

SoundBites Podcast Transcript

Episode: Dr. Achin Bhowmik

Dave Fabry: Welcome to Starkey Sound Bites. I'm your host, Dave Fabry, Starkey's Chief Innovation Officer. If you've listened to this podcast before, you know that I love to talk technology, and Starkey recently introduced some groundbreaking technology in the hearing aid space. Technology, really, that has never been seen in our industry before. There's no one better to speak on that topic than our CTO, Dr. Achin Bhowmik, who's my friend, my colleague and importantly, my boss. I'll be on my best behavior, Achin, for the next little bit here, but welcome back to Starkey Sound Bites.

Achin Bhowmik: It's always great to talk to you, Dave, and share our exchanges with our audience.

Dave Fabry: Indeed. This has really been a long time in the coming. You joined Starkey in 2017.

Achin Bhowmik: August of 2017.

Dave Fabry: Really, almost in secret, began working on what is now known as Genesis AI at that time.

Achin Bhowmik: Right. We kept it quiet up until now.

Dave Fabry: Yeah. Let's go back to the beginning then.

Achin Bhowmik: Right.

Dave Fabry: When you first... When Brandon Sawalich, Starkey's CEO and president had discussions about bringing your industry knowledge coming in from your past experience at Intel, heading up the Perceptual Computing Division, and then you took this turn in your career to join our space. I can tell you personally, I'm very glad that you did. Talk a little bit from ground zero, how it is that you began on this.

Achin Bhowmik: Yeah. Thank you very much for the amazing setup here. I think, if you go back to the vision, it was very clear by the time I learned enough about what hearing aids are, sitting by the feet of Mr. Austin talking with Brandon, you and other

colleagues, listening to customers and patients, it was very clear, there was an opportunity to significantly improve the experience with these devices. Collectively as an industry, we were not where we could be. It required us to build a product from the ground up with just reimagining the devices inside out -- from its architectural design, the processor chips, the signal processing algorithms, the mobile app that patients use it for controlling the way the professionals fit these devices with the fitting software, the whole thing.

Dave Fabry: All new, everything.

Achin Bhowmik: Right. It does feel like a long time. Five years in the making. But given the magnitude, I would say even the audacity of the technical targets we set for this ground up redesign product with everything new. When you say everything new, it's not a marketing buzzword here. The processor was built from the ground up. It takes time to develop a processor that's custom-built for the kind of experience we're delivering with Genesis, which we are going to talk about, to developing new paradigms of sound processing algorithms.

Dave Fabry: Additive compression system.

Achin Bhowmik: We'll talk about that. Packing it all into an industrial design that we should all be proud about. Extremely comfortable to wear, pushing the patient experience higher, ground up built mobile application that's so intuitive to use and fitting experience we're going to talk about. Looking back, five years is a long time, but that's just how long it takes to build a product of this magnitude.

Dave Fabry: Absolutely. Even in... Yeah, I don't think you mentioned the receiver cable on the RICs is new.

Achin Bhowmik: Yeah, it's part of industrial design.

Dave Fabry: It's still a snap fit that I thought our six-pin receiver snap fit was the best connector in the industry.

Achin Bhowmik: Right.

Dave Fabry: This one is better than that.

Achin Bhowmik: The best gets better, yeah. It's significantly better.

Dave Fabry: Just the use and the durability of that, the pliability of the receiver cable, we left no stone unturned in this. Let's talk a little bit. Now, we just had the launch. In that, we sort of hit the high points, but now, sometimes you get to go into the weeds. I can't think of a better person to do that with and a better place to do that than on this Sound Bites Podcast. Let's talk about deep neural networks.

Achin Bhowmik: Sure.

Dave Fabry: Your expertise in this area is legendary.

Achin Bhowmik: Thank you.

Dave Fabry: Coming from Intel and your use of that in the visual spectrum and then, now, in the audio space, what... talk and unpack a little bit for the professional.

Achin Bhowmik: Right.

