it's not required, but in my opinion, we should strive for the best quality possible consistent with our core value of *excellence*. And high-quality hybrid meetings are complex undertakings.

I put this guide together to help you do two things: 1) decide if hybrid meetings are for you and, 2) figure out how to conduct them *if* you believe they are. I hope it helps. Please feel free to modify it, add to it, extract from it and pass it on to others.

Best wishes for your continued success!

Dana

dg_richard@hotmail.com

Contents

Hybrid meetings—are they for you? 1
Nothing but the best 4
Creating a modern conference room experience 4
Cameras. 5
Lighting. 6
Microphones and speakers 7
Microphones. 8
Solutions. 9
Speakers 11
Connections—plugs, jacks, and adapters. 12
Monitors. 13
Power. 14
A note about bandwidth. 14
It's meeting time! 14
And in conclusion… 16
Hybrid Meeting Checklist ..... A
Troubleshooting Guide ..... B

Figure 1: An example of a hybrid meeting set-up 3
Figure 2: A possible camera set-up to capture both the speaking area and the "studio audience" (i.e., the in-person participants) 5
Figure 3: Using integrated laptop cameras for both a speaking area and the in-person participants 6
Figure 4: Depiction of microphone/speaker feedback loop 7
Figure 5: Wireless microphone system 10
Figure 6: Possible microphone configuration 11
Figure 7: XLR microphone connectors 11
Figure 8: 3.5mm and 1/4" jacks (connectors) 11
Figure 9: A USB-C connector (left) and a USB 3.0 hub 13
Figure 10: Types of video input/output ports 13
Figure 11: Types of input/output ports commonly found on a laptop 13
Figure 12: an AC/DC adapter plug 14
Figure 13: The Sound Control Panel in Windows 10 15

Hybrid meetings—are they for you?

Before going through the process of planning *how* your club can hold hybrid meetings, i.e., a combination of in-person and on-line participants, you should carefully consider whether your club *should* have them. They may be a good idea and offer many benefits, or they may actually hinder your members' growth as speakers. It is also possible that it may cost too much in either time or money to be practical, especially if they only benefit a very few members or if your club is small—the level of cost and effort may not actually be worth the return in some cases. It is important to think through this before deciding to actually do them. So before delving into the mechanics of how they can be done, and for this I refer you to my *User's Guide for Conducting Hybrid Meetings*, let us consider the advantages and disadvantages of doing them and consider some important questions.

This guide is intended to help guide the discussion for your club, but the actual decisions are, of course, up to you. It will provide questions for you to consider and a thorough discussion of what might be required, from a technical perspective, to conduct high-quality hybrid meetings. This guide will not address hygiene or pandemic mitigation measures; therefore, you *are encouraged to consult local guidance and any additional guidance for facilities you may be using*. This guide will focus exclusively on the mechanics and technical aspects of hybrid meetings.

Advantages	Disadvantages
Can allow temporarily remote members (vacationing, on business trips, etc.) to participate	Can lead to a tendency to be less professional in dress and demeanor
Can allow members outside the club's immediate geographic area	May require resources that are not readily accessible
Can allow meetings to continue during adverse weather (allows an option to not attend physically, but an entirely on-line meeting might be a better option in many cases)	Can hinder development as a speaker (more difficult to use gestures and maintain audience eye contact, use of speaking area)
Provides opportunities to learn how to communicate effectively on-line (i.e., how to use the medium to advantage)	Can reduce development of personal relationships that are beneficial for club and personal growth
Can allow members who cannot travel to the meeting to participate	Are subject to frustrating technology failures that can cause participants to drop off or freeze
Can make media-based projects such as podcasts and webinars more effective	Can reduce interaction with the audience
Can provide opportunities to learn technical skills	Can be derailed by someone forgetting a critical component

Here are some questions you should ask before deciding to hold hybrid meetings:

- Will it enhance the member experience?
- Will it contribute the club attaining excellence?
- Will it increase the education benefits available to the club's members?
- Will it increase the professionalism of the club?
- Does the club have, or is it willing to obtain, the resources required to conduct effective hybrid meetings? (Some club members may already have some or all the required equipment and may allow the club to use it—but responsibility for ensuring it shows up must be clearly planned and understood.)
- If you are borrowing a club member's equipment, will it consistently be available for club meetings?
- Will the club's physical meeting space accommodate the set-up required to permit participants to join remotely?
- Will members joining remotely be integrated fully into the meeting? (i.e., effectively fill any required meeting role, not just speakers and observers)
- Is having members join on-line even available as an option at the meeting's physical location(s)?
- Will enough members be likely to participate remotely to justify the expense and level of effort of doing them?
- Are you willing to put in the set-up and break down time that doing this will require to do well?
- Can the club obtain/provide required training?

It is up to the club to decide how many of the questions need be a "yes," to make a hybrid meeting something that it advantageous to do. There are also some questions for which the answer should be "no" before proceeding:

- Will holding hybrid meetings result in an unreasonable burden being placed on a small number of members?
- Will it create friction amongst members that could weaken the club?
- Will it place any of the club's members at a disadvantage?
- Will it reduce the quality of meetings (more difficulty starting on time, more difficult to include all members, distractions and delays caused by technical difficulties, etc.)?

And in addition to these:

- Do you plan to do *every* meeting this way or just some of them?
    - Will it only be for special occasions?
    - Is it an "inclement weather" plan? (In which case is it the best solution?)
    - Is it an option that may be offered only for special projects?

As you will see, doing a hybrid meeting may require creating something akin to an executive conference room or a studio (or a combination of both). It can become a complex undertaking and you will need to make sure that your club has members with the skills to make it work (and there is a reason why large corporations have Tech $upport staffs). On the other hand, these can be useful skills to have and may be worth learning. You may read through this guide and think that it looks complicated. Doing it well, is. So, there is a quality issue as well—what is the minimum acceptable quality for the on-line experience, and why? Unfortunately, there are times when doing

the best that we can, is not good enough. Conducting a high-quality hybrid meeting might be one of those times; it may not be possible to do them at a high enough quality with the resources you have available. This guide is intended to help you decide if this is something you really want to do based on an understanding of what might be required to do it.

