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WIRELESS INTERCOM SYSTEMS' CONTINUING EVOLUTION

From durability to user-friendliness, wireless systems fit the bill.

Above: The 2005 Shakespeare Festival at the Lowell Davies Festival Theater is held outdoors, which makes wireless communications more critical than ever. The rugged design of newer intercom systems, which feature waterproof casing and limited moving parts, enables operators to communicate clearly in any weather condition or off-the-wall location.

BY J. MICHAEL HUGHES

“To be, or not to be?” For a performing arts venue, if it is “to be,” it has to think far beyond the theatrical productions, headlining stars and ticket sales, and start focusing on its professional audio equipment.

Through the years, wireless intercom systems, once a luxury item for the high-end market, have now become a necessary item for any theater production. “Before we got our wireless system, our mode of communication was literally flashlights and walkie-talkies that only worked about 30% of the time,” said professor Timothy Hopp, Tri State University. “Now a message can be relayed from the stage director to the sound booth and back to the crew instantly.”

Issues

However, with the onslaught of wireless intercom systems came an onslaught of issues.

In the mid- to late-1980s, the theater industry began working with equipment in the VHF frequency band, which is shared by broadcasters and many more users. Ultimately, the VHF band became so crowded that sound directors could only rely upon clear communications about 50% of the time. Though many hailed the FCC’s opening of the unused portions of the UHF band for low-power communications in

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the early 1990s, this band has hence been dominated by wireless mic and in-ear-monitor systems. It is not uncommon for a production to have 40-plus wireless microphones.

On top of static-riddled communication, sound crews, frequently working in dim to no lighting, face issues of equipment integrity. "Stagehands tend to be rough on equipment, plus they're bumping around backstage in the dark, so equipment historically has not had much of a shelf life," said Paul Peterson, sound director, The Old Globe Theater.

Small parts, such as knobs and antennas often fell victim to large backstage crates and props.

Next Generation Wireless Systems

An overcrowded RF spectrum and questionable equipment, once the standard in wireless communications products, no longer make the cut in today's tech-savvy theater industry. This forced manufacturers to seek and implement improvements in equipment.



Photo: Ken Howard

The Old Globe complex recently began using a wireless intercom system with UHF frequency and has cut down on its engineering staff's repair time by about 80%.

With the VHF and UHF bands nearing capacity, plus the government mandate requiring every broadcaster to carry an analog and digital signal for the next five years, the biggest complaints of theater sound directors is lack of available RF spectrum and poor sound quality.

Additionally, the wear and tear on the equipment historically have been a major factor for wireless intercom systems, clear frequencies or not. With \$40,000 budgets for batteries alone on many Broadway shows, a sound technician's last concern is repairing loose knobs and broken antennas. However, these minute details often waste more of an engineer's time than he or she has available.

Wireless communications systems of today have been designed to meet the needs of theater professionals, as well as many other types of users. When searching for a wireless sound system, theater sound professionals look for the following features:

- Secure frequencies and crystal-clear sound: VHF is a thing of the past. The UHF spectrum has full bandwidth and better sound quality, but is facing a challenge for available frequencies. Theater production crews are demanding 2.4GHz digital spread spectrum and frequency-hopping technologies, which offer multi-function capability and ensure an agile signal.
- Durability: Stage crews work in limited lighting and often bump into backstage equipment. Today's belt packs should be light and ergonomic with feature options such as detachable or built-in antennas, sturdy knobs, waterproof casings, padded belt pack covers and more.
- User-Friendliness: Many of today's

systems can literally be taken out of the box, turned on and used. Often stagehands are not as tech-savvy as the sound operator or an engineer, but are forced to work on the fly. Easy-to-use equipment with self-help features such as built-in “wizards” will keep any production running smoothly. Systems now also offer software that enables users to program equipment from PCs and PDAs, and adapt the system to fit exactly what each staff member needs. For example, some users may require ISO or talk-around functions while others may need to make stage announcements from the belt pack.