Dave Fabry: Keep in mind, this podcast is designed for hearing care professionals. Why should they care about a deep neural network in a hearing aid?

Achin Bhowmik: Right. It's a great place to start. All of the hoopla and excitement around AI, deep learning or deep neural network being a branch of AI, what people should care about it, because it changes the experience with the technology and the product. In the domain that I like to often bring an example from is the autonomous car. When that works, there is still work to be done to bring it to everybody, just imagine having just to sit back and relax and the car takes you where you want to go. It changes the experience when it works. In our domain, we are, of course, at the forefront, given in the last five years of work, on developing and deploying AI and deep neural network for hearing applications.

In the old days, the engineers had to handcraft specific types of settings and algorithmic tweaks to make the device behave well as we go about our daily lives. From having a conversation with you, to walking through the noisy cafeteria, to walking out in the street where cars are honking and there's wind blowing, the world throws that to you, all these very complex acoustic environments, and the device has to learn to deal with it. The old techniques, up until now, based on handcrafted algorithms were simply not good enough. What AI and specifically deep neural network does is a data-based approach for the device to become smarter and deal with challenges that are thrown at it from an acoustic viewpoint. In a way, that was not possible with previous technology.

Essentially, you take this neural network to a general audience. I like to explain that as mimicking the circuit that you have in your cerebral cortex of the brain. The brain is an amazing computational system. In fact, the most amazing computational system that you know of. At its core, not often the neuroscientists, the way the computational equivalent description of it is relatively simple. You have a network of neurons that are heavily interconnected and then learn from the information that is thrown at it. When a kid is learning to recognize language, they're basically training that neural network. Copying a page from biology, the technology equivalent of that is a

deep neural network built into the device. Well, there are two ways of doing it. One, you could just build it in a software, which is what most people have done so far.

With Genesis, it was an opportunity for us to go one step further and build a hardware architecture where neurons are interconnected in a block on the chip itself. It's an on chip accelerator that does such a good job in high performance execution for neural network algorithms, which should provide amazing listening experience for your patients, which is why our professionals should care about because it will improve the experience that their patients have with these devices as far as their listening goes in day-to-day life.

Dave Fabry: Correct me if I'm wrong, let me try to unpack that. There's a lot there. In terms of emulating the way that the brain works in terms of the deep neural network, if you will, in terms of nature in our brain, we're integrating information that comes from the left, from the right ear and the left ear, even from vision and from multiple inputs, timing, frequency, intensity where noise location sources are, what speech is occurring. The brain is taking all of that in and is capable of using the ears as sensors and submitting that and then sorting out speech, usually, is the most salient target that we want to hear. What we're doing in the neuro sound processor is emulating that by looking at inputs that are coming. Now, this works. This device can be fit monaural, but you would say then, it's designed with binaural-

Achin Bhowmik: Binaural.

Dave Fabry: ... systems in mind from the ground up to be taking those inputs in both sides and then monitoring to be able to determine, is this a quiet environment? Is there speech present? Is there noise present? Some combination of the two. Where are the noise sources, et cetera? What it takes more than anything is an insanely fast processor, I would imagine, to be able to take all that input in. Can you talk a little bit about the engine that the neuro sound processor has on this new chip set?

Achin Bhowmik: Yes. As I do that, just to build on what you just said, it's exactly what it is. It's like taking a step back, looking at the neurobiology of human hearing. Because at the end of the day, this product is designed to help you hear better. So far, for decades, the focus has been on what is lost in the ear.

Dave Fabry: Exactly.

Achin Bhowmik: The neurobiology of the ear is very well known where it performs the functions of a directional microphone. It performs tonotopic frequency analysis. In the cochlea, you have the outer hair cells that provide nonlinear amplification. Finally, you have the transduction that sends neural pulses resulting from the

sound waves into the brain. However, the magic, as you said, happens in the brain, understanding conversations, reducing of noise and helping us pay attention to what we care about or should care about. That happens up in the cortex. This amazing computation that is done by a network of neurons suffers if we live with hearing loss for a long time. You have brain atrophy, neuron losses and all that.

