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Opening keynote presentation by Tom Bianculli, CTO of Zebra

Technologies—Transformational benefits at the intelligent edge

Featured Speakers:

Tom Bianculli, CTO of Zebra Technologies

Roy Chua, Founder & Principal, Avid Think

Angus Robertson, MC

So to kick us off, let's get started. I'm privileged to introduce our opening keynote, he's a trailblazing CTO that's helped transform some of the largest brands in tech to become more efficient, more competitive, and more profitable. So please join me in welcoming Tom Bianculli.

Tom Bianculli, CTO of Zebra Technologies

We do a lot of work at Zebra. Thanks. We do quite a bit of work at Zebra with a number of different consultants and industry analysts some of which we have here in the room. And one of the individuals we've had the pleasure of working with is Professor Robert Woolcott. And he's quoted as saying one of the most powerful forces shaping markets will be that production and provision of products and services ever closer to the point of demand, being able to deliver value in the moment in someone's moment of need. Right. And whether that's in a b2c context, or a b2b context, and you only have to just, you know, look around at some of the data points that are out there. We ended last year with total global e commerce sales of about \$4 trillion over the next four years that's gonna grow by 50% to 6 trillion. And some of the correlating factors we've seen around that as with every additional billion dollars of E commerce sales, there's about a million square feet of logistic space that gets built out, right. So a lot of urgency around being able to rise to the occasion from an E commerce perspective, and more and more of that is happening in a mobile fashion. So these orders are being placed where we're all we're all doing it. They're being placed using a mobile device and kind of doing it in a snacking based fashion. So rather than queueing up a set of purchases, you're doing that sort of as the moment unfolds in what you're thinking about ordering and placing those orders and the ripple The effects of that into enterprises into the supply chain are actually way more profound than you might initially think. Think about the number of parcels that need to be shipped. The one CEO said to me, we're shipping more and more each is and less and less cases. And so the idea of kind of being able to do that and do an on demand ordering type of way, the way customers perceptions have shifted, right 62% of customers believe fast delivery is going to be the

biggest differentiator. And the market for on demand by 2025 is going to seed over exceed over a quarter trillion dollars. So massive amounts of money flowing into this. And that's all happening right? In the face of this triple squeeze, where we're dealing with unprecedented labor shortage. We're dealing with this shifting expectations. So what consumers brands expect from those that they interact with is changing very dynamically. And it's happening in a much more liquid fashion. I'll speak about that a little bit more in a moment. And there's this massive diminished predictability. So if you're trying to predict what inventory you need, and what location Good luck, that's changed, you know, immensely over the last couple of years, you're trying to plan where do you place your capital equipment, right, whether that's trailers, or its transportation equipment that's got to be positioned around the network to be able to do optimal delivery, that's gotten chair challenge in terms of predictability. And of course, the labor side as well. And just to put this in perspective, we ended 2020. Here, as you can see from this, some of this corn fairy data with about a 3% labor deficit, which is, you know, unusual in in and of itself, that resulted in about \$2 trillion of unrealized global economic output by the end of the decade. Okay, we're looking at an 11% labor shortage. So more than a tripling of that labor shortage with a unrealized economic output of between eight and \$9 trillion. This has never happened before in history, right? Where we're actually going to gate economic output because of this labor challenge. And as one CEO said, to me, when we were talking about some of our automation capabilities, and the opportunities around that, we were talking about ROI. And, you know, he was talking about his team working on the return on investment, he said, Listen, it's got to pencil, right, we have to be able to get an ROI on this automation initiative. But more importantly, than that, I need to deploy this in order to ensure I'll have business continuity, right. So what he was really saying is to ensure I can even run my third party logistics warehouse company, I need to deploy this automation, in order to get the continuity, the financial part was there, but it was secondary to the need, or the imperative around him being able to run his business. And to put this in perspective, out of the 20 countries in the study that Korn Ferry did, if you fast forward to 2030, that results when I just showed results in at a shortage of 85 million workers, which is the entire population of Germany, right, just to put that in perspective, and that \$8 trillion of unrealized economic output is the combined GDP of Germany and Japan together, right. And this is we're staring down the barrel of this over the next six or seven years. And it's not like if I just go back one, it's not like, oh, you know, we it's not happening, it's happening, it's been happening for the last three years. As we advance over the next six or seven, we're gonna see it, you know, more than more than double as a challenge for us. So that one's in the backdrop. The other one, around expectations. This is another really profound one, because expectations for a enterprise used to be driven by those that do commerce with them, their customers, and their competitors, right. Those were the competitive forces largely playing into what are the expectations that my constituent has on me delivering to them more and more this concept of liquid expectations is emerging, which is the idea that an experience you have in one industry, you know, just fluidly, bleeds over into another industry and changes your expectation in that other industry. The example I'm using here is consider the Apple Genius Bar compared to a healthcare experience, right? If I go to the Apple Genius Bar, register ahead of time I select a slot, I describe what my challenge is, maybe what the health of my devices, even from a healthcare kind of analogy, context, all that information is shared ahead of time, I'm greeted by name when I arrived there, and all of the necessary elements that are required to have a great experience at an Apple Genius bar are in place when I when I arrive and all that contextual information is set ahead of time. Compare that with a health care visit, right where it's like he fill out, you get there and you're filling out forms and you're doing that in maybe a paper based fashion. So the expectation being set in an apple environment is affecting the healthcare environment. In fact, we're giving a talk later this year on what has been called the retailification of healthcare. So healthcare providers are thinking about the competitive forces relative to them around that. And when we get to the Q&A, I think Roy and I, I'll talk

