Braille Literacy Canada 2024 Symposium Transcript: Where are We Now? An Update on the Monarch Dynamic Braille and Tactile Graphics Display (Peter Tucic, HumanWare)

**Daphne Hitchcock:**

We can start with our next speaker. So, Leo, if you would like to do that introduction.

**Leo Bissonnette:**

Thank you, Daphne. It is indeed my pleasure to introduce a very familiar name and a very familiar voice to you, Peter Tucic. Peter has presented at previous symposia, and he's back again. He's excited to be here. And he wanted me to mention that when we had a little email exchange, he was pleased to be back with us as he shared good feelings about his previous presentations to us.

In case you don't know Peter, Peter Tucic is the Director of Strategic Partnerships at Humanware. Over the years he has been involved with many product lines. Today, he's going to focus on the Monarch Tactile Graphics Multiline Braille Display. Indeed, this is an important and relevant topic with our theme of “Touch The Future”. This is a new generation product that is going to revolutionize for us Braille production and Braille access in the next few years. Indeed, the Monarch in the next few months will be more available to people. Peter is going to update us on the availability, the results of education field testing, teacher trainings, and the feature set that will be released later this year. So, Peter, with that introduction the virtual podium is yours.

Peter Tucic:

Thank you so much, Leo, I tremendously appreciate it. And yeah, I'm absolutely jazzed. I'm fired up. I'm ready to rumble on a Friday afternoon. Tthanks to everyone and BLC for the opportunity, and really just being able to come and talk with all of you. certainly we'll have some time for questions - I really look forward to it.

For those of you who have heard me kind of talk on this before, this will be a bit of an update. And for those of you who may not be familiar with the Monarch, maybe you'll come away with an item or two that you may not have been as aware of. This will be a kind of a walk-through a why ,a when, a, what, a how, and they were sort of presentation, really looking at why did we build this? What is the device? When will it be available? What is going to be on it? How are we going to get there. Certainly a device of this nature is a bit different. There is a cost factor that definitely comes into play. I'll be able to address that. We'll be talking about that. Because this is not a 20 or 40 cell Braille display. It is a far, far cry from that it's something very, very revolutionary. And we're really looking to change what refreshable Braille or really what you know, dynamic refreshable tactile content can look like.

When we talk about: why did we build this device?, why did we go down this road, and why did we start with the education environments. it is to be noted that education is a starting place. Education has been the Northstar of why we've started this. Students today receive materials, far later than their sighted peers. Often times we're sitting in the classroom and we're just waiting for that tactile graphic or that information be given to us. The impromptu learning is not as as efficient as it is for a sighted student or sighted colleague. We need to lessen the production time, we need to think about recreating a Braille page on a refreshable Braille device, and thus eliminate the need to collate to ship to store to save the sorts of files in physical form. Not that refreshable Braille is going to displace hardcopy Braille. We absolutely do not want that to happen. And that is not our intention. We do know that in a classroom or even in a workplace, having volumes of Braille taking up space is not the most convenient way to walk through our days. When I was in school, I had one of the only German textbooks in North America at the time, and it took up about 70 ish volumes. My chemistry textbook took lots of space. That is something we've sought to lessen. We've sought to get around and bring ourselves into a more natural environment; to be able to house content, and be able to more readily access that content in real time. So we're not up to having to refer to that exact volume that we need or to that exact graphic we need. We know oftentimes, that when a tactile graphic is given to a student, or when we see a picture and any sort of tactile graphic is given to us, we use it to learn, a concept and then it's put away or we don't see it again. And that can be a problem. I mean, if someone sighted only had access to a picture. And then it was all of a sudden not available until the next time they went to a cabinet pulled out that photo in today's world that is just very, very impractical. That's not how it works. From our field testing and the results very early in this process, we knew that on average most blind people are only seeing 20, 30, 40 tactile graphics per year. If you were to think about a level playing field and you were to think about what a someone who sighted is looking at, im terms of pictures or comprehending, you know information in that sort of visual way. They're looking at 20, 30, 40 pictures within the first few minutes of waking up. So we really want to bring forward what that means. We also want to increase impromptu learning. We want a quick way to illustrate that I saw Sully's triangle A quick way to refer to those floor plans that maybe you're reviewing for your course.