If, after considering all the above, your club has decided to move to a hybrid format, read on!

This guide will not address hygiene or pandemic mitigation measures; therefore, you *are encouraged to consult local guidance and any additional guidance for facilities you may be using*. This guide will focus exclusively on the mechanics and technical aspects of hybrid meetings.

One very important, very essential, very critical thing to know about conducting effective hybrid meetings – it is more difficult than conducting meetings either entirely in person *or* entirely on-line. Let us take a look at the Fig. 1 to see why this might be so.

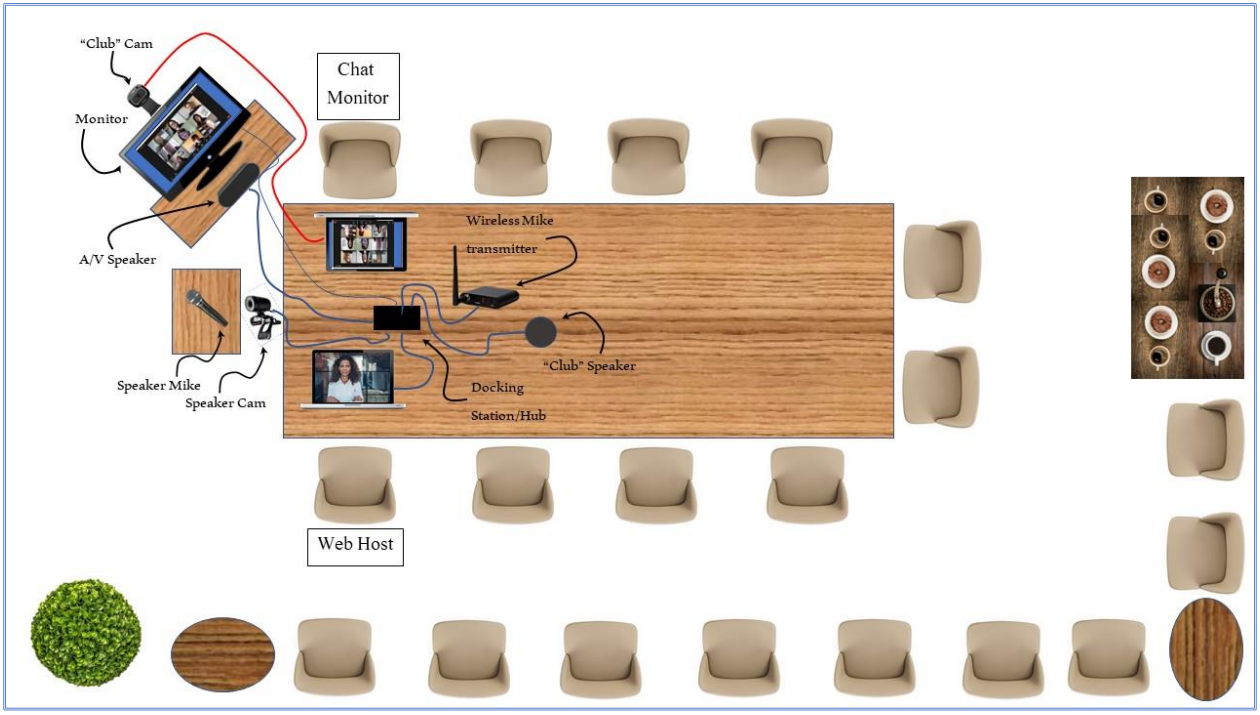

Figure 1: An example of a hybrid meeting set-up

There are two things that should jump out at you:

1. There is a fair amount of equipment involved, all of which we will discuss later.
2. There are two additional meeting roles, which will also be discussed later.

This is just an example. The exact equipment you need for your meeting may be different depending on where you are hosting the meeting from and what equipment is available to you, but this is what is required for an *optimal* meeting from a technical/logistical standpoint. We will discuss the ranges of options for doing these meetings and the relative merits.

Nothing but the best

For the club who has everything, including a fully equipped, modern A/V ready conference room which allows remote participants to join on-line, this is pretty easy. All you have to do is learn how to use the equipment or have technicians on-hand who can help you on demand. Many corporate clubs have this. The biggest questions in this case are:

- Who can join remotely?
  - Can only members of the organization who are at remote location do so?
  - If anybody can, what is required for them to do so?
- Is this facility consistently available?
  - Is there a chance your club could be bumped on little or no-notice?
  - Is an alternate location with comparable capability available?
  - Do you have a back-up plan?
- What size is the facility?
  - Will the in-person participants be in a small area or around a small table or spread out over a large area?
  - Will it require multiple microphones, cameras, speakers and/or monitors to ensure everybody can be seen and heard?
- Are special training and permissions required to use the equipment?
  - Who in the club has these?
  - Are there enough to ensure that one of them is (almost) always available?
  - What is the back-up plan if they are not available?

In some cases, corporate rules and policies may make it exceedingly difficult to conduct hybrid meetings, even if the capabilities to do so exist. In this case, they may not be a realistic option unless the club essentially "moves out" and conducts meetings from a different location. Perhaps that is an option, perhaps it is even a good option. It is something you will need to work through. And maybe, a hybrid meeting is not a viable option for your club.

Creating a modern conference room experience

What Figure 1 shows is everything that a fully equipped conference room has, only the way you might replicate it at some other location. Can you do a hybrid meeting with less? Certainly, but every component you remove takes a percentage of meeting quality with it. You will have to decide when that point reaches "too much," or if the best you are able to do will be "good enough." On the other side of the coin, you can also, very easily, reach "too much" when acquiring new equipment, which can very quickly become quite expensive, or at least more expensive than what your club needs to be paying for what you are trying to do. Also, managing storing, transporting, and setting up/taking down equipment might prove to be more cumbersome than your club is comfortable with.