The opportunity for processing that goes on in a hearing aid now is not just to amplify sound in a way to mimic the sensors, sensor cells in your ear, but also, pre-process that signal in a way to help your brain understand those sounds that matter. Processing that is typically done in human... healthy human brain, but this is an opportunity for us to perform processing in the neural network and the fast competition to deal with additive comprehension systems such that it becomes easier for our patients to understand speech, to reduce noise and just go about their day-to-day life. It's much easier with these devices on than otherwise or even with legacy devices.

Dave Fabry: Indeed. On the chip, it needs much faster processing than has ever been in the hearing aid before. Certainly, in anything we've offered or anyone else.

Achin Bhowmik: Right. Let me just geek out on the numbers a little bit on the processor.

Dave Fabry: Yeah. Please. No, and this is the time to do it.

Achin Bhowmik: Yes, and you pointed out my past life at Intel, the small chip company.

Dave Fabry: Yeah, you know a little bit about chips. Yeah.

Achin Bhowmik: Chips, I can geek out for a long time, but just let me tell you a few things about it. That the processor itself takes the longest time to develop in any product that we build. It took us five years to bring this to market from the concept to the market. This processor chip is a once in a decade upgrade. It's not a minor or even incremental improvement from the processor of the past generation devices or even compared with what our industry is familiar with. Just to give you and for your audience some numbers, we have crammed in, packed in six times higher number of computer elements or transistors into this tiny chip that's actually smaller than the past generation.

Dave Fabry: Right. It's smaller with six times a chip.

Achin Bhowmik: It has four times faster speed. It has that deep neural network hardware accelerator engine built right into the hardware of the chip. It has five times higher processor memory, 10 times higher system memory. Because guess what, AI needs as much computation as you can throw at it, and it needs memory footprint for bigger models to be hosted on it. The engine under the hood is what enables this amazing performance listening experience for the

product, but this engine, the upgrade of the processor, its once a decade significant upgrade.

Dave Fabry: With that engine, that processing speed, the number of transistors, the onboard memory as well as everything else for doing all of this computational power must be tremendously draining on the battery, right?

Achin Bhowmik: That should be the traditional conventional wisdom. In fact, I call it the tug of war for the engineers because more computation performance, the more processing you do, the more energy draws and hence, lower battery life. I call it the challenge of defying gravity. You have this four times faster, six times more transistors, a deep neural network and amazing sound processing engine that we built on it where you have additive system. It's dealing with different sounds in parallel and bringing it all together at the end. We couldn't do that before because we didn't have the computing power. What does it do to the current draw and battery life? Should we be just preserving the battery life? That would be a great fit.

Dave Fabry: Sure. Yeah.

Achin Bhowmik: We defied gravity in engineering terms because not only we have this orders of magnitude, higher computation performance, we have doubled the battery life on a single charge. Whereas the previous goal for prior products was make sure that you can get a full day of use from a single charge. Now, we get more than two days of full use out of a single charge from Genesis RIC RT devices.

Dave Fabry: Yeah. I think that's incredible in terms of the RIC RT with a telecoil, with all of this processing and computational power, and it has 51 hours of battery life if you're using it just as a straight hearing aid with no streaming. Even streaming, you're 40 plus, 45 hours of battery life, almost two days.

Achin Bhowmik: Yeah. All the while, you have now 10 times faster noise reduction system. We have 20 dB, wider dynamic range, lot more processing going on. At the same time, you are using the device twice as long as you used the other devices.

Dave Fabry: You talked about that in this case it's an onboard DNN accelerator. Talk a little bit about where would professionals and ultimately, patients expect to see the benefits? You talked about faster noise processing. Is that where this shows up in terms of noise management? It shows up in overall sound quality, speech intelligibility? Where is going to be the tangible benefit that a professional and ultimately, an end user sees from Genesis AI?