We need a way to store and refer to content. So the y was tremendous. We also know that we want a Braille device that will allow you to naturally read Braille. If we're reading braille properly, we're employing the butterfly method. The butterfly method is where we use two hands to read that line of braille, and we're about two thirds of the way down the line to be moving from left to right, our left hand moves to the line below on that physical piece of paper anchors the line below and our right hand finishes the sentences and then comes down and meets our left hand and we repeat the process. On today's refreshable Braille are one long line they make the world seem like it's one big long line, we're not reading like that. We're reading kind of in a in a way, that's not really how we're taught to read. And so we wanted to recreate that experience as well. So to employ that butterfly method for reading and kind of loosely is why the product is called the monarch. But certainly there is another piece there too, which I can touch on.

When did this all happen? How did this come about? So we are partnering on this product human where as partnering on this product with the American Printing House for the Blind in the United States. APH put out a request for information in the summer of 2020. We've been working on this for over four years I've been very, very heavily involved with in this for over four years. And even longer than that with our dot, Inc, the technology cell technology partner, but human where was selected in 2021, to be the provider, we are an equal investor on this product, we are equally investing with the American Printing House for the Blind on developing. This has never been done before. Traditionally, The American Printing House for the Blind will take a product and adapt it and put it intoproduction. There were times where they did develop some of their own products. This is an equal venture between ourselves and the American Printing House. And it's been remarkable to work on this from conceptualization through something we have that's actually scalable and rreleasable. In just a few short months its showed up in 2022. I still have mine that I use primarily some of you may have seen it out in the wild a little bit here and there. That device was one of the few units that came out in 2022 beta units and sort of field testing took place in 2023. We did this toward the latter half of the fall last year. And then in the spring of this year we've already had over 75 Canadian teachers and others attend monarch trainings to prepare us for the full launch that will take place in September. Traditionally our products, when we come out with anything, it's Hey, we're going to talk about this about a month or two or three before. And we're going to get everyone excited. And we're going to take pre orders and we're going to let you come feel this at convention or at various shows, and then away we go.

This has been a very, very different process. We have taken many years to get here. There has been lots of back and forth between myself and many other individuals who are far smarter than I am on the development side to get the product to do what we want it to do. We don't always agree, Greg Stillson and I are very, very close friends. And we have lots of heated discussions and get lots of feedback from the field testers and from beta testers as to what is the right way to work in this multi line environment. It is not as simple as taking what is on one line of a 20 or 40 cell Braille display and multiplying that by 10. There are lots of nuances where we have never seen things like post messages or pop ups or how do we indicate what item is in focus when you're looking at 10 lines of Braille with no speech. These sorts of things take months to kick around and we've definitely put in a lot of time to do that. And then to build that multi line protocol has been a challenge and it's something we've conquered and we still have a long way to go, especially when it comes to the screen reader compatibility with a multi line protocol. does not exist at this point. And that is something we're working very hard with the likes of Jaws with NVDA. With voiceover. They're very keen to work with us. And that is something that will be coming, but certainly is something that just hasn't existed to this point.

