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German entrepreneur tunes into hearing loops with Otojoy

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Technology

A Santa Barbara entrepreneur is hoping to make life in public places a little easier for people with hearing loss.

Thomas Kaufmann's Otojoy installs hearing loops, which take audio signals from sound systems and then transmit them electromagnetically to be picked up by a special feature found in most hearing aids. They eliminate many of the problems that hearing aid users have with amplified sounds in public places. Otojoy has installed more than 25 systems, most of them in the Tri-Counites, since being founded in mid-2012.

But Kaufmann's story starts in his native Germany, where he founded his first company at age 18. He booked musicians and DJs for corporate events at BMW, KMPG and other firms. While onstage, he was always careful to protect his hearing with high-tech earplugs that are common among musicians in Europe.

That helped put Kaufmann through school while he was earning his diploma degree — the equivalent of a master's degree in the U.S. — in physics. While finishing his research and juggling his business, he also freelanced at a patent law firm in Dusseldorf, where he connected with a professor at UC Santa Barbara. He came to California for a four-week internship. At the end of it, the professor invited him to work on a doctorate in chemistry at the school, even though Kaufmann hadn't taken a chemistry course since high school.

"Then I went back to Germany for eight

see **TECH COLUMN** *on page 8A*

TECH COLUMN

Continued from page 7A

crazy weeks to essentially cancel my life in Germany and learn chemistry," Kaufmann said.

Kaufmann eventually sold his old business in Germany. But it wasn't long before he decided to stop with a master's degree in chemistry and start Otojoy in the United States. What sparked Kaufmann's interest initially was the high-tech, custom-fitted earplugs he'd used in Germany. They were ubiquitous among musicians in Europe but rare in the United States.

He was making progress when someone from the Hearing Loss Association of America's Santa Barbara Chapter asked him if he'd ever worked with hearing loops.

Though the technology is fairly simple — it's literally a wire loop around a room — it requires some scientific knowledge to get it right with tricky rooms, and it also has to integrate with professional audio systems. "That was extremely interesting and very exciting," Kaufmann said. "Because of my background in physics and experience with music, we can do it all at once."

Hearing loops leverage something inside a hearing aide called a telecoil, or t-coil. The t-coil was invented to get around the problem of talking on a phone with a hearing aide, which can cause a nasty whine of feedback. The coil and associated circuit cut off the hearing aid's microphone and instead pick up and amplify an induction signal from the vibrating magnet in the phone's speaker.

A hearing loop simply takes the sound from a public address system and turns it into an electromagnetic signal that can be picked up by t-coils. The coils, which are in about 70 percent of hearing aids, are universal, so they work with loop systems all over the world. And they do not get tangled up in the cacophony of radio frequencies bouncing around the modern world.

"Whatever comes out of the loudspeakers is fed into the loop system. Essentially the system is a giant antenna," Kaufmann said. "When it's a large room, or the building has metal in it, things get more difficult."

In a big room like a theater, it's hard to get a homogenous electromagnetic signal. And for reasons of physics (the magnetic field lines need to hit the vertically oriented t-coil at a perpendicular angle to produce a current) the systems won't work if a user is right on top of the loop, near the edge of a room. The systems use a clever arrangement of phase-reversed arrays to get around those problems.

Otojoy's business strategy has been to get the word out to people with hearing loss and ask them to ask venue's about installing the systems. So far it's working. The systems are in the Lobero Theater, the New Victorian Theater and several civic meeting rooms in the city of Santa Barbara.

Tony Ruggieri, a production supervisor with City TV Santa Barbara, said the city had been using FM-transmitter based headsets for hearing assistance in the city council chambers and elsewhere.

"When you're dealing with a small station like that, it's susceptible to all sorts of interference," Ruggieri said of the FM-based systems. "And the big thing is it's not tuned to all hearing aides. You have to check out a headset, tune it in, and sometimes there's static. [A hearing loop] seemed like a good solution for us, so we installed the loop system into three of our meeting rooms."

Otojoy's next steps are to try to take loops to any place where a person with hearing loss might have trouble hearing sound from speakers, whether its at the teller window at the bank or a pharmacy. It is also working on a piece of hardware and a mobile phone app that would let people pickup hearing loop signals anywhere they're present without having to pay a lot.