about some of those dynamics a little bit more diminished predictability. You know, the example I used here, and you could focus on the right hand side of this chart, in the interest of time was just was the inventory side of things, you don't need to look any further than what happened in retail inventory, if you want to look at the challenge in predictability. So two years, the increase, so two years after essentially the start of the pandemic, those two years following 2020, we saw a total inventory, distortion increase of 20% in terms of overstocks, and 8%, in terms of understocked. So a couple of years after this challenge started of being able to predict what inventory do I need to have in what location, the largest of the large, retailers still getting it wrong to the tune of costing between those overstocks. And under stocks, the tune of costing \$2 trillion, which is 10%, of global retail trade impacted because of overstocks. And under stocks. So this predictability challenge is not one that's going away. It's not one that people have completely figured out. And what's gotten leaders in their industries to where they are today is not going to get them to where they need to go. And they're not going to stay in those positions, unless they rethink their business model. And they rethink how they rise to the occasion, given the challenges around these three key dynamics. So what do you have to believe, like what, like what fundamentally needs to change, if you're dealing with an on demand economy, the production provision of products ever closer to the point of demand, you're faced with this really undebatable labor shortage that we're in the midst of, and that's only going to get worse over the balance of the decade, expectations continue to rise and your competitors and you aren't even setting them are being set by entirely different industries. And predictability has gotten shattered, using historical data to predict future demand.

Only, you know, non accurate way of being able to get to that outcome. So what has to change? What has to change is, we've got to think about going from systems of record, we're all really familiar systems of record, think about in a lot of the examples, they gave an electronic medical record system, or an Inventory Management System, or customer relationship management system, a warehouse management system, these are systems of record that are telling you what should be happening, right? Where should my people be? What should my inventory be on this shelf? Where should my capital assets be, but they're not telling you where they really are. And more importantly, they're not enabling you to react or change in real time. The system of record is essentially a plan. And the world we're moving into the competitive forces are killing the notion of a of a plan is profound as that may sound. And why would I say that? I would say that, because if you're delivering in an in an on demand world, and the expectation is, what's the expectation of that in the limit? In an on demand world, the expectation is that I get infinite selection, delivered in closer and closer to zero time. I can have whatever I want, delivered in closer and closer to zero time. What is in that context of a plan? What does that mean? If I have to deliver something in two hours, four hours, within a day? What is the meaning of a plan, I put a plan together, and it expires the next minute. All right. So we really need to move to a world where we're not operating off of systems of record, that are producing plans that we're trying to execute. But we're leveraging systems of reality, which are observing, they're creating a connected fabric at the edge of the network, where you're literally not understanding what should your inventory position be. But you're seeing your inventory position in real time. Right, you're seeing where that capital equipment is, in terms of real time visibility platforms, you're understanding how best to orchestrate your workforce. And with more and more automation coming to the workforce, whether that's through robotics, or other forms of digital automation, how do you orchestrate the collaborative environment between those weigh those robots, and those people work together in those environments. So going from systems of record to systems have reality to be able to react and respond in real time and do that in an intelligent way. That's, that's the fundamental shift in terms of what you need to believe. So if we want to, you know, breathe a little bit of life into that make it real, I thought it'd be kind of neat to just take a look at three different use cases. Alright, so the first one,