In terms of the Monarch itself, what is it? Well, the Monarch is a connected tablet. And it's not a refreshable Braille device. It's not a graphics device. It's both. It's really an equidistant array of pins. Today's Braille cells we need to remember that they those Braille cells are not equidistant. They are spaced out through a number of cells on your display. You couldn't show a tactile graphic necessarily, because you wouldn't have equidistant pins. What we're able to do is we are able to utilize the entire array, it's 3840 pins that can display either Braille or graphics. It is a connected tablet that is running over the top of an Android base, although it is not Google certified. This is not a device that you're going to use to come into the google play store and download applications. That does not mean it isn't connected, it's just not certified, which is a good thing when it comes to security. And when it comes to what it is we're going to be doing as we move forward. We do not have any intention to certify the device. That is certainly something that we've ran into lots of we'll just call them stumbling blocks over the years and have ended up sort of leapfrogging you know, various players have leapfrogged and kind of spun themselves through different Android versions that we're constantly on our back foot, always. And it does not necessarily allow us to work as cohesively with the mainstream operating system. The device will have 10 lines of Braille at 32 braille characters per line. So again, that's 320 Braille cells. When it comes to a graphics array we have an equidistant cell perspective, it's 48 cells per line at 10 lines. So we have 480 equidistant cells. So we have an algorithm that allows us to show prer Braille spacing. The Braille is ever so slightly larger than that of a standard sort of Braille page. It is ever so slightly outside of that BANNA Standard. I think by like, zero point something millimeters, but it is capable of producing multi line Braille and tactile graphics on that same surface, thanks to this array. Andd again, the array is able to do 48 graphical cells per line in 32 Braille cells per line. There is audio and video output on the device. We do have text to speech. The device will also be capable of sending out the visual through HDMI to a monitor. And what makes it very unique is the device is touch capable, so that we do know where your fingers are. This is great because you can utilize this to point and click on options as you would on an iPhone. This is not a touchscreen device. It's not a capacitive touch sensor. What it is is an infrared beam that runs across the top of the array that looks down across the array and knows where your fingers are based on light blockage. This is a technology not only that will allow us to point and click on options. Also for someone who's sighted for a teacher, you can see exactly where your users fingers are on the line and we can track how your fingers are moving. That could be lots of implications as we move forward on what that means. But for those of us who are users it means we can point at an item and click on it we can zoom into certain parts of images and various pieces. So it is it is capable of that. We do have USB a support for thumb drives USB C port on the device as well for charging and for moving content to and from the device. There is a Braille keyboard on the device. We have a multi line word processor, we have a multi line Braille editor you are able to create, edit and work with multi line documents. And the dimensions it's the same dimensions as a 15 inch standard gaming laptop weighs about four and a half pounds. So it is it is definitely a far cry from some of the big bulky, not only books we carry around but also the types of devices it certainly we did believe when we did our initial studies and gathered feedback we thought folks would want a 40 character line by nine lines. It is what they wanted but it became too wide but the actuators and where we needed to put the actual motors and things that well not motors but the actuators that control the electromagnetic cells. So when you do graphics when you have an aspect ratio that's that Why'd your graphics become very stretchy? It does not work properly. And this is something we had to figure out what is the right aspect ratio? What is a ratio for a tactile graphic to be readable unviewable versus on a same screen, you know, we're array as a multiple lines of Braille, that is a challenge in ideally, you would have more of a square visual array. But ideally, on a Braille page, you want a more wider page with not as much depth. So, again, pieces that we've had to conquer, and I think we'll certainly see how this pans out as we move forward in terms of what people are going to want to see in future iterations.

The monarch itself. From a software foundation standpoint, we have a textbook library. So this will be the ability to download books from Bookshare, or fromCELA and other places, we're going to use the dolphin EasyReader SDK for this. We are certainly working with digital talking books working with all sorts of file formats, including EPUB, and others. We also have a tactile image viewer, that is what will allow us to look at tactile graphics. We're not seeing pictures, we're not trying to show you as much as I'd love to throw a picture of my kiddos on this device, it wouldn't make any sense, right? We're showing tactile graphics, that has been our goal here. Our goal has not been to take a picture of the Mona Lisa, and throw it on to this device and have it be somehow comprehensive to somebody who's blind. We are trying to recreate the graphics that exist in textbooks. And with that, trying to create simple tactile graphics. For starters, as you get into complex tactile graphics, you know, if you're creating them with embossers, you're looking at sometimes 25 30 40 - eand ven up to 50 dpi - , which is dots per inch. We're looking at of it above it somewhere in that 9.8 DPI range. So we are able to do the tactile graphics, but we're looking at basic sort of textbook tactile graphics, sometimes the more complicated you get, the harder the graphic is to read anyway. And then if you're really getting carried away, you end up getting your DPI so high that you just read the paper, I think we've all seen some really messy muddy tactile graphics for sure.