Achin Bhowmik: Right. I'll call out a few areas. Of course, it's a ground up redesign for the overall experience for listening, but I'm going to call out a few areas where the patients are just going to notice the difference immediately. The listening experience in soft sounds, they just appreciate how quiet and reduced noise in relatively quiet

environments. That's why we spend most of our times in your quiet study room, right?

Dave Fabry: Yeah. I'll tell you that I've worked with patients on this product and fitting them and even those who'd been fitted with Evolv AI. One patient, I asked him if he wanted me... if he was willing to try Genesis as we were developing. He said, "Sure, I'll try it, but I can't imagine how you're going to give me anything that's better."

Achin Bhowmik: Any better. Right.

Dave Fabry: In the frame of spontaneous user acceptance, I put them on him, programmed them and we were in a quiet room when we did. He said, right off the bat-

Achin Bhowmik: They notice the difference.

Dave Fabry: ... "It sounds more clear. It's quiet." He said, "I'm hearing every word clearly." I know everyone says when they introduce new products that's the case.

Achin Bhowmik: Yeah. Yeah, they will forget-

Dave Fabry: I'm telling you, this is a tough sell.

Achin Bhowmik: They will forget that they're wearing the device.

Dave Fabry: Yeah. Yeah.

Achin Bhowmik: The secondary place they will see the benefit. This is all stemming from the wide dynamic range and seamless processing of sound with additive compression system that deals with different sounds of different response times. They should feel reduced listening effort in noisy environment, in understanding conversation speech in difficult environments. They'll feel the difference there. From the softer sounds of life to noisy environments where you could get every help you can in understanding speech, they should feel the difference from the prior generation products and from other products in the market.

Dave Fabry: Yeah. We will have... We're going to talk about this over the next several podcasts. If we don't get through everything that we intend to today, we'll have you back. Dr. Sara Burdak is going to come back and talk a little bit about the clinical outcomes. One of the things that, I think, really impresses me beyond that how quiet something that is really exemplary is the sound quality when there's low ambient environments, but then we have 118 dB input dynamic range, that's the largest in the industry. As you said, it's processing those very soft sounds, keeping loud sounds from reaching an uncomfortable level when programed by a professional and then delivering that sound quality throughout all of that range, using this additive compression system that uses different time

constants and different attributes for transients versus steady state noise and really enabling the hearing aid user to make the maximum use of their residual-

Achin Bhowmik:

Hearing.

Dave Fabry:

... dynamic range, the residual auditory area.

Achin Bhowmik:

Yes. Yes. Right.

Dave Fabry:

In so doing, I think, one of the things, and I'll tease a little bit on some of the clinical outcomes is, we've seen for the difference between previous hearing aids and current, the Genesis AI, is the magnitude of the difference increases with increasing loss. I think it's really because of this processing that is emulating-

Achin Bhowmik:

Enabling them. Yeah.

Dave Fabry:

... and enabling them to make every use of their remaining hair cells in the brain.

Achin Bhowmik:

Yeah, with remaining... Yes. Yeah. We are taking on some of the processing tasks that their healthy brain would've done, but unfortunately, we don't have that between the ear and brain. Yeah.

Dave Fabry:

Offloading that and that translates into ease of listening.

Achin Bhowmik:

Yeah. Also just the crunchiness, the speed of processing, 10 times faster noise reduction. Before you feel it, it's gone, and then the wider dynamic range that you're talking about, 40% lower noise floor and people are going to feel that. Yeah.

Dave Fabry:

Look, and in our industry, others have used training, using a deep neural network for training of the devices, but as you said, this is an onboard accelerator that we're using and Edge Mode Plus. Now, is that an example when people have said, "Well, Edge Mode is pretty good for those patients who get into challenging listening situations that can either double tap or button press in an app to activate an Edge Mode acoustic analysis in a challenging environment." Edge Mode Plus is incorporating elements of DNN already, correct?

