Sunu Band: Hands-on Technology for Mobility

By David S. Morgan, President & CEO
New Hampshire Association for the Blind at the McGreal Sight Center

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Fernando Albertorio is CEO of the Boston-based startup Sunu. I first met Fernando two years ago when I was Vice President of Perkins School for the Blind. SUNU was awarded the assistive technology prize as part of the MassChallenge incubator program for their innovative prototype of a wearable device that aids mobility.

David: What is Sunu, and how did it get started?

Fernando: First of all, thank you, David, for having me as your first guest speaker. I'm really excited to be part of this process.

At Sunu, our mission is empowering independence for people who are living with sight loss or impaired vision. The idea behind Sunu is to create technologies that help empower mobility and orientation for anyone who is either blind, low vision, or living with vision loss. I live with low vision and am legally blind. My eyesight's below 2200 because of albinism. Like me, there are **over 200 million people worldwide who are living with some form of vision loss or impairment**. Sometimes in living with this vision loss or impairment, freedom of mobility is one of the biggest things that [is] impacted, and it affects quality of life for many people. The impact is pretty huge, as you very well know.

One of the biggest problems is that people [with sight loss] tend to opt out of using aids or any other type of technologies that could bring value, could bring an impact to their mobility. [Some] reasons for this [are] because these technologies are hard to learn how to use, they're expensive, and there's this underlying current of social pressure or anxiety when it comes to using some type of adaptive tool — leaving someone with the feeling of being embarrassed or stigmatized by our own society because of the condition that they live with.

At Sunu, our core philosophy is you shouldn't feel embarrassed by using a tool or technology that empowers your life. This is why, at our core, we use design. **We use a human-centered design to create wearable technologies that empowers orientation and navigation.** The first of our technologies that we've been developing is something called the Sunu Band. Essentially, it's an **ultrasonic navigation smart-**

watch which uses sonar technology, or ultrasound, that's embedded discreetly within the wearable. [This can] empower or provide a sense of awareness for the individual, for the user, around things that are within their environments (obstacles, objects, things that are within their path) whether they're walking about, whether they're in an environment like a building, or indoor spaces.

Sunu infographic with image of watch and tag, courtesy of Sunu, Inc.

The idea behind the Sunu Band is to provide a heightened sense of awareness so that you improve perception and improve orientation, and thereby, improve mobility. This project [is] a couple years in the making. We started out in Guadalajara, Mexico where my two co-founders and co-inventors of the technology, Marco Trujillo and Cuauhtli Padilla, were working on a service project at a school for the blind in Guadalajara. They noticed that kids at the school for the blind would struggle during their weekly orientation [and] mobility lesson and also that game-play was very different. It struck them that game-play at the school between kids at the playground was very different. They had this idea of bringing in one of their early prototypes to get kids to solve mazes and just play.

What happened next was pretty remarkable: the kids started solving matrix mazes, they were playing tag, and they wanted to use this within their orientation and mobility lesson. That caught the attention of the principal, the teachers, and the parents who basically saw something in this and asked Marco and Cuauhtli to try to develop it further. That kind of set us on this path of creating what we have today as Sunu.

David: Terrific, that's a great story. I'm wondering, as you talk about the Sunu Band, what is it about? What comes to mind when we use the word "accessibility" these days?

Fernando: What comes to mind for me [is that] accessibility goes hand-in-hand with inclusion. [There is accessibility] when you have diversity of abilities, diversities of point of views [*sic*], whether you're building something, you're prototyping, whether you're producing, or delivering a service. When you have inclusion, you're more likely to be successful in bringing something of value that helps many, many people. Of course, you can build for a certain group, or for a niche. But then when you're also building a service or product for everyone, it really does have a big impact by bringing in that diversity of thought, of abilities […] — people who are visually impaired, in this case. Obviously, this is the topic that we're talking about today, but it could be even just diversity of knowledge or in other areas.

When I ask myself, "How do we make things accessible?" I think [about] inclusion of people around the table when you're developing, creating, delivering services. It just makes things so much better and impactful. It reminds me of the talk that [you gave, David,] at the Design Museum in Boston, where [you mentioned that by injecting inclusion early on in] the design process, you're basically creating empathy. You're creating more individualism, the ability to reach out to those most in need representing a smaller portion of the population. **With making small changes, you can have a big impact.**

Below is a continuation of this interview from our blog.