There is a multi line word processor, this is going to be capable of also doing math content, both forward and back translation in the UEB. Math, as well as mammoth code. What that means is we can consume math, and that has been created in Microsoft Word that math can be consumed by a user in UEB math, there is no middle entity needed to go from Braille to print or print to Braille. For a math user in the classroom. That is a major step forward utilizing Math ML to do this. And so the word processor will be capable of opening working with creating editing, multi line, Microsoft Word documents, and textfiles, but also doing Math ML content embedded for both forward and back translation and editing and creating content consuming content. All of that can be done.

There is a tactile image viewer. As I said, that is how we will look at our tactile graphics, we have a graphing calculator on the device that has been created using the Desmos. Kind of API, we're working with Desmos. And they've been a wonderful partner for us on building this product. So we have not only a graphing calculator that you can put in expressions and graph them it is a scientific calculator as well. But you can also feel you can in real time generate what is y equals 4x? Plus three, what does that line look like in conjunction with my XY axis? What happens if I manipulate that line and change the y equals 4x plus three to y equals 4x? Plus two? And I'm sure I'm bringing like back some anxiety to those of you who struggled with graphing and I certainly did. And a lot of times, you know, we would build our graphs using wicky sticks and using rubber bands. And using the Squeezy Tong things and the Barbie pizza cutter wheel thing and the tin foil, we still need to do that we need to do that to know how to build a graphic, it's very important that we understand how to build a graph. But it becomes very silly when we're trying to take more advanced math classes. And we're creating these little art projects for our teachers. And we're not that enable even to understand when you manipulate a parabola. How does it flip, you know how what happens if you change a value, The only way we can understand that as blind people is to either use sonification, which is good for some situations Or we build that graph manually, which takes a lot of time. So now we're in a situation where we can manipulate lines, hide lines, show lines and actually feel those lines change. Why does their curve change? Where do they intersect with each other and actually get that information in real time. So that's a huge step forward.

There is a multi line Braille editor this would be used if you want to write Braille without having any tactile translation. I mean any braille translation, I should say, I want to write music or I want to write my own grade three kind of shorthand not contracted great to but something further where I'm building my own Braille dots and I'm understanding what it means it's kind of like working on a Brailler we have that type of braille editor as well. So we have a word processor for all that sort of Braille translated content forward and back. But the Braille editor is more a raw kind of working on a brailler working in a straight up Braille editor that will allow us to work with Braille in Braille in Braille out as we want it to be.

It's only the beginning. We are working on I am about to see next week, the multi line web browser that will be on the device that has been completed, we will have an email client as well on the device that still is not there yet, but will be ready for launch. And the final piece, and the biggest is the Braille terminal. Those three items are our three short term goals. And short term effort is being put heavily into those three pieces. We know that for this device to be successful, it needs to function as a Braille terminal, we've had a bit of a chicken in the egg situation where we want the Braille terminal to work. But the screen reader manufacturers are saying, "well, you need to give us the terminal" so that we can build the protocol. And we'll say, "Okay, we'll build you the terminal But will you build the protocol because the protocol does not exist". So it's kind of this. There's a lot of faith and confidence, which I am all about. I love. And I fully believe in working together. And we're all in this together. So we've had some very, very great discussions, it will happen there will this device will function as a Braille terminal, not at launch, but it is something we are very, very actively working on behind the scenes. I was just in Australia and had a wonderful dinner and meeting with the folks from NVDA, we know that these things will happen. It's just going to take some effort on both of our ends to get there. And fortunately, everyone in this space - . I've been in this field about 10 years - working well more than that, but with Humanware work for about 10 years. And there we're all in this together. Even the companies that we sell competing products, we are all at the same shows, we all talk to each other. We are all in this together, we work together. And on projects like this, we have to work together. And that's what we're doing. Speaking about the working together -there is a how here - how did this happen? We have lots of partners, human Where is an equal investor with a APH. I brought that up before. But there are other players here we have the dot inc, is our technology provider that is a company out of South Korea, some of you may be familiar with the Dot Watch. And maybe saw that back in the day, the Dot Watch, we've worked with dot over the years to refine their Braille cells. So it is not so scrubby, it's a lot easier to read. The Braille cells have been worked on by Humanware prior to us even getting in touch with APH about when they ey had the request for information. So we've been working with dots since about 2018 on their Braille cell. We also have partnerships with the National Federation of the Blind and other blindness organizations because the feedback and with a lot of our field testing, it's been very important to gather feedback from blind individuals feedback from the blindness community, especially those involved with education because that is the kind of the Northstar for us until we push this all forward.