Achin Bhowmik:

Yeah. Right. Yes. Like you said, I used to say, Edge Mode is putting the power of artificial intelligence at the fingertips of the patient, right?

Dave Fabry:

Exactly. Yeah.

Achin Bhowmik:

Now, with lot more data in our bag, lot more use conditions and use cases allows us to go to that next level with the Edge Mode Plus where it's optimized

for listening experience, speech understanding or you might want to go into a noise reduction mode and get extra benefit that you need from this with the power of deep neural network providing the algorithmic performance behind that.

Dave Fabry: Yeah. In particular, those moderate and really noisy situations are where this is now scratching the surface and then we're not done there yet. As we've said before, we're just getting started. With this product, this is really planting a flag with this onboard DNN accelerator as to where we can go with this in the future.

Achin Bhowmik: What it does is, it resets the baseline. It resets the baseline. It's almost like, every time you have a breakthrough technology, it resets the previous baseline. When vacuum tubes used to be the devices powering our electronic devices, when transistors came, it reset. From single digit to tens and hundreds of vacuum tubes, now, you have billions of transistors on the chip. The platform, the engine under the hood that we have now, it allows us to basically get on a bandwagon for unlocking newer and further benefits with algorithms.

Dave Fabry: Right. Now, for the clinicians that are listening, a lot of times the unknown, the anticipation of a breakthrough like that has some fear associated with it. Reassure me, as an audiologist, that deep neural networks aren't going to put me into extinction.

Achin Bhowmik: Right. In fact, if anything, it is going to help, because the patients are going to be more satisfied. The way that I explain the devices, first of all, you need the devices to be fitted really well. The only way to get that done is through the professionals. We didn't get into the details of it, but the advances in the technology for Genesis is not just in the processor or sound processing algorithm or even the mobile app, but the fitting software, Pro Fit, takes it to a very different level that our professional customers will immediately notice. We call it Minute Fit, four clicks from box to First Fit and even the quality of the First Fit where we have algorithmic advances to fit very well. No two ears are the same, right?

Dave Fabry: Yeah.

Achin Bhowmik: The improvement we have in the fitting algorithms are going to enable great patient experience. Once we have fitted the patients and they're out in the wild, you want them to be happy. What these devices do with AI and deep neural network is, it instantly analyzes whatever challenging environments that are going to work through their day-to-day lives is going to make, guess this, 80 million automatic adjustments every hour. That's 22,000 a second. In fact, that's almost two billion per day.

Dave Fabry: That's crazy.

Achin Bhowmik: These devices, without me doing anything, are constantly analyzing and adjusting for me, are going to make happy patient. It's actually great for us and great for the professional customers. As Bill Austin likes to say, his vision was, "Can you make hearing aids to be my very own brain assistant?" That's what it is, because what you lost in your healthy... what used to be in your healthy brain, the ability to process sound, understand speech, reduce noise, you don't have them anymore with hearing loss. These devices are the very personal brain assistant. The AI engine in there is constantly working, constantly analyzing, making two billion analysis and adjustments every day without you even knowing about it as you're going about doing your own things. Helping you hear better, helping you reduce your listening effort, helping you enjoy the softer sounds in life, connect with people and connect to the world around you. It's great for entire ecosystem, good for the patients, great for the professional customers who are fitting those patients, great for us because we have satisfaction of bringing advanced technology to serve people that we serve.

Dave Fabry: For sure. You mentioned Pro Fit is the new fitting software and for people that have been very content and very happy. I've heard a lot of feedback over the years that Inspire is, for many professionals, their favorite software, but we've even streamlined that further. With simple things like being able to have the devices automatically detect left ear, right ear and see those are-

Achin Bhowmik: How do you do that?

Dave Fabry: Through that smart connect.

Achin Bhowmik: We needed to do the snap, the cable. We needed to redo cable to put smarts in it. It's a complete design.

Dave Fabry: Right. Now, as soon as you go to read a new set of devices, you're not reading two left devices. You're reading and identifying the left one and the right one.