being in retail, and so think about retail, I got up your flawless fulfilment, right? So you're ordering online that's being fulfilled, more and more from the store. So Target has said this publicly Target stores they're fulfilling 90% of their orders from ecommerce they're fulfilling those of 90% of E commerce orders are being fulfilled from the store, right? More and more retailers are fulfilling from that store. So now predicting the inventory you can have that store isn't just a function of the people that are coming into it. It's a function of orders that can be coming from geographies way away from that. And being placed online, as is the assortment, the selection, the pricing. And that is a reality in the face of you've got about at the end of the day 65% inventory accuracy. So what do you do? And why do you have that 65% inventory accuracy, you have it, because of his over reliance on the system of record? That's that inventory management system? And so in somewhat of a cute way here, we're saying, hey, what if those walls could talk? Right? What if we could enable that store to be a smart sensor enabled store. And so through the combination of RFID, computer vision, other types of sensor technology, we're able to see in real time, what's on the shelf, what's on the rack, where are people dwelling, and be able to understand that, essentially, in real time, so with an RFID tag, you know, like the one I'm holding, in my hand, the very vast majority, majority of apparel now is being RFID tagged. And with an RFID tag, like this one, in a an apparel setting, like you see here, this could be clothing could be fast fashion, apparel retailers, were able to put in infrastructure, you'll see kind of in the bottom right hand side of the slide that looks like a sort of a variation on a wireless access point. That's infrastructure that can be mounted in the ceiling. And this is deployed today at select retailers that can perpetually see all of the RFID tags in that environment. So without anybody having to go and perform the inventory, check manually, we're seeing all those RFID tags and understanding that inventory position as a system of reality, in real time. And so when we say that, that sweater, in his size, medium red is available to promise to somebody that placed the order online, we mean it, we know it, we don't then say Oh, just kidding, thought we had at that store, you won't get it tomorrow, you'll actually get it two days from now. So that's creating that that system of reality, essentially, across that store environment, it's combining these different types of sensor technologies to be able to do that. So that's, that's one example, in retail being deployed today. And we're gonna see a lot more of it. I would say, particularly on the RFID side, and those of you that have been tracking the RFID industry for a while, you know, it's, it's always been the year of RFID. I think the year of RFID is past us, actually, I think it was in the last year or two, I'm happy to catch up with some of you separately as to why that's the case. Okay, increasing here in terms of what it means to society. So inventory is interesting. But you know, if you don't get your sweater, nobody dies, right? Going up a notch. Food waste 1/3 of food produced for human consumption is lost or wasted globally, that's over a billion tons per year, from a food waste perspective. And so what can we do about this? What, how can we embrace a system a reality, to change the dynamic around that. And so one way to do that, in a way that we're participating in doing that, together with a host of different partners, is by being able to bring IoT sensing, so environmental sensing, down at the individual pallet, the case level for these perishable goods. And by the way, this is applicable to biologics and pharmaceuticals as well, where we actually track the vaccine viral vials, for instance, for the COVID vaccine, we track the temperature exposure of those, as they move through the supply chain for every single vial. That's, that's delivered, ensuring that it's got efficacy desired, when it reaches that end location based on the environmental conditions it was exposed to. So in this case, we've got a tracker that you can see there. And you know, another type of example, would be a tag essentially like this. So even though it's flexible, it's a recyclable organic battery technology that's put together with the tag that's delivered in this shipment for that produce. It's sensing the environmental condition that that's exposed to communicating that back in real time. And now with that information, you can better predict the expiry date of that shipment. So what does that allow you to do? It allows you to set the pricing model in a in a much more bespoke fashion. So you can ensure that you sell through that product before it actually perishes and gets thrown

away, right? So it's not, it could be a combination of acting on it and real time saying, hey, instead of delivered here, delivered over to there, that's one way to deal and leverage this data in a real time system of reality fashion. But the other is performing analytics on that data based on the shipment type. And predicting, with a pretty high level of accuracy, when it will perish and then using that to set a pricing model that ensures that you sell that through before that actually happens. So that's an example on the food waste front and then And lastly, you think about the medical side of things in the healthcare side of things, always amazed by this statistic, which is that the third leading cause of death in the United States responsible for 250,000 deaths per year is actually medical errors. And 10% of those are not just medical errors, their medication errors, right? So it's the it's the delivery of the wrong medication to an individual. So how can we think about that in a system of reality context, well, being able to connect every asset in that hospital, every patient in that hospital, and this is something that we're piloting today, where you do positive patient identification, in an automated fashion, you do positive medication identification in an automated fashion. And so if I can ensure that I'm administering the right medication, to the right person, in the right way, at the right time, if I can connect the thread across those several things, I can ensure that medication error doesn't occur. So you essentially eliminate it. And you do that in a completely automated fashion. So by equipping the healthcare worker with a badge type technology that's able to identify themselves to the network, the patient wristband that's able to identify itself, the time of day coming from the network, the medication without RFID tag, as an example, among other types of sensing technology, we're able to collect all of that information seamlessly together, and verify that all of those things right medication, right person, right time, right care provider delivered in the right way. And that that eliminates that 10% of those 250,000 deaths, right, potentially, as we deploy more and more of that. But the other interesting effect is you see on the left hand side of the slide, it allows these caregivers, these clinicians and nurses to actually do the job that they're passionate about, right, nurses didn't go to school, to document things, they didn't go to school, to handle care coordination from one shift to the next, they went to school to care for people and improve lives and improve outcomes. And by collecting all this information seamlessly, we don't just eliminate that error. But we actually return the time back to the worker to improve the quality of care. And I gotta tell you, that's been a really satisfying dialogue with these Flint frontline workers, these nurses, these clinicians, as they go through that journey and adopting this type of technology. So some really interesting changes we can make in areas we can we can adopt this idea of system reality, to impact the outcomes in so many different ways. So, in conclusion, and then we'll move over to a Q&A. I just wanted to highlight that, you know, essentially, whether we're looking at football players on the football field, which I should mention, as well as kind of a cool one, at the Super Bowl and actually had every NFL game, Zebra has a tag, it's actually this tag that I'm holding in my hands, size of a quarter, maybe a quarter inch thick. It's in the shoulder pads of every single NFL player at every NFL game throughout the season, including the Super Bowl, and we even have a version of this tag in the football. And we track those players in the football with 10 centimeters of accuracy 10 times a second. Right, so we're able to understand the position. But because we do it so frequently, we can also understand velocity, acceleration, the acceleration. And so we're doing that tracking on the football field in real time. It's a great example of a system a reality that's used by the broadcasters to improve our fan experience through next gen stats you see on TV, but it also is used by the coaching staff to improve player performance. And so if we can do that on the football field, I guess my question is, what are we waiting for? Right? We got to go from the football field. And we got to go think about how do we do that for patients? How do we do that in an oil and gas type of environment where safety is critical? How do we do that from a supply chain perspective, to make sure that we can get the right goods to the right place at the right time to fulfil needs. And if we do that, if we do it the right way, we've got a great opportunity to create a more responsible future, a more sustainable future a more healthy one. And it's all about

connectivity, visibility and being able to orchestrate that workflow in real time. So let's go on that journey together. Thank you