We have cniv as a "ambassador" organization in Canada, we have more than 40 partners around the world working with us on the new EB rail standard. EBraille is something that will work in conjunction with the efforts of building the monarch to redefine what electronic Braille files will look like and what Braille files kind of look like in that we're building a Braille file with markup. And this is a huge piece of this. And this is where I talked about Humanware and APH. We're not trying just to build a nice big shiny device and say this is really cool and you can buy it and read your Braille and get your graphics. We know that infrastructure has to happen also. And so this file standard that Willow free, has worked on extensively at APH and is now in the hands of the DAISY Consortium. This file standard is going to revolutionize the way blind people all over the world regardless of the device you're using Interact with Braille files. Today a Bril BRF is just a big wall of text. And that needs to change. We need to be able to navigate formatted Braille documents. Today graphics are not embedded in the files. They are embossed separately. They are placed separately in the files. Today we cannot access footnotes or endnotes easily when we're reading a BRF file or really when I mean, we know if we're reading a hardcopy book we have to struggle with what that is how does that work? And so the worldwide kind of effort has been underway with other over 40 partner organizations to build the E BRF or E Braille standard. It's going to revolutionize the way we look at Braille. It's a dynamic, interactive, and navigable new file type. This is a Braille file with markup think of it as a Braille ePub simplest way to put it is a Braille file with markup for headings for chapters four, you'll have hyperlinks you'll have you know if you're in a table of contents, and you need to go to chapter six and it's on page 73. You'll be able to press enter or activate that and it will load up it's an eight HTML based Braille formatted Braille file. It'll combine the Braille and the tactile graphics in one place. And this is extremely important for the transcribers. This is where it benefits even hardcopy Braille. Because now, when you embossed the file, if you have a graphics capable embosser, the graphics will emboss. At the same time it's embedded, it's a zipped file containing your Braille text as well as your images. It's gointg to enable digital braille delivery to really change and benefit Braille users everywhere. And again, any Braille device that can open an HTML file will benefit from this. So it's not just for those using monarch it truly is for everyone in the world. We want this to be a piece that the entire blindness community, all of us, allo are real users can benefit from APHA is developing an open source BRF to Eb RF converter that should be available next spring. And that has been going to be a huge part of this. So how are we going to do this? Well, the over the air updates, we'll come to update the monarchs as we as we continue to push updates out. We've also developed a software development kit SDK is our huge, we are not traditionally assistive technology, companies don't have SDK or software development kits, we usually hold our source code, code source cloak code, very close to our chest. Here, we're allowing we have we want trusted partners to build applications for the monarch. And this is something we're aiming towards APH has already built a couple of apps using the software development kit, there's a chess game on the device, and again, gamifying, some of this and the chess game is awesome, an interactive two player chess game, and eventually they would like to get it to work with chess.com. And that would allow a blind person to play chess with sighted opponents all over the world in the spatial way. They also, were able to build an interactive startup tutorial, they're working on a drawing app, which would allow somebody to draw on an iPad, send it over to the monarch, again, we talked about that impromptu learning, we're learning about isosceles triangle, or maybe we're reviewing the L shaped route, we're going to take from point A to point B, being able to quickly get that on the device is extremely important. So there is going to be a lot of this talk and work on the software development kit for our trusted partners. To be able to build applications. This is not going to be open source. It is not going to be something that's available to everyone. But we intend to have trusted partners build applications, and I would see spatial calendars or periodic tables, or maybe somebody wants to build a very, really amazingly neat spatial database manager, things that Humanware or even APH can't build, because we don't have the time or we just haven'tthought of those opportunities. So that will exist for our trusted partners