Here is a quick laundry list of the equipment (we will explain the "why" for everything when we discuss how to set up and run the meeting):

1. 2 (or more) laptops (one will be for running microphones, a speaker and a camera, the other(s) for an additional camera and monitor)
2. 2 (or more) Cameras (webcams one the speaker and one for the group)
3. 2 (or more) microphones (one for the speaker and one for the group)
4. 1 (or more), external speaker(s)

5. 1 (or more), or more, external monitors
6. A docking station or USB/AV hub

This might be a good time to discuss why just setting up two laptops, without additional microphones, cameras, and speakers, might not work for you. Basically, it boils down to what laptops are designed to do. They are very capable these days, but they are optimized to support one person at a time. This means that the cameras, microphones, and speakers all tend to have limited capabilities—plenty when it is just one person and that is why meetings with everyone on-line are pretty simple to do. But that is why they may be inadequate for groups. Generally, the further away from them you are, the harder you are to see and hear.

Cameras. The video aspect of conferencing is the easiest component to deal with, so let us start with cameras. Most modern laptops have an integrated webcam and this may be adequate although they do have some limitations that we will discuss in a moment. If possible, using external cameras is a better option but these can vary a lot in price and capability, so whether they offer an advantage over the laptop's camera will depend on what is available to you. For our "optimal" set-up you ideally want one to be a wide angle (shows a large area) one to allow the in-person audience, or as much of it as possible, to be seen on screen by remote participants. There are many low-cost options for this.

The other camera is the one that will be focused (or zoomed in) on the speaking area. The thing that both have in common is that they will probably have wide-angle lenses. A camera that has a zoom lens feature works best for the speaking area since it can be focused tightly on a person or

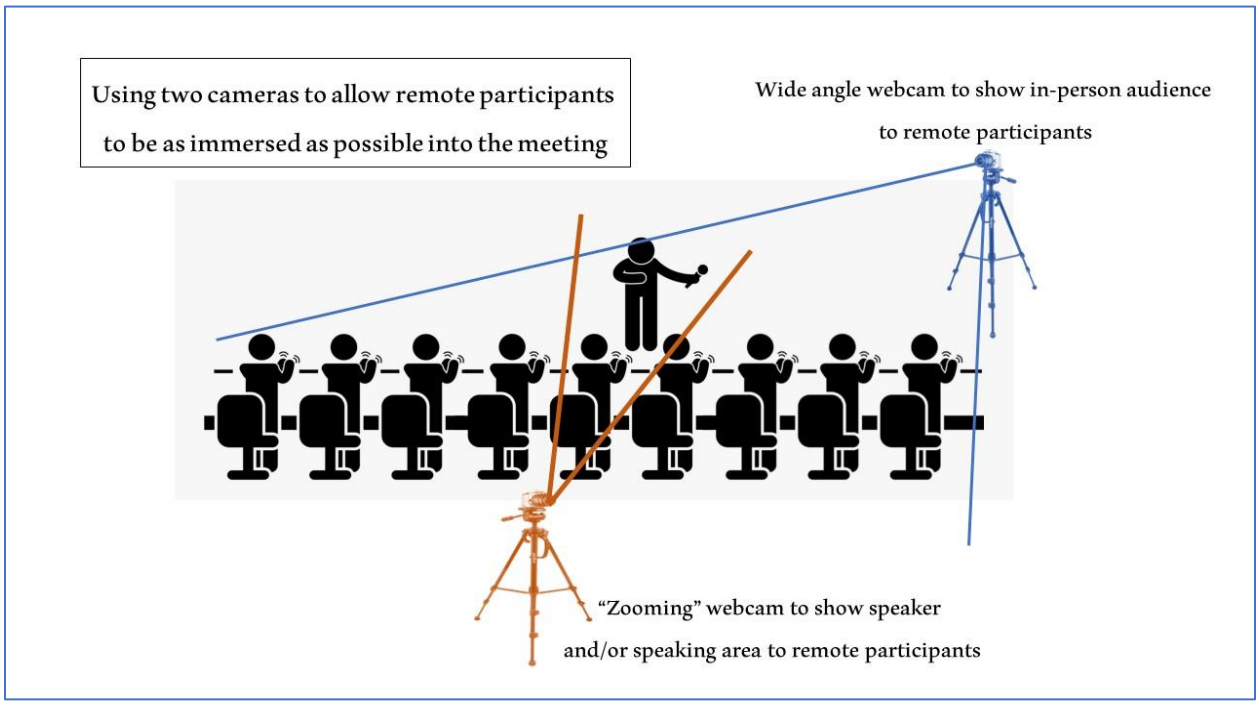

Figure 2: A possible camera set-up to capture both the speaking area and the "studio audience" (i.e., the in-person participants)

zoomed out for a larger area. However, this feature will only be found on more expensive cameras. Which brings us to a key advantage of any external webcam—it can be mounted on a tripod (perhaps even a very small tripod) and moved closer or further away from the focus area as needed. The intent behind this is to make the meeting as immersive as possible for remote

participants. This set-up is illustrated in Fig. 2. Being able to see the speaker and the audience, to the extent the equipment on the remote end allows it, is an attempt to replicate the experience the in-person club members are having. Barring the use of specially configured computers, it is only possible to run one camera per laptop, so each additional camera will require an additional laptop. Most webcams will use a USB port (types of input/output ports are discussed later). For the configuration we show here, two will be required. Fortunately, those two laptops will be adequate for everything else we will be adding.

How many cameras do you need?

Consider this from the perspective of remote attendees. If the in-person participants are spread out over a large area then it might be helpful to remote participants to be able to see the audience from the perspective multiple cameras so they can see everybody. But the "must do" is to ensure that remote participants can see the lectern and speaking area, and this can be done with just one camera.

Can you do this with just two laptops and their integrated cameras? Yes. Is it optimal? No. But it can be done, and is shown in Fig. 3., and how effective it is may rely more on the microphone set-up, which we will discuss next. This brings up another consideration—management of the "studio audience." The larger the area being filled, the more difficult it is to capture it on camera. If it is possible to concentrate in-person participants into a small area then capturing them on camera is easier to do, and also helps remote participants since they may be able to see them all in one frame of their display.

So, managing the use of the space, how the in-person participants fill it, is also a something you will need to think through in deciding what equipment you will need and how best to use it.