- **Compatible systems:** Large productions often need more belt packs working than a single base can manage. Today’s systems allow users to cascade multiple base stations to operate like a single unit, and will interface with old equipment or equipment from other manufacturers. The roadblock of four belt packs per base station has been passed as well, allowing some systems to operate as many as 16 belt packs on a single base station.

School Play vs. Phantom

Different productions require a different level of communication needs. If a production features 10 year olds tap dancing, and the audience is comprised of parents mostly, the sound equipment should be easy-to-use and much less tech-centric.

“Professional audio products of today can literally be taken out of the box, charged up and used, with little or no set-up time,” added Peterson. “This has relieved so much set up time for me and my crew, which is not as tech-focused.”

Systems feature belt packs with multiple volume controls, which allow belt-pack users to adjust and mute the volume of each intercom channel. Master and auxiliary volume control knobs provide a push-to-mute function so users can temporarily mute a channel while keeping previous volume settings. Dual-channel access allows users to choose from two hardwired intercom channels. Simultaneous dual-channel access is obtained using the optional second receiver module.

According to Hopp, "Our wireless intercom has enabled us to be more professional than we ever were before. Previously, we had to do sound checks from the booth and backstage, but now I can sit next to the director and get the audience perspective."

Digital technology and greater frequency options now available in portable communications devices allow for clarity of voices and a higher quality of sound than ever before. Frequency agility enables operators to communicate within the 470 to

740MHz UHF band. These synthesized frequencies can be selected in 25kHz increments over each 18MHz operational band, allowing users to easily choose from 720 different transmit and 720 receive frequencies.

These features do not stop with the simplistic systems, however. More advanced systems, used for large productions, offer users digital, frequency-hopping transmission and smart technologies that communicate with other systems, old and new. "We produce a number of Broadway-bound

shows, which means a lot of gear is coming out from New York," said Peterson. "Wireless systems can be programmed to work with other manufacturers' equipment, enabling us to have a seamless performance. It keeps the industry standard going."

Expandable Systems

Expandable systems allow users to configure the systems to meet the theater's communication needs. For example, by intelligently linking several base stations together, up to 12 users can communicate with each other in full-duplex operation and up to 16 users can communicate when some frequencies are shared. The multitude of configurations enables crew to communicate on two-channel networks, giving managers the opportunity to talk to one another, while the stagehands solve problems on an entirely different channel. Today's systems have been designed for everybody in need of professional audio equipment: for theater, broadcast television, sporting events and more. However, with a versatile programming interface, each system can be set up to fit the specific needs of each venue.

Sound directors have complete control of the intercom communications because they are able to change belt pack configuration via PDAs, and base stations through a front-panel interface or even through a computer program on the latest systems. "The amount of access we have [nowadays] to every aspect of the system is amazing," said Chris Luessmann, sound supervisor, La Jolla Playhouse. "I can literally program every aspect of every module way before the production begins."

New PDA interface options provide a convenient method to configure belt pac frequencies and functions through a built-in IrDA port using a Palm-OS PDA and PDA850 program. Belt pac controls are configurable for multiple transmit modes such as "push-to-talk" and "push-to-enable." Separate talk buttons for each channel can be configured independently for latch or momentary operation. Buttons not set up for transmitter con-

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WIRELESS INTERCOM

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trol can be configured for party-line selection, paging, ISO, alert and call functions.

“Each member of the crew becomes accustomed to certain settings and equipment,” said David Naunton, sound director, Goodman Theater. “Newer systems have adapters that are compatible with a variety of headsets, so people can work comfortably with what they’re used to.” Versatile headset connectors allow use of standard four-pin XLR male connector or field-install a four-pin female or five-pin female XLR connector. And beltpacs have been designed to auto-detect the microphone type.

In larger productions, equipment often is shipped from show to show, causing beltpacs, headsets and other equipment to take a beating. With this in mind, engineers have designed features to make equipment much more durable and rugged. “In the past, when something broke, we were literally in the dark flying blind,” Hopp added. “Today’s systems stay intact and have LED blackout modes, so now the audience is blind to us, instead of vice versa. ■