Achin Bhowmik: Yeah. Thanks for calling that out. These are innovations that should make our professionals' jobs easier.

Dave Fabry: There are ones that we tend to forget with all of this newness. I'm telling you, that's a pain point in the past to sort of, "Oh, okay. Now, I have to look at the tiny printing or try to read which one is which." This automatically does it, four clicks from start... from the box into the ear and with that First Fit and yet, for those people who loved Inspire, there's a sense of familiarity in Pro Fit, with innovation by things like that, that smart connect, I think another feature that will, for some people, just go unnoticed, but it's embedded in there with that accuracy of the First Fit is that after you run the feedback initialization, it takes into consideration the venting. It improves the venting... It uses the venting to improve on the feedback optimization and that First Fit is that 2.0 is taking full advantage of that improved dynamic range both in terms of the amplitude and the frequency to better model.

We're able, because of this additive compression system, to deliver more high frequency gain, but with great clarity. Some people are going to say, "Oh no, they're going more high frequencies." That's going to sound harsh.

Achin Bhowmik: Not here.

Dave Fabry: We didn't hear that.

Achin Bhowmik: Also, talking about patient, sorry, the professional benefits. Should we talk about the firmware upgrades? How long does it take to upgrade the firmware? We have, now, four times faster firmware upgrade, possible with Genesis compared to Evolv.

Dave Fabry: A pair of devices in about three minutes, maybe four minutes. That's remarkable.

Achin Bhowmik: Yeah. How about being able to do that through the mobile app?

Dave Fabry: In the app. One of the things... As you know, one of the things I do is, it's like the hair club. I'm not just an employee, but I'm a customer. I wear the devices when we're testing out new ones. One of the cool things is in the radio dial under my hearing, you come in there and you look at my settings about my hearing aids and it tells me whether the firmware is up-to-date or not. If it's not up-to-date-

Achin Bhowmik: You can have-

Dave Fabry: ... I can do a firmware update within the app myself as the end user.

Achin Bhowmik: Yes, the first time.

Dave Fabry: That's convenience for me and for the professional. For the first time, I can do that and it updates the firmware in just minutes. Many clinicians will prefer to use that as an opportunity to have the patient come back in, explain to them what the-

Achin Bhowmik: The new features.

Dave Fabry: ... the new features are that are going to come along with the firmware. They may want to control that, but for people like me, that are maybe a little more tech savvy, I want to have the convenience to get access to those features as soon as they're pushed out. Again, we're finding this balance for that... from the minute fit, from the box to the ear in four clicks, but yet, I'll still, as a professional, have access to the 24 channels on the premium product. For soft, moderate, loud inputs plus MPO, I can go in and get under the hood and tweak all I want, but I don't have to. Same on the end user side, Edge Mode now offers that same easy button, if you will, that I can go into Edge Mode and just click

one button. It'll do an analysis in an environment, but notice that I have two additional features now that allow me to optimize for-

Achin Bhowmik: Speech.

Dave Fabry: ... speech audibility and clarity and to take advantage-

Achin Bhowmik: Right. Reduce noise.

Dave Fabry: ... of that additional noise management, that more aggressive noise management. We're really finding... I think... I'm biased, but we found the sweet spot between ease of use and that comprehensive adjustment by the end user and by the professional. I think it really continues that objective that we've had for a number of years of saying, our technology in the professional's hands continues to deliver the best patient outcomes and that people, professionals don't need to be afraid of DNN. 80 million sounds like a lot of adjustments every hour, but-

Achin Bhowmik: Happens by itself. Nobody has to do anything.