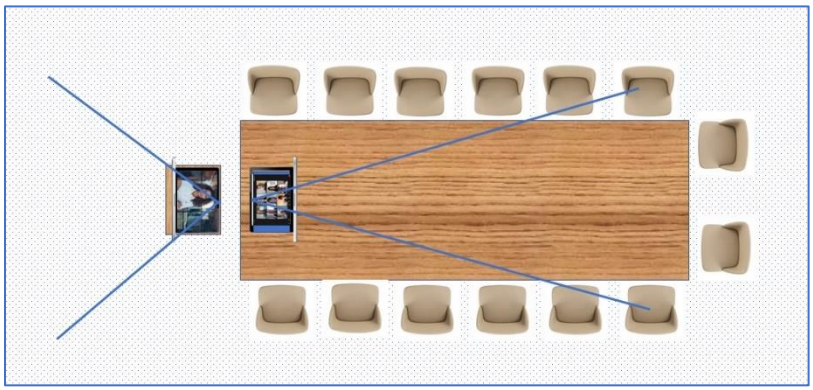

Figure 3: Using integrated laptop cameras for both a speaking area and the in-person participants

Lighting. This is a variable that can probably only be effectively tested on-site with your cameras, but it is something you must be prepared to address. Some cameras require more light than do others. Some meeting locations will have more light than do others. And some meeting locations will have uneven lighting that will cast shadows that will make it hard for remote participants to see speakers and in-person meeting participants. Lighting is essential to photography and videography and because of this there is a lot of equipment available across a wide range of prices. Lighting is also something that can very quickly become over complicated, so let us try to simplify it. The basic purpose of auxiliary lighting is to illuminate areas that room lighting does not sufficiently illuminate,

but not over illuminate (i.e., wash out) the area or person being illuminated. Some cameras will compensate for low lighting in which case additional lighting may not be necessary. But in some instances, lighting may still be inadequate. Lighting must also be able to cover the entire area; it must be wide enough and deep enough to cover the area being illuminated. This means that more than one light source may be needed. Many inexpensive lights are available which allow the brightness to be adjusted as well as some that allow the temperature of the light (warm, cool or daylight) to be selected. The more control you have over the lighting, the better the meetings on camera appearance will be.

Light temperature can also be thought of as the light quality, or the color it casts on the subject or area. Some people put look better in cool (blue) lighting, other in warm (yellow) lighting, and the quality is also effected by the ambient room lighting.

Many members may have “ring” lights that they use for their personal meetings and these may be sufficient for your purposes. These come in many sizes ranging from small 2”-4’’ lights that can be mounted on a camera or smart phone, through 18” studio lights. Generally, the larger the area you are illuminating, the larger the light you will need. The light will probably also require a stand (most larger sizes come with one).

Microphones and speakers

Microphones and speakers are more complicated than cameras and can introduce challenges, the principal two of which is feedback and echo. Without getting into much detail regarding sound engineering, feedback happens when a microphone sends sound to a speaker and then picks up that same sound and sends it back to speaker again, and picks it up again, over, and over in a loop. This is illustrated in Fig. 4. It creates a very high-pitched, very unpleasant sound that you

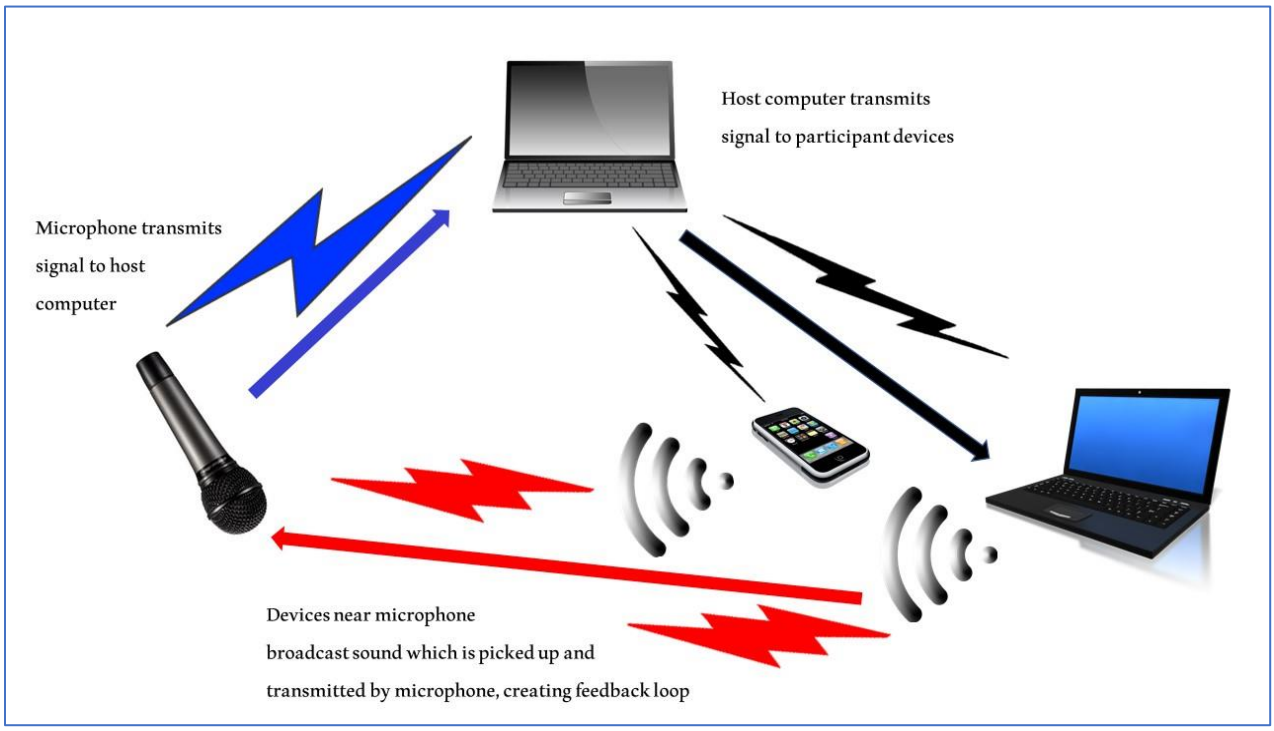

Figure 4: Depiction of microphone/speaker feedback loop

will want to avoid. Echo has multiple possible causes, one of which is the same as feedback but rather than creating a high pitch whining sound the sound echoes, which is only very slightly less annoying. Since echo has multiple causes, let us look at those preventing them will also prevent feedback. Also, as there are multiple possible solutions, some of which require more technical expertise than others, and which also will have variations depending on what kind of computer and equipment is in use, we will limit our discussion to the simplest and likely most universally applicable solutions