David: I think that's a really great point. The spirit of what you're talking about, accessibility, for me, is viewing technology as this great equalizer where technology becomes ubiquitous. It's kind of, in all ways, just an expectation that technology will be accessible for all of us, irrespective of the type and nature of disability.

This seems to be a trend, but I'm wondering how you see mobile technology, apps, the emergence of wearables integrating into lifestyles for the visually impaired. What's that future look like?

Fernando: That's a great question, and one thing that just stuck with me is technology is a great equalizer. I grew up in the 80s […] way back before computers were mainstream. Pretty much, I had a handheld magnifier if I wanted to read, or I could get access to one of these giant screen readers. Reading books, for me, was very tedious and sometimes it took longer for me to go through a book than my other schoolmates. It wasn't because I didn't know how to read or because of my proficiency as a reader. It's just because I have to use other tools to do the same job.

Now, think about an iPad and what that iPad has done for me. It's opened up e-books where I can readily change the font size, the style, and now I'm pretty much a voracious reader. I'll go through three books a month. […] Depending on what I'm reading, whether it's a business book or a science fiction book, I'll consume that content faster because of this tool, this iPad or even my mobile phone.

That has actually changed the way I interact with content. When we think about mobile applications [and] wearable technologies, again, we as individuals with impaired vision, we have everything to gain here. It's very exciting because, with wearable technologies, we're seeing this big boom in technologies around fitness, health, whether it's activity tracking, and its all-around personalization. Give me a device that will personalize my medicine, my health, my fitness, my exercise, so that I can own that personal bit of my daily activity. I use data that is personalized to me that will help me take action and make either a lifestyle change or will help me have a better conversation with my doctor.

We also look at applications, mobile applications. What happens is that technology becomes this great equalizer. What we're doing is […] making visually impaired individuals more consumers. Therefore, the developers of these technologies have to build (and they're going to have to build) with accessibility in mind, with serving the visually impaired segment. We're not talking about a trivial amount of people. We're estimating between 20–30 million Americans will be living with severe vision impairment by 2020: that's what the CDC is reporting right now. The biggest drivers for severe vision loss are macular degeneration, glaucoma, and diseases like diabetes and cancer.

As we're developing personalized medicine devices for monitoring your glucose levels, monitoring exercise, we have to — and developers are now taking into consideration — the side impacts of these diseases, like diabetes and cancer. We are starting to see a lot around mobile applications for empowering the visually impaired around anything, from navigating outdoors to even indoor navigation. […] Technologies that were used initially for commerce, or for stores to track where customers are at a big box store, [are now] being repurposed to tell you where the bathroom is or where, for instance, the next store is in a shopping mall. For someone with vision impairment, that actually is access to information — information that's around your environment.

David: Interesting, and this seems like a natural lead in to asking [you] about what's in store for us in the future. Some of the spirit of what you said resonated for me in that, more and more, we have the ability to design for the “one,” rather than just designing for the “many.” We have 3-D modeling, open source software, [and] education focused on individualized and project-based learning. Do you see this trend benefiting those with disabilities in general and particularly those with vision loss?

Fernando: Absolutely, and it has to be because, as I said, it's not trivial. With 20–30 million or more Americans living with severe vision loss, […] people who have low vision, like me, who were born with that, and people who are also blind, we definitely are to gain from the technology. […When the activity tracker] Fitbit first started out, it wasn't the most accessible device for people with low vision or people who are blind. And then we are starting to see [that] Fitbits obviously are used by people who are blind and [who have] low vision because they've evolved that so […] it's now accessible. I think […these technologies and platforms…] are more ubiquitous and developing for accessible phones. You can access all your apps and your navigation tools with voice command, [and] we are going to start seeing a lot more applications being produced and developed with that mindset, to reach the visually impaired.

David: Does some of this speak to why developers are paying more attention to accessibility and designing for the visually impaired?

Fernando: I really think so, and I think that also it's because there's this push [for accessibility]. As you start developing, we become consumers. [Designs for the visually impaired] is a practice that traditionally isn't served, and it's not marketed to as well as our sighted counterparts. As the applications become better, accessible, and we actually are asking for more inclusion, then absolutely: we definitely have to pay more attention [to those with sight loss].

