

Current Issue

Sound Design



Personal Sound Reinforcement



Sometimes even a stack of speakers isn't loud enough. Here's some options and guidance for choosing your assistive listening system

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The presence of assistive listening systems (ALS) has grown in recent years, and they benefit people who are

hard of hearing or visually impaired. And sometimes they can be appropriate for people who just want a boost in the sound for straight plays that are not miked.

Determining what type of ALS is best for a venue depends on needs and budget. Some of the main manufacturers of assistive listening devices are Listen Technologies, Williams Sound, and Sennheiser. The main types of systems vary. FM-based RF (radio frequency) systems are quite common, as are IR (infrared). Induction loop systems, popular in Europe, are making a resurgence in America. IR tends to be more expensive and is known for higher quality sound, but other options may be more appropriate for a theatre or other public venue.



David A. Bateman, Jr.

"The RF tends to be a little better quality in a broader setting with a wider coverage area," says David A. Bateman Jr., a senior consultant for Acentech, a Boston-based firm that designs sound and video systems for venues ranging from high school auditoriums to theatres to 10,000-seat arenas. "It's easy to get more people in the coverage area of an RF transmitter as opposed to an IR emitter."

Erich Friend, a principal consultant for Fort Worth-based Teqniqal Systems, which specializes in performing arts technology and safety, has worked with a wide variety of systems across different venues. He says that FM-based RF systems, which utilize transmission frequencies specially allocated by the FCC for ALS audio, are "more common than anything else. There are even different versions of that, with analog and digital based technologies, and they're not fully interoperable." Analog FM systems utilize bandwidth differently from brand to brand, too. "Many times you can't use a Brand A transmitter with a Brand B receiver."

"The RF meets a lot of criteria," adds Friend. "The digital RF systems tend to be very clean audio quality wise, but the leg up that the IR systems have had is the quality of the audio has historically been better. There's always the debate: If the end user can't hear in the first place, what does the quality of the audio matter? I don't think that's a good argument because if you're trying to hear something, you need every little bit you can get in the clarity of the sound that comes to you. These systems are also sometimes used for simultaneous interpreting, descriptive systems, and monitoring by technicians and performers."

IR systems are favored in many indoor places like classrooms and



Erich Friend

especially on Broadway where they are the norm. Bateman says that infrared technology is great in RF-rich environments like Boston or New York because IR emitters “completely stay out of that RF bandwidth.” The tricky part with IR systems is that the space needs at least two emitters to cover a space like a Broadway theatre. The signal can sometimes be obstructed by a person, object, or piece of clothing like a scarf. Lights and infrared cameras used in shows can also disrupt IR signal transmission. Fluorescent lighting in schools can do the same depending upon the modulation scheme, and sunlight overwhelms IR systems, making them dodgy for outdoor use. However, the advantage IR has over RF is that the signal bounces off of walls. It does not leave the building or room, which Broadway theatres favor because it prevents

piracy of shows.

“IR is more secure in board rooms where security of what they’re discussing is important, and if they need it they’ll go to an IR solution for that,” says Bateman. “With RF, it’s hard to stop the wall, so you could have two back-to-back theatres that could be operating on different channels on that same MHz band. Maybe Channel A is the Beacon Theatre and Channel C is the Strand next door. If the theatregoer has the ability to change the channel on his receiver, he could be watching *Macbeth* and listening to *Othello*.”

Mixing for ALS

New York-based Sound Associates handles the ALS needs for most of the theatres on Broadway, which is mainly IR, and Steve Harris, director of sales and operations, explains that their feed usually comes from the mixing console. Sometimes the feed comes from foot mics on the stage, which picks up the creaking of floorboards beneath the actors’ feet. Often times, however, those foot mics are used for the dressing room and monitoring feeds, not the assistive listening.