Angus Robertson, MC

fantastic, thank you, Tom. So we'll dive a little bit deeper into digital transformation with the intelligent edge. So Tom, feel free to take a seat and for this expanded discussion, Roy Chu, a founder and principal of Avid Think we'll ask a few more questions of Tom and in parallel. If you have any questions look for Mark on this side or myself on this side. And we can bring you the mic if you'd like to ask Tom to dive a little bit deep deeper in any particular area?

Roy Chua, Founder & Principal, Avid Think

Okay. All right. Exactly. Excellent. Excellent presentation. Oh, that's like the sort of three pillars to the three, the three elements or three squeezes, whatever you want to call it. So just to get us started, and audience start thinking about questions, I'll turn it over to you, relatively shortly. But I thought would get a chat going first. So one of those things in terms of bringing that experiential element, right, and getting things closer, so you can look at what's really happening on the floor, is bringing the proximity of compute and data down to wherever things are happening. So you started the presentation with now there is a cost of doing that, that doesn't come for free, right. And we always talk about this edge computing thing. So in your mind, what are you seeing trend wise, in terms of that edge computing spread? And what are the challenges we're bringing to kind of computing and data management all the way down to the factory floor to the shop floor to wherever? You know, the reality is?

Tom Bianculli, CTO of Zebra Technologies

Right. Yeah, no, great, great question. I think, you know, this is one of these areas that just there's no, there's no single answer, right. And so looking at use cases, looking at architectures, across the way it's deployed, it's, you know, CIOs are definitely considering that, I think one of the interesting tenants working with a number of CIOs across the various vertical markets we serve and so we play into, you know, retail, transportation, logistics, manufacturing healthcare. So the opportunity to speak to a pretty wide swath of individuals. I think one of the interesting tenants around that has been this, this statement of the CIO shared with me, which was, you know, from an architecture point of view and an edge compute perspective, keeping the compute is close to where the, the data generated, and data comes with what the data consumed will be. So there's data generated, that needs to be operated on in order for it to be consumed. Because obviously, if you've got those RFID readers in the ceiling and the cameras and you're not consuming that data directly, you've you're consuming derivative data off of that. But if, if that's all deployed in the store, and then it's going to be consumed in the store, put as much of the edge compute you can down on the edge in order to deliver what's going to be consumed at that edge. So I think that's an interesting starting tenant. And then you start to layer in things like the economics, of being able to do that the trade off between what needs to be in the cloud and on prem, the security implications of internet and so on. So I think more and more we're seeing the idea of compute go down to where the point of consumption is going to be.

Roy Chua, Founder & Principal, Avid Think

Yeah. And I think that that's, that's interesting in terms of, you know, having compute near the near effect before, compute near where the workers are, and we used to call the computer rooms, right, but baseball was right, because now it's the edge because that's cooler. Fundamentally, yeah, it's a little different. Management.

Tom Bianculli, CTO of Zebra Technologies

50 years ago, 50 years ago, was the computer room of computers. We got much more savvy on the way.

Roy Chua, Founder & Principal, Avid Think

That's correct. Yep. All right. It's excellent. It's so in terms of this change. Right. And you talked about it? Why is there why is an urgency we always talk about, you know, jokingly, you said your RFID or of this, we're talking about the these elements, you know, bring compute, you know, improving experience. What, why now? Yeah, and in particular, right. And is this different from before? Or are we just going through the cycle, and every year we just repeat it says it's urgent. Now? It's urgent, right?