Dave Fabry: ... it happens by itself. Then really being able to see the proof in the data of the outcomes that we've shown. Ease of listening has improved, more audibility for soft sounds as you mentioned, more high frequency amplification to provide that clarity without harshness, that full advantage of the dynamic range and overall speech understanding in quiet and in noise. I think clinicians are going to be blown away and their patients will. I think, and I want to hear from you if you're getting a different experience and you try the devices, but we're delighted to bring this to market. I'm appreciative to you in terms of your team and your partnership to helping to deliver this really significant-

Achin Bhowmik: Well, thank you for bringing that point up. Earlier, I was having a conversation with Brandon about just what it took, right? Five years went in a flash, but every part of the company played a role. It's on the technology side. You have from... from vision, to ideas, to advanced research and development, to engineering, to operations, for manufacturing and finally, to the commercial teams for getting trained and have it out there. It took the entire company the last five years to bring this, I would say, breakthrough line of products.

Dave Fabry: Yeah. My home is the R&D group. I think there isn't a person in R&D who wasn't involved in some way or another.

Achin Bhowmik: Right. Yeah. It's a massive project.

Dave Fabry: It's a massive effort. I think we had over 200 patent submissions since 2017. Many of which pertained directly to this product. We still have some of the features that we introduced back with Livio and continued in Edge and Evolv

with physical activity tracking, but also, continuing to make these devices smarter. Now, we've doubled the activity classifications-

Achin Bhowmik: Yes. We should have-

Dave Fabry: ... so that the device... In the old days, I get on the elliptical trainer as I do most mornings, and it would say that I got steps. It would say that I got some exercise, but now, it can say... it can differentiate between running, between standing, of course, laying down even, riding a bicycle, all aerobic activity.

Achin Bhowmik: It's an advanced activity tracker.

Dave Fabry: All of that is automatically detected and chronicled in the app for those people who want to record-

Achin Bhowmik: It continues to have the lifesaving fall detection feature. We happen to have the only device in the industry that saves patient's lives if they fell and send an alert to their loved ones.

Dave Fabry: Yeah. All within... We highlighted a little bit of the My Starkey app. We'll have more opportunity to go into this in greater detail in the future, but I think just... There's so much to talk about, but within My Starkey app, the user interface puts all of the most common adjustments front and center, so that, now, you just have the radios for Edge Mode program My Hearing, which is, as I said, where it is that you go in and look to see if you need a firmware update, volume control adjustments. Even... Most people are going to turn the volume up and down in the two ears because the professional has set it up to be balanced, but I can still override that and go in just underneath the hood and see that.

Achin Bhowmik: Right. All of the controls are there.

Dave Fabry: Everything is right here. All the controls.

Achin Bhowmik: Very simple and intuitive interface.

Dave Fabry: Yeah. While the program... For somebody that suffered lifelong visual challenges, the nice thing is, I can just swipe and it will change from memory to memory. I get the audio prompt in my ear. It changes the color. That's such a subtle detail of that little different palette, so that I don't have to concentrate on trying to read in low light or challenging environments. I know that I've changed it. I get the audible feedback in the ear. I couldn't be more excited. I know how passionate you are in leading the team through this. I thank the entire team at Starkey, from R&D, to marketing, to sales, to operations, to everyone that's making this happen. I can't wait to see-

Achin Bhowmik: It's a big moment.

Dave Fabry: ... what market thinks. It's a big moment-

Achin Bhowmik: It's a big moment. Right.

Dave Fabry: ... and congratulations.

Achin Bhowmik: Thank you very much.

Dave Fabry: For those people who listen to the Sound Bites Podcast, if you enjoyed this, please like it. If you hit subscribe, you'll be sure not to miss a single episode in the future. I know we'll have you back to talk more about this because we're just getting started with this. I can't wait to see where we're going next. I can't share everything because as I said, the R&D part of me wants to tell everyone about and shout from the mountaintops, but we have a lot of other things that are coming out in the future-

Achin Bhowmik: Yeah, we're just getting started.

Dave Fabry: ... and we know that the patients are going to like. Thank you, Achin, for what you do. Thank you for being here to share and nerd out with me a little bit today on this podcast and look forward to seeing you again.

Achin Bhowmik: Thank you, Dave.