Let's talk about the cost. This is always something we intend to bring into the funded market. We're exploring all typical funding options. So when we think about Canada, I mean, you have various models provincially. And we've certainly are in contact with and have had great discussions with all of the traditional funding models, that the cost of the device is 24,000 Canadian dollars. With that being said, I mean, we are very proud of that we do not hide from that we believed that when we built this product would cost far more, when we look traditionally at what sort of the device is in that in what we're doing. And being able to provide this refreshable array of 320 cells, and 480 graphical cells, when we think about the cost of braille, and what it was 30 years ago, or even 40when refreshable braille was brand new, the cost did not preclude it did not prohibit people from using refreshable braille. It was very, except they're very expensive. And when you adjust it for inflation some of those products, single line products, were more expensive by far than what this product is going to be at launch and what this product will continue to be so it is a puff piece. I mean, I know I am totally blind. I I know what it's like to be a blind adult, I we fully understand that this can be seemed to be very cost prohibitive. When we look at what we're trying, you know what, what we're getting out of this though, and traditionally and kind of historically, what we're what we're at where we are, we're happy with what we've been able to do. Now, does that mean that we we just say, hey, write us a check for 24,000? Absolutely not. We need to be creative. We need to subsidize the device. We want all of you to make your voices heard. Talk to your members of parliament tell your stories to help get this device funded. Telling your story is how this can happen. The monarch can be subsidized the American Printing House for the Blind has had federal funding for a very long time and makes it sound very simple sometimes, and that they have quota, right they have this quota funding that can be used to purchase products for education. That would make it appear as though devices are free. They are not free. It's just they are federally funded. In other parts of the World human Where's responsible for the distribution in Canada and Australia and the United Kingdom? That is something that we're constantly needing to explore ways to subsidize outside of the traditional funding markets that exist outside of your ADPs and RAMQs y what else in addition to those products, what are those services? What else can we be looking at? If you have questions, you can always email monarch@humanware.com.

we can certainly answer any questions regarding the device. And I know that many of you will have an opportunity to get your hands on the monarch sooner than later. As far as where it will be available, it will be internationally, again done by Humanware localizations at launch will be in English, French and Spanish. So those pieces will be launched with localizations. More will follow. And it's going to be available this fall, we are shooting for a September release, that will happen. We will release in September, I don't have an exact date and time, at some point, I will keep everyone posted. We're just thrilled we know we are committed to part of our contract is committing to five years of development, post release. So post launch, there will be dedicated teams working on the monarch at both Humanware and The American Printing house for the Blind. The product's lifecycle would be upwards of five to seven plus years. So we were really excited for this. The Braille converter will also be a part of this should be available in the spring we'll see native born Ebro content next summer. All right, I think I did really well, I got it to 31 minutes. And I can do that presentation for about 90 So I tried to truncate it. I really appreciate the opportunity. I would love any questions.....

**QUESTION PERIOD**

Question:

How do you switch to tactile graphics from Braille and vice versa?

**Peter responds:**

Oh, my gosh, I love this. So it's a great question. So right now, the way you would do that is your tactile graphics would be separate files. So I'm reading a book and let's say there was a graphic, and I would switch over and I would open the tactile viewer and locate that file. Now, once e Braille is a thing, and you can do this today with ePub books as well, if you have an embedded image, what will happen is as you're reading, you will have a symbol that will denote an image or a tactile graphic, you will point and click on that symbol and it will load in the tactile viewer, you will review that tactile graphic, and then you will press your space with your triangle button and return to your book and carry on reading. So if you're using an EPUB, or this this EBraille file standard, those graphics will be embedded. And we have the mechanisms that will allow you to read your graphics and continue reading or vice versa. You also could store your graphics separately and the devices do have access to the T tactile graphic, which is the tactile graphic image library. So there are over 2000 graphics already on demand available on the device of everything from the SAD diet, which is a standard American diet. I love the acronym. Well, you know pie chart, two buses, the double decker bus in London or, you know, you can search the TGI L for all sorts of things. So and those can be downloaded and saved separately. So there, there is a dedicated tactile image viewer. And certainly if your books have embedded graphics, those would be viewable in real time right inside the books by switching to the tactile viewer by pointing and clicking. It's a great, great question. Thank you.