Tom Bianculli, CTO of Zebra Technologies

yeah, I think that, you know, where we kind of look at this period from really kind of 2015 year periods, a whole bunch of different dialogues, we can kind of have around sure, you know, innovation diffusion curves, and, but typically, you've got about like these big waves, kind of like 20 year cycles, where there's, there's big shifts that occurred, right, whether you go back to kind of the age of mainframe, and you go to, you know, connectivity, mobile, and so on, and in the middle of that cycle, you're kind of kind of at the peak or And so when you go back to kind of the 2016 and 2017 timeframe, it was becoming really apparent that the whole industry 4.0, the Internet of Things connectivity had the opportunity to really transform experiences, I think, I think at the end of the day, it's an experiential economy, right? So the idea that I have a dialogue with my with a retailer that I'm working with, or maybe directly with a brand, or with the transportation company that's delivering, to me, that's created a competitive shift in the diner in the dynamic that's requiring companies to kind of respond. Now. It's like the example. You know, that I gave around that. The C level executives saying, hey, it's about business continuity, I have such a challenge from a labor perspective, I don't have the labor I need, right. If I don't deploy this automation, I don't have business continuity. If you think about the expectations I was mentioning earlier, we had some dialogues with large public carriers, right. And I must admit, I was kind of caught off guard on this one, where the this was a CIO at a large public carrier, and they said, hey, the biggest competitor, we see is somebody like a Starbucks. And I was thinking about Starbucks and public transportation company, what's the connection, right? And he said, well, listen, you order your beverage online, on your mobile phone, you can completely customize it, you show up at the look at Starbucks location, there it is, with your name on it, you pay on your mobile device before you get there, right. And so you've read from the your interaction with that brand, is only the best parts of the experience, you're picking up the beverage and enjoying it. Right? You have no interaction with that brand, when you use the latest technology, in terms of waiting online, figuring out what you're getting, again, you know, placing the order, all of that's kind of happening outside at your own convenience. And so what his point was, well, I maybe we shouldn't be delivering to people's homes anymore, you know, is the expectation that we don't deliver to people's homes? Should we be delivering to people's drunks or their vehicles? Should we be delivering not to an address, but to a person? Should we should you have a real time view of where everything is that's going to be coming to you is at? and so should you be able to interact with that transportation brand, in a way that's similar to the digital conversation that you have with a Starbucks as an example. And so that's, you know, fundamentally changed. And the last thing I'll say on it is I know we're going to move on, right? The digital empathy is another term I've heard now, right, where we, we need to have more and more digital technology, more and more empathy for the frontline worker. And when I probed on this one, and in dialogues with lots of customers, when you look at the employees entering the workforce today, over the last couple of years, they're digital natives. Right? Right. So they're asking tough questions. They're like, Hey,

I'm using augmented reality on my mobile phone, why don't I have that in the work environment there? Why am I taking inventory on the shelf instead of just taking a picture of it? Why? You know, so they're asking really savvy questions and have really demanding expectations. And that's creating a dynamic where our customers are saying, how do we have more empathy, because we're asking those workers to do more and more things in the face of historical attrition, where retailers are seeing 70 80% turnover? And so this isn't a nice to have anymore, it's a need to have. Right?

Roy Chua, Founder & Principal, Avid Think

So I think that's where I think a lot of it, as you point out is driven by disruption in certain industries around the experiences, right about the ability to deliver that experience that you want, right? Amazon, you expect same day, second day, worst case, and you're like, why is this taking three days, right? Well, and that puts pressure on the whole ecosystem to deliver faster. And there are good effects of that which is become more efficient, right? Rely on your IT systems to give you the information that you need to operate to get operational efficiency, using technology with automation, to make your workers more efficient, maybe reduce their mental stress, right to give them more time to relax, because the system is taking care of the mundane stuff, as you pointed out in unnecessary examples. I think there are, there's good. And then there's also bad in terms of Do I really need a second day and run the truck one extra time with the one extra load? Or is there a way from a sustainability standpoint to optimize these things? And I think fundamentally, technology plays a part in all of these things. Yeah. And, and you can use technology to optimize the delivery to improve sustainability, just as you can use it to burn more fuel and get it to you faster as well. Right. That's a choice that we make. Yeah. I think that's all sounds great technology, bringing advantages to experiences improving logistics supply chain, getting that reality closer, so it's not a systems of record, but assistance or real time record, which is the assistance or reality, right, in essence, sounds good. But obviously, we're not there yet. I know. We're not all there yet. And what do you see you work with a lot of companies across a lot of industries. What are the biggest challenges to bring in and is it not understanding the technology or is it what

Tom Bianculli, CTO of Zebra Technologies

The technology absolutely plays a role, but I would say the kind of transformation Sure we're talking about here, it's the change management is, you know, people, it's kind of the sort of the myth of a lot of what we're talking about is that the technology is the challenge to adoption, when it's really, you know, the change management, people management leadership, right. So you got to make it happen. And I think, you know, I can share with you a quick example around that, we've actually, we have a capability that actually uses 3d computer vision. So there are 3d cameras that are deployed at like over 10,000 doctors in the United States. And they were looking at the trailers that are being loaded. To your point around, Hey, can I put one less truck on the road, right, as those trailers are being loaded with packages, it's computing that 3d cameras, the volumetric efficiency in real time, and then it's giving nudges and guidance to the workers via wearable mobile computer, it's actually showing them what their load score is, and how well they're performing and being able to load that truck efficiently. And then it's also mobilized on tablets to the dock manager, as well. And in that industry, if you think about a think about a dock, where you've got all these dock doors in the truck, the trucks being loaded for the last 50 years, 70 years, that dock manager, those dock managers in that environment did what they call a dock walk, and what's a dock Walker dock walk is. I go from, you know, dock door to dock door, and I take a look at what's going on, I understand what's happening. And down on the device, we got a 3d camera at every door, right? So down on a tablet, they can literally just click on the door, they can see exactly what's happening. Furthermore, they can see what the actual load cube score is. It's called the actual volumetric efficiency

that door they can see the timestamp, they can shuttle back and forth in time, right. So they can go back in time and see what how it's progressed. And yet they were doing doc walks every day, right that that facility

