

Putting the focus on conversations

A three-part whitepaper series

Moving to a new technology platform presents hearing instrument manufacturers with opportunities to make changes that positively impact patients. The introduction of the powerful new North platform has enabled Unitron to go above and beyond, helping patients hear speech in noise to really focus on conversations. It's not surprising that many other hearing instrument manufacturers share Unitron's goal. However, meeting each patient's listening goals while still maintaining natural sound is a significant challenge and not all solutions are up to the task.

Part 3: SpeechZone 2

This whitepaper is the last in a series designed to explain how Unitron leverages the combined strength of three signature features to help patients focus on conversations like never before. SpeechZone[™] 2 allows hearing instrument wearers to automatically hear speech coming from any direction in noisy environments. On Unitron's powerful new North platform, SpeechZone 2 is optimized to work with the SoundNav automatic program and Sound Conductor to take focusing on conversations to the next level.

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Favorite sound: wind chimes

Inspired by real-life needs

Difficulty understanding speech in noisy environments is the biggest complaint for those with hearing loss! In the real world, important speech doesn't always come from in front of the listener. People often have conversations with those positioned at their side, even when their focus and attention needs to remain straight ahead. There can also be multiple people involved in a conversation and the target talker is not always positioned directly in front of the listener.

Unitron introduced SpeechZone 2 to help hearing instrument wearers experience the best perception of speech coming from different directions in noisy environments. This premium-level technology uses the latest in algorithmic advances, including leveraging wireless technology to provide a variable directional beam based on the presence and location of a speech target. We have now taken this approach to the next level, using SpeechZone 2 to help patients focus on conversations in the toughest listening situations. SpeechZone 2 functions within an overall strategy that supports conversations with unique types of background noise, rather than just a single class of speech in noise. It automatically engages the appropriate microphone strategy in each hearing instrument when the classification within the SoundNav automatic program is one of the following:

1. Conversation in a crowd
2. Conversation in noise

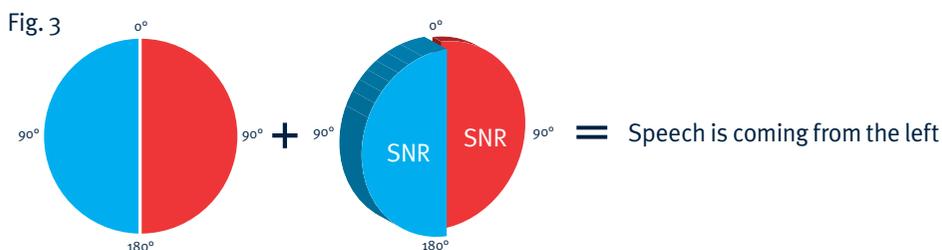
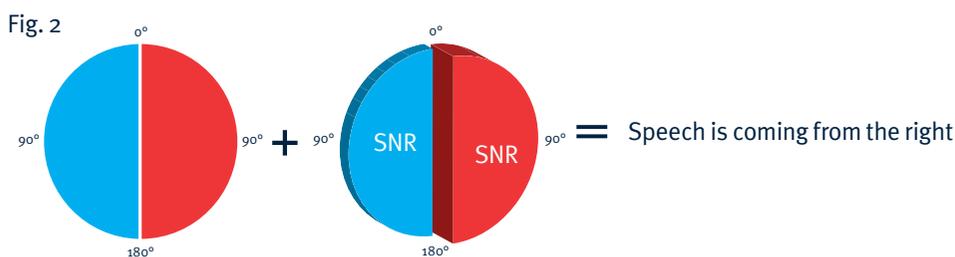
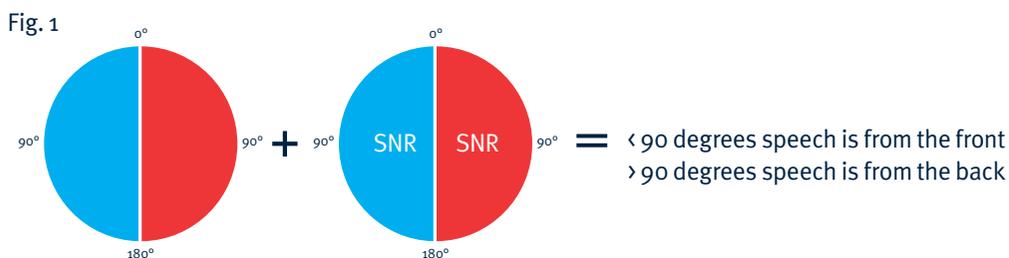
These two conversation types represent the listening environments where patients are likely to have the greatest amount of listening difficulty, especially if the person speaking is not directly facing the patient.