“It may not necessarily cover the whole playing area, so we put in a shotgun mic to augment or to take a separate feed onto ourselves, in which case they wouldn’t be on the floor so you wouldn’t hear the walking,” says Harris. (The recent play *Love Letters* featured its two actors wearing body mics, offering a stronger feed than a foot or shotgun mic.) “For musicals, we usually get a feed off of their mixer, and most productions are kind enough to alter our feed that they give to us to make it more accommodating to a person with hearing loss rather than a person who’s just trying to get an augmented sound.”

Musicals require more of a mix for ALS than straight plays, and given that some ALS users can have hearing loss associated with age or something more profound, a special mix tailored to their needs is an ideal consideration. “When the musicals come, we ask them if need be to dial back the orchestra in the mix that they give to us, so it still gives ALS users orchestra but gives them more of the lyric,” says Harris. “Unless they’re completely deaf, using a cochlear implant or a neck loop, they still get a certain amount of the orchestra through their natural ear, and that tends to create a balance for them that gives them the same effect that you and I are just listening through our ears. It allows them to have the clarity of the lyrics and still get the nuances of the orchestra and the support underneath of the orchestra, so it doesn’t sound a cappella.”

Harris and Sound Associates usually procure an ALS mix at the final dress rehearsal, and they typically get a feed from the sound engineer. If not, they will put up a shotgun mic that will capture the sound onstage minus any sound effects run through the board. “We like to use the audio that they’re giving to the audience as best we can, and it’s usually not known until the very last minute if it’s not going to work,” says Harris. “I would say 99% of the time the production feed that they give us works, and a majority of those times they’re willing to futz with their mix of what they’re sending to us. If they’ve got a board that’s got an auxiliary output, they’ll give us their own feed if they can and will fine-tune it for the needs of an assistive listening system. It varies from production to production, but for the most part they’ve got something.”

In the Loop

Another type of ALS that is popular in Europe and gaining ground in America is induction loop technology. “This creates an electromagnetic field that a hearing aid will pick up if it’s equipped with a telecoil T-Coil receiver,” says Friend.

For a loop system, a cable is run under the seats (preferably under the carpet as well) and sometimes around the walls. Harris says that ultimately every 18 inches has cabling, “and that cable that emanates a modulated AM signal, so a person with a T-Coil in their hearing aid could tune it to that and use it without having a separate receiver at all,” he explains. “A couple of Broadway theatres have put it in, although I don’t know if they have necessarily gotten that much use out of it because there are not as many T-Coil users going to the theatre as they may have anticipated. Our infrared systems have a pendant receiver that would also work with the neck loop, and I can tell you that our numbers for the neck loop are not nearly as great as the stand-alone headset, which anybody can use.”

Bateman notes that loop technology is favored by some people who would rather use their personal hearing aid or cochlear implant and not draw attention to the fact that they require an assistive listening device. It’s a personal choice. He also notes a technological advantage. “You can design an array where you lay out a particular pattern of wire in one way and a different pattern of wire in a slightly different way,” says Bateman. “It has the same audio signal going through it, but you can adjust the phase and the amplitude on it where you can then ostensibly steer the coverage pattern. With a properly designed loop, you could have it in a really tight configuration and could have two theatres next to each other with loop assistive listening in it, and one can’t hear the other because of the way that the array is designed. That’s another reason why as theatres are renovating they’re finding that the loop will work in their space and make sure it’s not going to interfere with the space next door.”

Bateman adds that theatres have another component to ALS: a descriptive system. For people who can hear but have limited vision or are blind, a separate audio channel offers a feed from someone in a booth describing the action on stage while trying not to speak over the dialogue. "Assuming it's an RF system, Channel 1 is the show and Channel 2 is descriptive system," says Bateman. "But it's the same for an RF or IR system. Loop would be harder. You couldn't have two channels of loop happening at the same time, but RF or IR allow for that to happen simultaneously."

There are different options for theatre and venue owners who need or want to upgrade ALS devices. Regardless, it is clear that they are an indispensable tool for many audience members that can enhance the appreciation of many performances. Even for some of us without hearing issues, they can boost the sound of a play and make sure we never miss a word.