Roy Chua, Founder & Principal, Avid Think

because they don't, they're not comfortable with

Tom Bianculli, CTO of Zebra Technologies

exactly. Well, you know, it's just that's what we do. And it literally took, you know, an executive vice president level mandate to say, hey, we're using this technology, we have a deployment, let's rethink our standard operating procedure, right. And standard operating procedure in many of these enterprise critical environments is not something you mess with, then you put it in place. It's a standard operating procedure. SOP, exactly right. And but if you're going to embrace the full value, you've got to kind of rethink what should my SOP be? Why am I doing a dog walk. And I'm really excited to say in this case, across all of those environments, the facilities that support those 10,000 doctors, they now do what they call virtual doc walk multiple times a day. So they actually do the doc work more often. Yeah, they just don't do it don't have to walk. But yeah. And so what that allows them to do on that tablet device is highlight, which is the door that I should go to I can bring the most value. Sure. Sure, what are the three doors, I can bring the most value, and then you're doing the walk specifically to those destinations. So you did as you return time to that dock manager to make more impact. When the original perception and deploying the technology was you're taking away my dock log? Right. And so that's just it's one small example. But it shows the challenge and the need to really judge drive that change management from the top down. Yeah.

Roy Chua, Founder & Principal, Avid Think

So there is still human in the process. Humans take time to change. Yeah. So do we still have time? Or should we?

Angus Robertson, MC

Yeah, we have time for a few questions. If there are questions from the audience.

Roy Chua, Founder & Principal, Avid Think

I think that hand went up on the right hand, right side first, that one.

We'll go left, right. And then we'll just take a couple of questions. And

Antony Savvas, IT Europa

Anthony Savvas from the UK. I write for IT Europa, vanilla plus and IoT Now. Zebra has been at the edge for decades. We're still talking about this. Now. We were talking about this about five years. 10 years ago. I know about the NFL story. It's very good. But surely, the telcos they own most of the edge at the moment. You have a lot of alliances with technology vendors, who are your What are you doing to drive this image forward? Do you have a strong alliances with the telcos? Are you concentrating on the hyper scalars? The Hyper scalars trying to get in bed with a tail? Because we're just wondering how strong your proposition is through the telcos? Because that's what's going to need to drive it forward.

Tom Bianculli, CTO of Zebra Technologies

Yeah, yeah. Great, great question. So break it down into a few parts. I think the first part of what we're saying is, and we've been talking about this a long time, right? And I think the Zebra has been in business for, you know, over 50 years. So if you think about identification, and manual identity, you know, read a barcode printed barcode that's been around a really long time, it's not going away. But what is changing is it's not just about identification anymore. It's think about it, as you know, not just what is it, which is identification, but what is it? Where is it? How is it? What is its condition? So I think he's kind of rounded out over the say, the last five years, and now going forward is that perishability example and food waste, like it's not just good enough to know that these are a creative apples, creative apples with this much ethylene in it that's causing this much perishability over this period of time? So it's, you know, what is it? Where is it? How's a lot more data coming in from that perspective? And then to kind of jump forward to the latter part of what you're saying. If I were to rewind to Let's call it four years ago, we had a very limited relationship with hyperscalers. As an example, we've always had relationship, not always, I should say. But since the early 2000s, we've had a relationship with the telcos primarily because we make mobile computers, enterprise Android based devices that are connected over, you know, a Wi Fi network. The telco relationship has moved from just enterprise mobility to private network considerations. When you start to think about what we're doing, we acquired a company called Fetch robotics, which makes autonomous mobile robots that are deployed in warehouses for picking applications, it material transport, manufacturing, so manufacturing, in particular, is making a big push towards 5g. And we're gonna talk about this and some of the debates. And that's not necessarily at a most mobile device level. It's about IoT infrastructure, which includes the robotics and includes the edge compute. So there's relationships that are building there on topics that didn't even exist for us five years ago. That's on the telco friend and the hyperscalers. There's, you may have seen it, we've had some announcements around this. There's a lot we're doing with both Microsoft and Google Cloud in particular, those two were we built. I can't get into specifics, but we built a lot of the Software as a Service Cloud offerings that we have, that we also didn't have four or five years ago, on those on those hyper scalars. So yeah, the both of those relationships are really ramping up and it's probably pre 2019. It was minimal to zero on the hyperscalers. Other than our own internal it says trust. Now, it's one of the biggest partnerships we have actually, we're one of the top five partnerships, we so it sounds like you know, it is happening.

Roy Chua, Founder & Principal, Avid Think

Yeah, we've talked about it a long time it is in fact happening. You have a lot more concrete examples than they used to. It is not a revolution, but it's been an evolution over the years. Right.

Tom Bianculli, CTO of Zebra Technologies

Yeah. And I think people in Israel invented that, you know, the hype cycle, trough of disillusionment and coming out the other side, I spoke about the 20 years. It's that 20 year, and when you're in about the middle of that 20 years, I was kind of calling it at peak is 20. Yeah, I mean, I was calling it 2016 is sort of, so you look at 2026 2027. Yep. And then you kind of look halfway in between isn't where we're at. Right? So 2324, I think is you know, these are going to be big.

Roy Chua, Founder & Principal, Avid Think

Sounds like it, sounds like you're engaging both. I think that the question you're engaging both the carriers and hyper scalars equally, yeah, it'd be for different golden market or different use cases is what I heard. Next question here.