Although the outcome that SpeechZone 2 demonstrates is primarily a response in microphone strategy, the intelligence of the response is dependent upon the right and left hearing instruments wirelessly communicating with one another regarding the detection and location of speech. This communication happens by wirelessly transferring data between hearing instruments when speech is detected. The system then responds based on the outcome – specifically, whether or not both hearing instruments agree on the location of speech. When there is agreement between the hearing instruments, the result is either a symmetric or asymmetric directional response based on where the dominant speech is coming from, making it more flexible for providing patient benefit.

Binaural spatial processing is key

SpeechZone 2 knows where speech is coming from thanks to a combination of binaural spatial processing and wireless communication. SpeechZone 2 uses speech detectors to identify when a dominant speaker is present from any angle, where less than 90 degrees indicates speech is in front and greater than 90 degrees indicates that speech is coming from the back.

It then uses detectors to look at the signal-to-noise ratio (SNR) difference between the hearing instruments. While an agreement on the presence of speech with equal SNR is consistent with a front or back location (Fig. 1), a higher, more favorable SNR in one hearing instrument indicates speech is present on that side (Fig. 2 and Fig. 3).



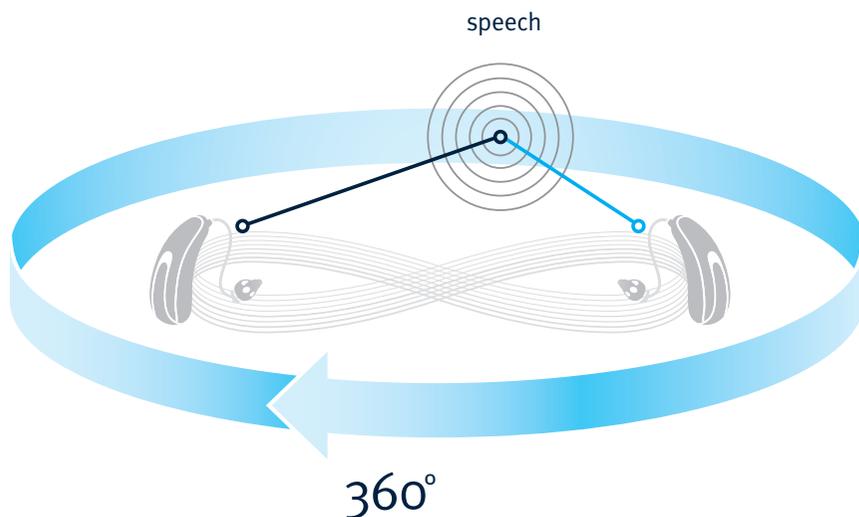
An intelligent response

SpeechZone 2 uses binaural spatial processing to determine the exact location of speech, whether it's coming from the front, back, left or right. It then leverages advanced technologies to provide an intelligent response, automatically selecting a symmetric or asymmetric synchronized microphone strategy to ensure the best speech understanding in noisy environments. This is all done automatically when classification within Unitron's SoundNav automatic program is either the "Conversation in a crowd" or "Conversation in noise" listening environments.

When speech is from the front the response is a symmetric maximum multi-band adaptive directionality.

When speech is from the side the response is asymmetric, applying omni directional with Pinna Effect on the side targeting speech and adaptive directional on the side with noise. One of the great benefits of this asymmetric approach is that it can engage automatically when the conditions are deemed appropriate, without the risk of missing speech from the front. It locates the dominant speaker from any direction and maintains audibility without sacrificing environmental awareness or requiring the listener to stay in one place.

