A distance collaboration session is only as viable and successful as the quality of its audio. Poor sound can quickly turn a conference into a frustrating experience, making it difficult if not impossible for the participants to concentrate on what's being said.

Elements that will ruin a pure audio or video conference include acoustic echo, which is experienced as a participant hearing his or her own voice being transmitted from the other conference site, albeit delayed a few milliseconds.

Factors contributing to acoustic echo include room acoustics, room size and the materials used to construct the room. Acoustic echo occurs as sound travels from the individual at the “far-end” of the conference to the “near-end” and then returns to the individual through the speaker system.

An acoustic echo canceller (AEC) prevents this type of echo. The AEC, which is necessary at each site of the conference, functions in both “near end” (transmitting speech) and “far end” (receiving audio) states. The AEC done at one end of the call is what prevents echo at the other end. (See figure below). As a result, participants can enjoy uninterrupted, productive conversations.

Frequency response, tail length and convergence time are the three most critical components of an AEC. The wider the frequency response, the more natural the sound. Tail length, the time over which an AEC can cancel echoes, increases as room reverberation increases. The longer the tail length, the longer the echo that can be eliminated, a function that is essential in larger rooms. Convergence is the time it takes for the AEC to converge to a specific amount of cancellation. An AEC that has a faster convergence time makes it easier to move around microphones, such as wireless mics, to different positions in the room.

Just as the right AEC can improve the sound quality of a conferencing session, the wrong solution can make bad audio even worse than one with no AEC at all. When buying an AEC, look for one that accommodates full-duplex operation and includes noise-free mic preamps. An AEC with a longer tail length is good, so it can compensate for acoustically challenging rooms, including those with a large distance between walls or that propagate sound reflections.

A directional (cardioid) microphone works well within an audio conference setup. This type of mic is aimed at the talker and away from loudspeakers. In order to eliminate “howling,” it should be placed as far away from the loudspeakers as possible.

The basic process of cancelling out echo is the same among all AEC solutions. Biamp’s Sona, which is included in a number of its digital signal processors, including Nexia TC, Nexia VC and AudiaFlex, employs an algorithm that helps create more natural sound during video conferencing sessions. The AEC algorithm references each microphone to the far end audio (other site or sites) and determines what is echo. It then uses a digital filter to eliminate it.

Because the human ear still makes a great test instrument, the best way to assess the quality of an AEC device is to make an actual conference call with participants on both ends.

ABOUT BIAMP SYSTEMS
Biamp Systems is a leading international provider of professionally installed audio electronics. Biamp is widely recognized for delivering high quality and innovative audio products like the award-winning Audia® Digital Audio Platform, Nexia® family of digital signal processors, Sona™ AEC Algorithm, and the new networked media system, Tesira®.

ABOUT AVI-SPL
AVI-SPL is a global leader in audio video communications technology, providing comprehensive solutions and services for professional AV installation, telepresence and video conferencing, digital media systems, control rooms and network operations centers, hotel rental services, event staging and production.

Our commitment to the client culminates in communication systems that completely integrate into the environment, are easy to use and truly fit their application needs. For this, we depend on today’s leading manufacturers of video, collaboration, presentation and AV technologies, including Biamp Systems.

Headquartered in Tampa, Fla., AVI-SPL has highly-trained and certified system engineers throughout 32 U.S. offices and an international network of solution providers in 30 countries. Please visit www.avispl.com for more information or connect with AVI-SPL on Twitter, Facebook and LinkedIn.