Guy Hervier, Informatique News

Yeah. Good morning. Guy Hervier, Informatique News. You mentioned, on one hand, you mentioned diminished predictability. And on the other hand, you said in 2013 30, we will be 11% labor shortage, you know, the future is never sure. And if it's so bad, well, we just have to improve productivity by 10%. And the problem was Bill, so. So that's one thing I were thinking of. And the other thing is, I was very interested about the tag on the NFL shoulders. And do you know, any improvement or any information this gave to the player in the in the team? Sorry, the last part was any of the improvement that this time? Could you know, all the information that because we talked about that, but to do what and to have? What kind of information about the game?

Tom Bianculli, CTO of Zebra Technologies

Yeah, do to improve the player performance? You're saying? Yeah, yeah. So on the first one? Yeah. So if you look, if you look at that, labor shortage and improving the productivity, I think the, you know, that's been a fundamental movement that, you know, all of our enterprise customers have been moving towards this, how do I improve incrementally improved productivity? I think the challenge is, if you look at it may sound small, but if you were pointing out, hey, if there's an 11% labor deficit, if I become 11%, more efficient, I neutralize the labor deficit, right. And, you know, depending upon the pockets, you can provide that improvement. And that can be true in more in certain segments than in others. But we're talking about in many cases, processes that have been honed over decades, right. So getting a 10% improvement in sort of the next five years. Although it sounds, you know, reasonable, it's 10%. It's a, it's a big shift. And I think the bigger part is, if you look at what's going to be required to get that 10% improvement, it's a lot of the things we're talking about. So they're there. But it's not going to be an incremental, you're not going to quite get there in a totally incremental way. So you've got to embrace some what Roy and I were talking about in terms of the change management. And then that becomes, I think, some of the barrier to this, this, you know, this actually happening. So if you look at the autonomous mobile robot market, you know, it's a couple of billion dollars. Now, in another couple of years, it's going to be \$5 billion. So it needs to go up two and a half x. And by the way, these are these are predictions. By the way, people in this room, these aren't my making numbers up, you know, over the next two, three years, and if I deploy a robot that's working alongside a human in that workflow, that's not about oh, let me give a piece let me give a tool Roy, so you can do your job 5% 10% better. It's now I'm going to throw you in an environment with a robot that you need to interact with. And so what does that mean? What does that mean? Correct the psychology of doing work in an environment like that. So just a lot of other elements around it. As far as the NFL goes, Yeah, I mean, in terms of the player improvements, a couple of things, just very quickly. One is, maybe it's obvious, but we the information is timestamp, right. So, you know, again, you know, who's on the field, you know, where the ball position is, you know, the velocity, you know, acceleration. And you know, that over time, so from a coaching staff perspective, I hadn't really thought about this before. And so I came across it interacting with the NFL ban, people that would say, Hey, give me you would say this, this team, show me a video over the last six months when the following conditions occurred in the field? Well, you can just do that digitally. Now, you can say when all the players are at the following locations, and this occurred, pull that video because our videos timestamp. So that's creating a massive training moment and opportunity in terms of leveraging historical video data and to be able to share that with the team. And then the other kind of anecdote is a player performance in the early days of this, like he said, we've been talking about it. For some time, we just renewed the contract with the NFL. In the early days, players were not sure they wanted this shared, because, hey, I'm obsessed with my performance. And that's totally swivel now to personalized, you know, individuals want it and these are highly competitive, you know, athletes that are saying, How do I get better? And if you've got information that can help me be better, I want to use that to impact my training regimen, and so on. So

how are you performing in the second half versus the first half? What is your yardage look like? What kind of when bad things happened? What happened that just preceded that. So being able to use that information to essentially inform what otherwise would have been a blind spot for a player is a lot of the ways that data is being used

Roy Chua, Founder & Principal, Avid Think

We'll take one last question. Before we wrap up, I think just two more. Two more questions. All right.

Steve Cassidy, PC Pro

Steve Cassidy, PC Pro, I'm interested in whether you're more on the side of passive systems solve the problem you're talking about? Or whether you think IoT, and the generally active management have otherwise done, you know, even inventory that's just along the line, right? And where that border lies for you whether you want to be distributing little chips with tiny LEDs on them, or whether you're into the label printing business in such a way that labels are the future. So it's, it's the question about active systems versus passive, renewable systems. How do you think that works? In the gap? You're identifying? Should people be sticking labels on things or adding compute power to the stop?