Since feedback and echo can both be caused by the same thing, a microphone picking up its own output, let's take a quick look at how this is caused in a meeting, which also leads us to the simplest way to prevent it. There are variations on how, exactly, this comes about, but the root cause is essentially the same—multiple devices, computers and phones, simultaneously have active audio and are close enough to each other for the microphone(s) to pick up output from the speakers. There are multiple possible technical (including acquiring potentially expensive equipment with sound dampening properties) and software solutions (such as tweaking various audio settings on the devices), but the two absolute simplest ways to combat this are:

- If multiple devices are in use, place them far enough apart to prevent the problem. However, while the exact distance required will vary, it is not unlikely that it will be more than a small meeting location can accommodate.
- Ensure that only one device (computer) is in use with an active audio, all others must have audio—input and output—turned off. (NOTE: Feedback/echo can be caused from any location, even a remote one, during a meeting.)

There are two other possible causes for microphone echo that might need to be addressed.

- Echo cancellation failure. Most computers have an echo cancellation feature, and some audio equipment will as well. It is a good idea to become familiar with these to understand their settings and drawbacks of using various settings (e.g., some computers and applications have very aggressive echo cancelling options but using them can lead to a microphone intermittently cutting out). Sometimes a persistent echo can be controlled by adjusting these.
- Bad equipment. Sometimes the microphone, or any adapters or receivers it might be attached to, develops a malfunction. This can only be rectified by replacing the equipment; thus, it is important to regularly check equipment and make sure that it is properly stored and cared for.
- Time lag. Sometimes there can be a time lag between when the microphone picks up the sound and when it is broadcast back over a speaker. This will normally not be an issue for in-person participants but can create a delay for remote participants. Different systems process signals at different rates and remote participants may have different bandwidth for the on-line connections. There probably is not much that can be done about this, but it is helpful to be aware of it.

Microphones. Laptops and many external webcams have microphones, but these are normally only effective for short distances. That is fine when you are sitting at your computer, which most of your remote participants will be, but not when you stand back away from the computer, which is the situation you'll likely have in an in-person meeting. Unlike cameras, which by comparison are simple and straight forward, microphones can be handled in many ways but can present

multiple challenges. Let us address this from the standpoint of the challenges you need to solve, then consider different configurations.

Before we do that, let us consider what are trying to accomplish and why that creates the potential feedback problem, as well as possibly requiring additional equipment.

1. First and foremost, everybody in the meeting needs to be able to hear everybody who has a speaking part. This includes speakers, the Toastmaster of the Meeting, evaluators, table Topics participants and other roles, in other words, pretty much everybody. The technical solution not only has to ensure they can all be heard clearly, but also has to do with minimal disruption to the flow of the meeting.
2. Second, for the in-person portion of the meeting to actual work to an acceptable standard, all these participants must be able to do so from a lectern or speaking area and not be tethered to a computer at their seat. It also helpful if speakers can move around in the speaking area.
3. It can be helpful to have a separate microphone that can be used to pick up conversations from a group at least a few feet apart from the microphone in the speaking area—such as for discussion during a business meeting.

But, as we already stated, using microphones on, or attached to, multiple computers tends to cause feedback. So how do we accomplish all the above and prevent feedback?

Solutions. Before we get into this, remember that as with cameras, more capable and sophisticated solutions will also be more expensive. Your goal is to find a solution that works for your club at an acceptable level of expense (or borrow equipment from members who may have obtained it for any number of personal or professional reasons). There is also a human element to this process. Referring back to the questions asked at the beginning of this guide, it is important to know what your normal meeting participation looks like and how much will normally be in person and how much will normally be joining remotely. There may be a point of diminishing returns relative to the monetary cost.

Use the laptops integrated microphones. This can be made to work, but frequently not very well. The range is usually limited which means that speakers must be close enough to the microphone. This limits the speaking area for the speaker to a small area close to the laptop. It also makes it difficult to engage in a group discussion, such as during a business meeting, unless the meeting space is small enough for all in-person participants to be close enough to the laptop to be heard clearly. It might be possible to remedy this by using more than one computer but remember that feedback and echoing may occur if they are too close together.

Attach one or more external microphones. There are a couple of primary options for doing this.

Omnidirectional vs. unidirectional. An omnidirectional microphone can pick up sounds from any direction around it. To an extent, all microphones are somewhat omnidirectional, most handheld and lavalier microphones are intended to be close to and directly in front of the source.

Option 1. Attach a wired microphone to a single laptop with a long enough cord to allow movement around a speaking area or around a meeting space (if needed). This is a simple solution and depending on the equipment used, the microphone might attach directly to the computer with either an A/V plug or USB connector. However, some microphones may require an adapter and some laptops may have limited input ports that may require the use of a hub or docking port. This will be discussed further in a moment. It might also, in some cases, be possible to attach a single microphone to multiple computers though they will need to be managed to prevent feedback. It is also possible to use a single wireless microphone which allows even more flexibility.

Figure 5: Wireless microphone system

Option 2. Attach multiple microphones to a single computer. This is also a fairly simple option but requires a transmitter that can be attached to a computer that can receive signals from multiple microphones. These will frequently be wireless which makes them flexible to use and permit movement around a speaking area by a speaker or placed in multiple points around a meeting room to facilitate group discussions. These can range from relatively inexpensive systems that allow connection of two or more handheld and/or lavalier microphones, up through very expensive professional grade systems. A wired conference room or classroom might have this capability built-in, but it may still be necessary to provide the microphones. Again, if input ports on the host laptop are too limited then a hub or docking port might be needed. Moving away from the mechanics of conducting an effective hybrid meeting as a *requirement*, becoming comfortable with using microphones for speaking is a valuable *benefit*. Some illustrative components of such a system are shown in Fig. 5.