**Question:**

In terms of repairs, will it be by cell?

**Peter responds;**

**W**hat's really neat about this is it's actually easier to repair these than it is the piezo electric because this is an electromagnetic cell technology. The device has a membrane over the cells and you can actually kind of spilled water on their cells and you can just wipe it off, which is a very neat demo we did for APH where we spilled a can of Coca Cola on the cells, I do not encourage anyone to do that. We're not, don't spill it anywhere else except on the cells, by the way, because if you spill down to the Braille keyboard, you might be in trouble. But the to answer the question the cells, they do not work like a Braille device today where when a cell fails, it's kind of like old Christmas tree lights, where you have to go in and fix that cell and it kind of becomes a hassle. This is a different process and it will be repaired in Canada at our facilities in Drummondville, Quebec as Well in Longueille, Quebec in one day. But we are able to fix an individual cell as opposed to needing to replace a whole string of them. And it can be done far simpler.

Question:

**Y**ou know, as a blind person, and I think you sort of addressed this when I was in school, and I had a lot of those thermoform math graphs. I just even today with 3d printing, I just can't resolve detail. And I know you touched on it. But how would the Monarch address this? Maybe by zooming in or something like that?

Peter responds:

Yeah. So it's really neat. It's a great question. You know, when again, I think at launch, and our goal is to simply recreate those tactile graphics. So we're, we're not going to be extrapolating too much additional detail. However, if you put a tactile graphic in, again, we we are able to apply filters. And these filters can allow you to see different elements of the tactile graphics that you might not get if they were just emboss. So there are ways to run, I have a watercolor example that I like to show where, until I apply a filter, it kind of just looks like a bunch of circles. And then when I apply filters, you can see the different shading and each circle, the the you know, based off the different thought patterns that have been put in by the tactile graphics creation, whoever created that graphic, and you're able to actually filter, or I have a boron atom where you can see the electrons and you don't see neutrons, or you know, and then once you filter it, you do see those neutrons. So there are ways to apply filters to to better analyze your tactile graphics. And there are a series of filters that you can apply to get more or less detail from that tactile graphic. But again, the detail is going to be limited by whoever created the graphic, you're going to get what they give you. But you certainly could. And we'll have ways to do more, because we do have the ability to have auditory feedback. Or if you're looking at a JPEG, an actual outline JPEG, you can zoom in zoom in zoom, Braille, tactile graphics, you would not zoom in multiple levels simply because the more you zoom, the Braille would then expand and it becomes very unusable. So there are some limitations on zooming a Braille tactile graphic, but we are going to be able to extrapolate more information than you would get from a hardcopy piece of paper. Also, you can scroll the graphic today, so you can actually move it. And for a blind person, we're able to see a scrollbar for the first time in our lives, a scroll bar is present and actually make sense to us, showing us where we are on that physical page as we move left, right up, down. And it becomes very neat. I did not see a scrollbar until I was in my early 30s. And it blew my mind and I'm like, wow, I've been hearing this term forever, never really understood what it meant. And now I show people and they're like, oh my gosh, it makes sense. And it allows us again, to kind of move around and have a more dynamic graphics experience to move and not just be limited by the physical constraints of the page we're looking at.

Question:

It's easy to get my hands on when I had a question about graphic novels with the rise of graphic novels. Have you been talking to publishers or people that create graphic novels to make them available on this device?

**Peter responds:**

 We've worked with publishers but more so on the E Braille implementation and getting them ready for content. We have not talked it because that comes down to creating tactile graph bricks themselves, we have not had that discussion, they will, you know, it really comes down to a transcriber ArrayList. Who knows how to create tactile graphics, it is something that could happen. But it's not a discussion that we've been focused on at this point. We have been working with several publishers, though. But it certainly is something we we definitely would love to work with an we would need to actually teach how to build tactile graphics to those folks, which would be a whole, a whole other world.