David: […] We're seeing this [sense of inclusion], of course, in announcements from Microsoft, Facebook, Google, and even car giant Toyota around developing accessible navigation, apps, and devices. But [we're] also viewing all this accessibility as a productivity improvement tool. What does all this mean for others, like you, trying to innovate in this space?

Fernando: I think it means that we're going to start accelerating the pace of innovation into great validation of what we're working on. As an entrepreneur in a startup within the assistive technology space, we're seeing a huge validation in terms of the major players recognizing that, for instance, social networks need to be more accessible for the visually impaired. They want access. They want to use the network. […Then] people, like Google, realize that there's a big need in terms of navigation support. [We can use] social data to provide better support for someone who's blind or visually impaired to locate their bus stop, for instance, or know what's within their neighborhood.

That's big, and we even see that with ride sharing apps, like Uber. For [example], one of our beta users […] normally uses the ride to try to get to an appointment, and it's a long and tedious process to get to use the ride. It's sometimes quite frustrating, and now he's using Uber. […] Uber is improving their app: it's making it more accessible so that,

wherever he needs to go, it's very instant. And now he's enjoying that benefit just like everyone else.

David: Are you finding, and this speaks to all these devices and accessibility coming into market, that it's good for business? Are folks just being altruistic and great corporate citizens, or is it compliance driven? Or is it a bit of all of that?

Fernando: I think it's a bit of all of that, and we're going to see which way [business goes… For Sunu,] it's centered by a huge social mission. We're sent out on our mission to improve independence and access through our technologies. We see a big business potential. Looking outwards into the horizon, again, the number of people living with severe vision impairments is going to be increasing. […] There's a big opportunity to solve hard problems. With companies (giants like Toyota, Facebook, and Google) innovating in this space, this actually brings this problem in the forefront of technologists [and] developers who are out there thinking about, "What's the next problem I'm going to solve?"

For startups that absolutely adds to the ecosystem, and it creates this big brewing ecosystem of talent and of innovation. It's going to accelerate it, I think, for the next couple years definitely.

David: What's next for Sunu, and what's your vision of Sunu's technology?

Fernando: Our vision is to create technology that uses a beautiful design — uses a human-centered design to be functional, intuitive, easy to learn, and that integrates within various aspects of your daily living. Right now, we're starting out with an ultrasonic navigation smart watch, and that ultrasonic navigation smart watch, called Sunu Band, [is] actually an award-winning bracelet. It provides you information about your environment. It tells you you're getting close to an object or you're about to hit something that's within your path. It's making you more aware of your surroundings.

I could see our vision moving forward [as] integrating that with applications that run on your smartphone [to] help you locate your bus stop, [or] things that are within your neighborhood — like a neighborhood Starbucks, or maybe it's a laundromat. Or maybe it's within indoors (inside your supermarket) so that you can find the bread aisle faster, instead of having to rely on having to ask people and having to deal with that social anxiety. We envision our technologies to basically complement those aspects of daily living. It's all around making you more empowered and independent.

David: Now, for those that are in Orientation & Mobility and are helping individuals with sight loss navigate their world, they're used to using a white cane. In some cases, folks might have dog guides. How would the Sunu Band work in that kind of continuum of tools and technology?

Fernando: Technologies are tools that are meant to improve and augment our abilities, so you have to be careful about not thinking of it as the “end all, be all.” When we started this project, we immediately realized that we're not here to replace a cane or replace a guide dog. We're here to complement, to augment, that person's ability while they're using either a white cane or a guide dog, in that regard. Our tool, our Sunu Band, complements.

It adds a new layer of awareness for someone who is using the cane. Sometimes accidents to the body, to the head, happen frequently — bumping into tree branches, or skirting around sign posts or trash cans. It’s just a frequent occurrence that sometimes you miss with a white cane. Even at some simple things, like standing in a queue and moving along in a queue, where some guide dogs are trained to get you out of the queue because they want you to avoid that obstacle. Our device, basically, fits into those areas where it either complements [those available tools and fills in] when those tools aren't optimal for you.

David: Terrific. Fernando, I'd like to thank you so much for joining us today and helping us learn more about Sunu's technology, the world of wearables, and accessibility and where it's going.

Fernando: Great, thank you so much, David. I really appreciate the opportunity to be here and speak with you and the New Hampshire Association for the Blind.