There is a variation of option 2 that may provide additional flexibility. In addition to the lavalier and handheld microphones, there is another type of microphone that can be included in your systems—an omnidirectional conference microphone. These microphones can be placed in the middle of a group, om a conference table for instance, and allow multiple participants to be heard (hopefully not all at the same time!) without trying to pass around a microphone. A illustrative configuration is shown in Fig. 6.

A wired conference room or classroom might have this capability built in, but it may still be necessary to provide the microphones and more advanced knowledge of audio-visual systems might be required to integrate it into a hybrid meeting. This discussion is primarily geared toward how to replicate this in locations that do not have this capability, but if it is available, it should certainly be considered and, again, learning the required skills to comfortably use a microphone is a valuable benefit.

Speakers. A speaker of some sort is necessary for in-person participants to hear remote participants. And as mentioned earlier, speakers are the other half of the feedback issue and while using them is not inherently difficult, using them in a way that enhances the meeting without interfering with microphones can be a challenge. Fortunately, it is a fairly easy challenge to overcome. As with cameras and microphones, laptop computers do have speakers built in, but their volume is usually limited, and it may be difficult for in-person participants who are not close to the computer to hear remote participants. Adding an external speaker is simple to do but must be attached to the same computer as the microphone(s) to prevent feedback. And, again as with cameras and microphones, they cover a wide price range, but an acceptable capability can be purchased on the low-end of the price range.

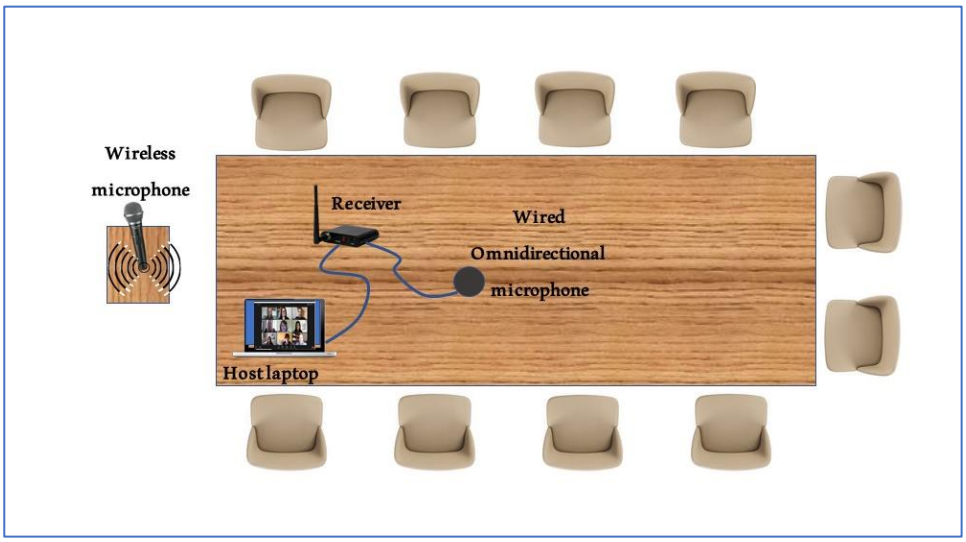

Figure 6: Possible microphone configuration

Figure 8: XLR microphone connectors

Figure 7: 3.5mm and 1/4" jacks (connectors)

Some meeting locations will have a public address system with microphones and speakers. Although they will have been configured to work together, it is still possible to create feedback if a microphone gets too close to a speaker. Also, many of these locations will be designed for use within the room, as in a classroom, but not be configured for the equipment to transmit on-line. It is important to understand the capabilities available at the location and whether or not it meets your needs. It is possible that you might be able to use the room's public address system, even using the system to amplify remote participants, but you might need to augment it to transmit the speakers in the in-person location to the on-line participants. Again, doing so may generate feedback so be prepared to mitigate this. In some cases, ensuring that microphones are not pointing at each other or that sound from speakers is bouncing off walls and interfering with the microphone will be sufficient. But sometimes the built-in public address system might have to be discarded to ensure that the on-line aspects of the meeting work. These issues should be explored and resolved well in advance of your meeting as they can take some time to work through.

Connections—plugs, jacks, and adapters. This is one especially important limitation that will frequently be encountered. It is, in fact, a key issue to your success since having the right equipment doesn't help if it can't be connected. A meeting location with a built-in audio-visual capability will like have microphones that use an XLR connector as shown in Figure 7. Your laptop won't. As mentioned earlier, many laptops will have limited input/output ports and jacks and, in some cases, they may not match whatever is required by the external equipment. One type of connector end you will likely encounter is a 3.5 mm (also referred to as mini-plug or 1/8-inch connector) or a USB 2.0/3.0. These are the connections most people are probably most familiar with as they are commonly used for headphones and headsets. The commonly used 3.5mm and ¼" audio connectors are shown in Fig. 8. If your microphone and speaker have one of these types of plugs, connecting them is generally easy, assuming you have enough ports. Many laptops will have a combined audio 3.5mm audio input/output port that can accommodate a microphone, a speaker, or a headset (that has both). To use both an external microphone and an external speaker you will need a *separate* port for each. Some microphones and speakers have USB connections, and this may mitigate this issue depending on the number and type of USB ports available. Some laptops and tablets will have only a single audio port and a single USB-C port, which means you will need to add a docking station or hub to have access to multiple connection points to separate your microphone (input) and speaker (output). Please refer to Figs. 9 and 10.

> And, as if that isn't complicated enough…
>
> The types of connections listed here are just the most common ones that you are likely to encounter. There are also 2.5mm connectors that look like 3.5mm, but aren't and thus won't work in the same jacks, and there are variations in design even among 3.5mm and ¼" connectors. The bottom line: make sure you know exactly what you are working with, don't rush into buying something until you've researched it, know exactly what you are getting and know it will work, and test everything before your really need to use it so you can replace or adjust.