Question:

How does the point and click feature work?

**Peter responds:**

The point and click, what you do is you, you, you it's a two handed process, you essentially find where you would like to activate with one hand and you isolate with one finger. And then you use the other hand to activate a an action button. That will kind ofpoint you're pointing with one hand and you're clicking with the other, we will have a method by which to do this for a one handed user, which we're still refining, but it's basically your your reading, you know, you find a place where you want to roll your cursor or an item you'd like to click on, you isolate with one finger so that the sensor can see exactly what you're pointing at. And then you double press a button between dots one and four, called the action button, and that will activate what you've pointed out.

Question:

Are you able to tell me where the monarch is currently available to look at in Canada? And because a lot of people haven't seen it here, and we don't have an ACB or NFB convention. So some people go when I've been in the past, but where can we see one and a scene IB have them? Will it be at the say the connecting the dots conference in the fall? Is they have that we need to know. Is there a list? So?

**Peter responds:**

Yeah, so I've had it at C and IB, I definitely had it last year at cniv Connecting the Dots both the East and West, both in Vancouver as well as at Toronto, I don't see any reason why it would not be there this year C and IB does have a unit, they are an ambassador organization. They do have one in Ontario. where that goes, I'm not too sure. But I know that as we launch, we will also have our distribution network should have units as well. So Canadian assistive technology may have a unit bridges may have a unit, we will have representation at the dealer level. And that certainly is something where we will be out and about but right now, I don't know exactly where it may be. I do know that it will be out in September. And at that point in time, I think you'll start seeing it at different shows. Certainly it we will host some open house events, I have every intention of doing that as we get into the fall, where and will will broadcast that far and wide where the monarch may be in try to do some sort of evening events where consumers can come take a look at the product, you know, we've been so, so heavily focused on education. I realize that we need feedback. And I want the folks who cannot come to an ACB or NFB demo to have an equal opportunity to share feedback with us. we need to find ways to get Monarchs into the community where people can come and check it out in Scarborough or in Sarnia. And I'd been saying or I don't know where that's a big old country, but I'm down to run around. And we would like to look at some of that. So I would stay tuned. But certainly the cniv Connecting the Dots would be would be a place that I would I would foresee,

**Follow up comment by a participant:**

you might also want to do workshops for TV eyes here in Canada, because we haven't had too many of them. Like for example, the drawing tool and things like that.

Peter responds:

I am open to suggestions and certainly look to put some of that together because we've done a lot of TVI teacher training. In April in May, I did about 10 of them across Canada. I will be looking my team. Our product specialists team will be looking to do more of that. So you will hear from us for certain we have every intention of continuing to bring the monarch around in person.

**Question:**

Does the monarch display movements of things that are happening?

**Peter responds:**

it's a great question. So it does not. And the reason is the way to sell technology works. It's an electromagnetic technology. Pins are either raised or not raised. If you have your fingers on those pins they will not raise and so we have a dynamic refresh mechanism that allows you to read naturally with this, but one of the, one of the pieces in the cell technology to get the equidistant types of pins, the magnets, if you leave your fingers on, you're not going to feel movement, you're not going to track a ball, you're not going to track. That doesn't mean it won't happen moving forward. But that is currently not available. That is not how the technology that's like our technology won't support that. Now you can, it can show you things moving, but it would be more of an a freeze frame environment where I can point at something and it moves somewhere else and I go find it. But you're not getting that real time. Keep your hands down and just kind of feel things fly all over the screen. Right. Okay. It's a great, great question.

**Leo Bissonnette:**

**Peter**, Thank you for coming in today.

we are excited to be part of it. We're excited for the work you do. Continue. Good luck with it. Over to you. Thank you. Thanks, everyone.

**Peter:**

I appreciate the time and I'm really appreciative as always, and I you know, reach out as needed. And I'm sure many of you I will be in touch with at some point. So have a wonderful weekend and hopefully, everyone has a great symposium.