When speech is from the back the response is symmetric, with both instruments in omni directional mode.



Hear speech from every direction

SpeechZone 2 is part of a sophisticated system that includes two other Unitron signature features: SoundNav and Sound Conductor. These three signature features automatically engage in the most challenging listening situations, working in harmony to help patients focus on conversations like never before.

SoundNav automatically identifies and classifies seven distinct environments, putting special focus on different conversation types, each with their own unique background noise.

Sound Conductor dynamically balances the appropriate features to deal with each unique listening scenario while maintaining natural sound quality.

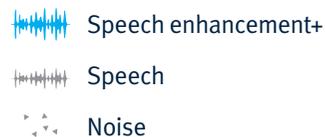
SpeechZone 2 automatically engages in extremely difficult background noise so patients can clearly hear the speech coming from any direction.

Speech from the front

Listening situation: Checking out at the grocery store

Patient goal: Make their purchase while engaging in conversation with the cashier

SpeechZone 2 response: Maximum multi-band adaptive directionality in both instruments



Speech from the back

Listening situation: Wearer is in a wheelchair and unable to turn around

Patient goal: Clearly hear the person behind them

SpeechZone 2 response: Omni directional in both instruments



Hear speech from every direction

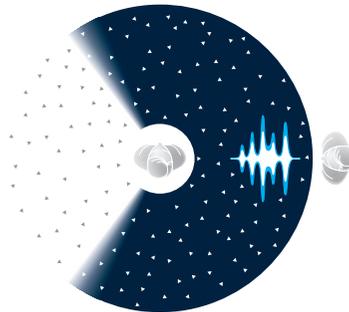
Speech from the side

Listening situation: Out shopping with friends

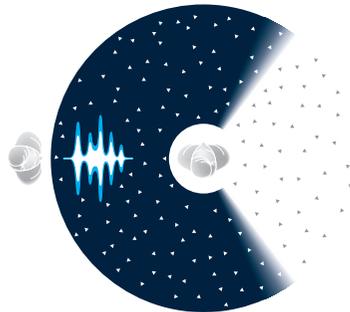
Patient goal: Carry on a conversation while watching where they are going

SpeechZone 2 response: Omni directional with Pinna Effect on the speech side; maximum multi-band adaptive directionality on the noise side

from the right side



from the left side

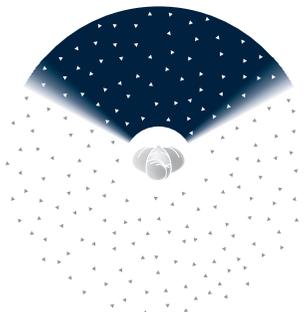


No dominant speech

Listening situation: Sitting alone in a busy airport or coffee shop

Patient goal: Comfortable listening without sacrificing awareness or audibility

SpeechZone 2 response: Fixed directionality in both instruments



Ultimate listening. Everywhere

SpeechZone 2 makes it possible for the wearer to achieve better speech understanding in situations that would normally be addressed by applying the traditional approaches of directional microphones and/or noise-canceling algorithms. SpeechZone 2 is an incredibly advanced solution that is only made possible by combining traditional directional microphone technology with the latest in wireless innovations. It works closely with two other Unitron signature features to put the focus on conversations so patients can experience the best speech understanding in conversations no matter what background noise is present.

As new technologies continue to surface, Unitron remains committed to engineering solutions that build on the benefits provided by signature features like SpeechZone 2 to solve the everyday challenges of those who wear hearing instruments.

This whitepaper is the third and final installment in our three-part “Putting the focus on conversations” series. To learn more about the other Unitron signature features that SpeechZone 2 works in harmony with to help patients understand conversations you can read the other two whitepapers in the series:

[Part 1: Classifier and SoundNav](#)

[Part 2: Sound Conductor](#)

References:

1. Kochkin S. MarkeTrak VIII: The key influencing factors in hearing aid purchase intent. Hearing Review. 2012; 19(3):12-25.

At Unitron, we care deeply about people with hearing loss. We work closely with hearing healthcare professionals to provide hearing solutions that improve lives in meaningful ways. Because hearing matters.