If your club is buying equipment, making sure your microphones and speakers have 3.5mm and/or USB plugs will simplify doing this. However, if you are borrowing equipment then it is possible that you may be trying to integrate higher grade equipment. This is good news from a quality

> A note on standards—or variations thereof. Some of the types of connections described may have regional or national variations; power outlets definitely do. This means during planning your meeting set-up, you need to have an understanding of what your local standards are. This doesn't really change any of the advice offered in this guide, but does add an additional question you must ask before you buy anything, if it is your intent to buy something, to make sure that your components are compatible with each other.

standpoint but does complicate your set-up since you may encounter ¼ inch “phone” plugs (shown in Fig. 8) or XLR connectors (shown in Fig. 7). In this case you are going need adapters or cables with different connectors on each end that allow you to connect.

Figure 9: A USB-C connector (left) and a USB 3.0 hub

Bluetooth®. By now the thought may have crossed your mind that many devices can connect through Bluetooth®. This is a true and it is an option you may prefer, but a word of caution is in order. Bluetooth® enabled devices must be paired to work together. This is (normally) not difficult to do but may add an extra step during set-up if the same devices are not used each time. Also, from time to time, devices do not pair, so have a backup plan.

Figure 11: Types of video input/output ports

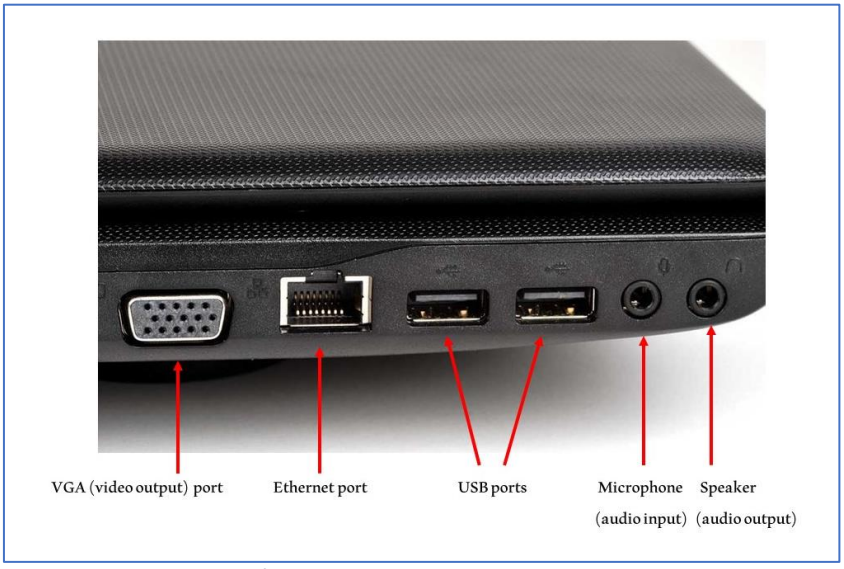

Figure 10: Types of input/output ports commonly found on a laptop

Monitors. We have now discussed setting up the video input (camera), audio input (microphones), and audio output (speakers). The final piece of the equipment puzzle is the video output—a monitor. Obviously, laptops have a monitor attached and some of them are very capable. But they are also small and cannot be seen from more than a few feet. To bring the remote participants visually into the in-person meeting, you will need an external monitor. Fortunately, many meeting locations will have a monitor you can hook your computer into. You have done this in the past to use various visual aids (slide presentations, video, Internet, etc.) and it is typically easy. Of course, if there is not a monitor available in the meeting room, someone will need to bring one. If the meeting space is large,

then it may be helpful to have multiple monitors at various points in the room. Most laptops are configured to have a monitor attached but attaching more than one usually requires the addition of an external video card (a component that powers the image on the monitor) to run more than one. These are readily available. Of course, it is also possible to disperse computers with attached monitors throughout a meeting space. But, as with microphones and speakers, there is more than on type of video connection. A laptop computer may have one or more but still may not have the exact one that matches an available monitor and an adapter, again, quite readily available, will be required. The most encountered types of video ports are shown in Fig. 11.

Power. Near the beginning of this guide, Fig. 1 shows how all this fits together, except for one thing that is extremely important, and extremely easy to overlook—power. Many of the components we have talked about will be able to draw power from the computer, whether directly plugged in or indirectly through a hub or docking station. However, as you probably already know, if the computer is not plugged in and is running off its battery, the more things that are plugged into it, the shorter the battery life is—perhaps too short for a meeting. And not all components can run off the computer, monitors for example. This means you will need extension cords and power strips. And since many components use AC/DC converters, such as the one shown in Fig. 12., there needs to be enough accessible outlets to accommodate them (they can occupy 2-3 slots on a power strip depending on the arrangement of the outlets. And some components will have their own batteries—always carry extras.

Figure 12: an AC/DC adapter plug

A note about bandwidth. Now that you have your meeting room configured, it is time to log-on and get everybody on-line. This should be the easy part, right! Maybe. It will depend on how you are connecting and how much competition you have for the available bandwidth. Bandwidth, in simplest terms is how much information a connection can handle at any given time, and there are limits. The more connections you have at a single location for your meeting, the more bandwidth you will use. It is possible that if you try to connect too many computers at once, and we discussed instances in which multiple computers might be used, then you may use up too much bandwidth, if this happens, the connection may be degraded, or even dropped entirely, throughout the meeting which is, to put it mildly, disruptive. There may not be much you can do about the available bandwidth, but you need to be sensitive to it as you plan your meeting set-up. Also, this is more of an issue with wireless connections than with wired connections through an ethernet cable but in most locations, you will probably be wirelessly connecting to the Internet via Wi-Fi. This may require obtaining a password—another meeting preparation item. If a location does not have Internet, then your last resort is to use a Wi-Fi hotspot, probably from a smartphone. Should this become your last option be forewarned that this is rarely satisfactory, so (if possible) do not put yourself in the position of having to do this.

It's meeting time!

After all this preparation you are now ready to hold your meeting. At least you are physically ready. The computers are on-line, the cameras, microphones, speakers, and monitors are all hooked up and running, you have eliminated feedback and the speaker's area is ready to go. Good for you! You have cleared the set-up hurdles! But there is a human element too. In Fig. 1., you will have

noticed two seats with labels—a Web host and a Chat Monitor. These are additional meeting roles that you may need in addition to the “standard” meeting roles.