Tom Bianculli, CTO of Zebra Technologies

Yeah, great, great question. I think that's going to that's certainly going to evolve over time. And I think we're moving we're moving into a world that example of the attack I was sharing earlier, where you actually have a flexible, rechargeable battery. So you're gonna get more and more device intelligence downs, at the label level that's coming, that's going to take some time to happen. I think the best example to kind of the question you're asking is in, in the location side of things, we probably have out of, you know, over half a dozen ways of being able to locate assets. And so how do you choose some are passive, like you say, some are active, and the what ends up kind of steering in one direction or the other is three kind of main considerations. So just to use location, as an example, cost coverage and accuracy. Right? So you say, Well, what accuracy do you need is one meter good enough is 10 meters 10 meters is good enough, you can use Wi Fi, and your handheld device. And if you're logging the handheld device, I can you know, then you by proxy, you can locate that person by locating the device, if you need, you know one centimeter of accuracy, then you need to use an active system. And so that sort of accuracy equation plate coverage, you might just trying to locate something with one meter or one centimeter of accuracy within this ballroom, or am I trying to do it across a 500,000 square foot facility? So what's my what's the coverage? And the cost plays into that? Meaning, how much cost? Can I bear in the infrastructure? And on the end devices? It's not kind of, unfortunately, not a simple answer. But just the build on cost went a little bit more, if you think about reusable tote packaging. So these are totes that like, you know, apples or pears or that maybe come you know from a form that moves through the supply chain. They're in reusable packaging. And so we can put a tag into that reusable packaging that costs a fair bit of money because that term gets recycled and reused within that network. There might be other cases like a pallet where you're never going to see that pallet again, right? So you have to use a passive technology because you can't afford to put \$10 on a pallet you can afford to put 10 cents on a pallet if you can locate it within one meter of accuracy. So that's a real example. We're using passive RFID on a pallet to locate it with one meter accuracy The inside of a crosstalk warehouse facility. And by doing that, we're orchestrating the forklifts in real time. So you're increasing your forklift utilization time from like 50% to 80%. And then creating the ROI based on that. So it's kind of horses for courses right now. I think this is a way to look at it. But I'd say it's gonna get more passable with time.

Roy Chua, Founder & Principal, Avid Think

I think that's - final question.

Tony Chan, Communications Day

Hi. My name is Tony and I write for publication out of Australia. We come from mostly a telco background. So you know, my focus right now is the huge investment that telcos have been putting into their 5g networks. So how did they get that infrastructure investment? To connect to your tags? I mean, there seems to be a bit of a disconnect there. So I mean, are you developing tags with 5g built in and, you know, in terms of cost, that would actually push it up quite a bit? So, you know, can you elaborate how you expect your tags to be applicable to? telco? You know, ecosystem environment?

Tom Bianculli, CTO of Zebra Technologies

Yeah, I mean, at least from our perspective, look at it from a kind of 5g telco point of view, I kind of lay out sort of three, you know, pillars, if you will, it's gonna go, what is mobile first, so we've already now deployed, you know, much like, we're all seeing mobile devices for the enterprise environment that are built natively on kind of 5g standards and being able to connect that and support that. The second is as backhaul. So I mentioned the example earlier where you know, whether it's a manufacturing facility or a warehouse facility, and they're pushing down all this edge compute and so the latency, that the reduction in latency is extremely small, lean. So you get with 5g allows me to be able to send real time data from a robot literally up to the cloud, send a response back, and still do all that within let's call it like human response times, you know, 10s of milliseconds, in terms of round trip, ways of operating. And that's changing the way we think about backhaul for something like our autonomous mobile robots for love to talk to people more about what we're doing. Like we're doing things wearable computing, and heads up display. And so now you think about a notification, the robot notification of the person, I'm sending that into the cloud over 5g, and then I'm orchestrating the dance of that rope, if you think about it that way, like literally the robot and the person in that workflow, to kind of get the job done. And then the third one is maybe what you started with is on the sensor side, I think that's the most nascent were you saying he natively you know that the label is gonna go up to 5g the way we're network, for example? Yeah. Right. Yeah. So I, you know, I think it's a little bit of all the above, you know, it's a Bluetooth Wi Fi and sort of backhaul. You know, local backhaul, basically gateway technology, if you think about it, so a lot of the tags are going either, you know, passive RFID, you're seeing a lot out there, there's a lot of startups in this space to doing things with Bluetooth technologies ZigBee, as well. And then that's gateway eating, let's say through Wi Fi, or Zigbee, up to a gateway. And then from that gateway, maybe going back over a 5g or, you know, whatever the backhaul is in that particular instance. But I wouldn't say it without naming names, or, you know, there's semiconductor companies were working really closely with, because we're not we're obviously not semi company, we integrate semis to be able to deliver this type of IoT technology that are working on native 5g connected sensor technology that is getting down to, you know, the sub 20, the sub \$10 range, which still isn't, obviously low cost enough to go put it on every package UPS recently had an article I think, was yesterday, where they're putting RFID down at the parcel level, and the economics of that worked for them for RFID. That wouldn't work with you know, obviously, a \$5 \$10 tag, but what we'll see is higher value assets, pharmaceuticals, that hey, for a \$10 5g connected tag on a high value asset will go up.

Tony Chan, Communications Day

Yeah, what do you expect this to actually hit the market like 5g applicable to like, you know, the application?

Tom Bianculli, CTO of Zebra Technologies

You're saying 5g Right down to a to attack? Yeah. So I mean, I would say, you know, in the next three years higher value assets, you'll start to see, and then it's, you know, 567 years is that it for the economics to kind of get down to the next level. And that's really just based on frankly, the, you know, the chipsets that are coming out now from the semi providers, the amount of time it's going to take those chipsets to seep into actual solutions, and then solutions to reach commercial viability. I think that's, you know, we're, we're two thirds of the way through that, you know, wave that or that, that, that set of things that needs to occur now, and so I expected another couple of years will, we'll see that become much more prevalent, but probably more for the higher value use cases.

Angus Robertson, MC

Well, thank you very much. Thank you. And thank you. Thank you, Roy. Certainly a lot of interest on this topic.