The “Web” Host is responsible for monitoring who is in the virtual room, admitting guests if you use a waiting room (which is a good security practice), and muting and unmuting microphones—both those at the in-person meeting location and remotely. The Web Host is likely seated at the “main” computer, i.e., the one the microphones and speakers are attached to. If there are multiple microphones in use, it will be their job to turn them on and off at the appropriate times. There are multiple applications and platforms available for on-line members, the Web Host should be an expert on the one you are using.

Prior to each meeting the Web Host will need to make sure that the appropriate microphones, speakers, and cameras have been selected from the computer and application (i.e., the meeting’s) settings. This is done in two different places:

- On the system (the computer) and is found in the computer’s “Settings.”
- Within the meeting application (Web, Teams, Skype, etc.)

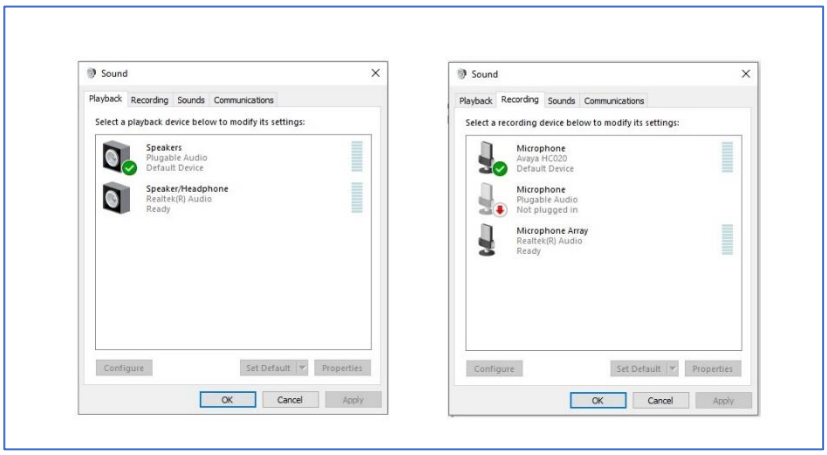

Figure 13: The Sound Control Panel in Windows 10

Fig. 13. Shows what the Sound Control Panel might look like for speakers and microphones in Windows 10 but will look different on other operating systems. Likewise, each application will have a different appearance. Since there are too many different possible configurations to cover them all we will not attempt it here. The main point is that the Web Host needs to know where to find them, make sure they are set correctly, and be able to quickly change them. For example, most of the meeting may require in-person participants to use the microphone in the speaking area. However, if a group discussion is required, it may be necessary to switch to a different microphone, such as an omni directional conference microphone. The Web Host must know how to do this, and it may require some practice. Since setting up the meeting location is a club’s sergeant at arms (SAA) responsibility, they should be included in the physical set-up. Whether or not the SAA can also be the Web Host and set up the electronic aspects of the meeting will depend on the club and individual. If your club wants to make this a permanent SAA responsibility, then you will need to make sure that they are trained. In some clubs, it may work better to have someone else do it.

The Chat Monitor has a different role. While the Web Host is focused on the technology aspects of the meeting, the Chat Monitor makes sure that the on-line participants can communicate with the in-person participants throughout the meeting. The primary way that remote participants can ask questions and pass information during the meeting is through the meeting’s chat function. The Chat Monitor’s job is to monitor these and bring them to the attention of the in-person participants. They can also post the agenda and other meeting materials in the chat for remote member’s access.

And in conclusion…

Hopefully, this guide has helped you decide two things:

1. Whether or not conducting hybrid meetings are something your club should do.
2. How to do them if you decide they are.

If you decide to hold hybrid meetings, or more specifically if you decide to hold high quality hybrid meetings, then you have your work cut out for you. This guide gives you a starting point. Technology changes, new computers and equipment with new capabilities enter the market, and new tools and applications become available as time passes and demand dictates. Nonetheless, this guide should provide some insights into enough of the basics to get you started. Please feel free to pass it on, add to it, improve upon it and share your own lessons learned.

Hybrid Meeting Checklist

	Checklist Item	Who is responsible
	Camera(s)	
	Microphone(s)	
	Speaker(s)	
	Monitor(s)	
	Laptop(s)	
	Docking Station/Hub	
	Cables	
	Extension cords/power strips	
	Spare batteries	
	Audio/video adapters	
	Wi-Fi password obtained for meeting location	
	Meeting link forwarded to remote participants	
	Web Host assigned	
	Chat Monitor assigned	

Troubleshooting Guide

Problem	Probable Cause	Possible Fix
Camera does not work	Not properly connected	Check connections
	Not selected in system or application settings	Check and correct settings
	Not turned on	Enable (turn on) in system and application settings
	Docking station not connected to power source	Plug in docking station
	Lens cover is still on	Remove/slide open lens cover
Microphone does not work	Not properly connected	Check connections
	Not selected in system or application settings	Check and correct settings
	Muted or input volume too low	Unmute or turn up input volume (more technically referred to as increasing the "gain")
	Not turned on	Enable (turn on) in system and application settings
	Docking station not connected to power source	Plug in docking station
	Dead batteries	Replace batteries
Speaker does not work	Not properly connected	Check connections
	Not selected in system or application settings	Check and correct settings
	Not turned on	Enable (turn on) in system and application settings
	Turned to "0" or muted	Unmute or turn up
	Not connected to power source	Plug in
	Docking station not connected to power source	Plug in docking station
Monitor does not work	Not properly connected	Check connections
	Not turned on	Turn on
	Not plugged in	Plug in
	Computer does not "recognize" monitor	May need to download a new driver
Monitor does not display properly	Incorrect display settings	Check and correct system display settings
There is feedback when microphone and speakers are turned on	More than device is on with a live speaker	Identify and turn off (not just mute) additional devices
	Microphone and speaker are too close (more likely if using built-in PA system)	Move further apart or make sure are not facing each other
	Microphone and speaker are on two different devices	Connect microphone(s) and speaker(s) to just one device

Since
1924