

BILL: We have a very exciting group of people to talk to you this morning. And the way we structured this, as Steve said, is I'm going to give each person about 15 or 20 minutes to make their presentation.

And we're going to reserve about 20 minutes at the end for questions, so I'll ask that you hold your questions until we finish. But we will then be up here as a panel to answer the questions. And the way we've got it structured is that-- I'm going to start off and I'm going to talk about a few things that we're doing at the University of Arkansas, and some of the holes that we see that are out there that need to be filled.

And then we have Simon Langford from Walmart, we have Terri Crawford from Publix, and that's the retailer side of things. Then we have Dick Cantwell from P&G, Gillette, from the supplier perspective. And we have [INAUDIBLE] from DHL from the logistics side. So we've tried to cover the supply chain with as much as possible with our panelists here. And then we'll wrap up then with Brian Ceberano from MIT.

Again, we'll start with academic, we'll end it with academic, and industry in between. So let's go ahead and get started. Again, welcome to our panelists. And I'll keep myself-- my job is going to be timekeeper, so I'll keep myself on time here.

I want to talk about what we're doing again at the University of Arkansas, and then talk about some of the research areas. We have research in several areas. I'm restricted because of our topic here being a supply chain to those specific topics, but we're heavily involved in, at this point, technology deployment.

We've got some groups that are looking at developing some technology, but for the most part, we're very heavy in deploying that technology-- static versus mobile readers, Gen 2, those type of things. We just-- our lab was just converted over. And I was just telling Simon, we're now totally Gen 2. No more Gen 1 testing for us at this point. And that's really from the demands that we're seeing from industry.

Data analytics, I'll talk more about that in-depth. Making the business case, I'll talk more about that. But we're doing projects in middleware, open source development. Lots of work around public policy, consumer reaction type issues, animal ID. We've got a group in our ag department, and also with our close affiliation with our friends at Tyson down the street doing a lot in animal ID, trailer tracking, load status, trying to move more into the logistics area there. And then also as we move up the supply chain into manufacturing as well.

Let me drill down into a couple of areas here and start off with data analytics. And that's one area that we've spent a great deal of time in trying to look at what the data is really trying to tell us. And I was having a conversation with Giselle this morning and a couple of conversations last night, and that's an area that really needs a lot of work.

We're getting the technology in place. The technology will come along. We've got it we've got a lot of things we can do there, but it's about creating that data, and then turning that data into business value. And so that data is a very, very, very important piece.

And we first look at this idea of the 100% read rates. And we've heard all kinds of things about we've got to see 100% of those read rates for it to make sense. And it really doesn't.

There's implicit read versus an explicit read. Yeah, did you see it, or can you imply that if it went from point A to point C that it went past point B? And Sanjay talked about yesterday the idea of this phantom inventory. If you were to miss it, that's extremely important obviously. If you're not going to get 100% reads, can you infer those 100% reads, or how can you get that?

And I think that's going to be very important as we go on. That when we reach this 100% read-- again, whether it's implicit or explicit-- you've got to be able to draw some inferences from where you saw that.

The data at this point is very noisy. And those of you in the room have seen the data, there's a lot of noise in that data. You may have hundreds of reads at a particular reader [INAUDIBLE] sitting near the reader and moving in and out of the field, or maybe it passed back and forth. Or as a forklift was pulling it down through by the dock doors, it was reading at every dock door.

It's a lot of noise there. And we've did early on quite a bit of work in using such things as neural networks to try to predict when something might be late, or when it's outside of its normal schedule, or using such things as genetic algorithms to try to pull out those patterns in the data.

And the data is just very noisy. And we can artificially take that data and create some good models, but at this point, we haven't been that successful in creating good models with the data as it is.

The data has got to get cleaner. We've got to find a way to clean that data up. And one of those starts with business rules for interpretation. I really feel that we've got to have-- and there's going to be multiple levels of these-- there's going to be business rules that help us decipher what was a good read, what was a bad read, how do we make that implicit read then if it's not there?

And unfortunately, these business rules, I think there's going to be some that are global in nature, but then there's going to be some that vary by industry. There's going to be some that are going to be specific to companies, and we've got to have some type of data architecture that allows us to specify those business rules all the way down, maybe even to a product level.

I'm not sure what that architecture looks like yet. We're still trying to conceptualize what that thing is. But we've got to be able to do a better job of interpreting that data.

Sanjay mentioned yesterday the idea of control charts, and I think that's going to be important is once we can start establishing these patterns, and establishing what these products should be doing, then we can use this to help us determine when things aren't operating properly. The idea of how much data will RFID generate, there's been a lot of speculation about the terabytes of data that will be generated.

And again, that goes back to once we can get this data filtered, and cleansed, and worked on, I don't think it's going to be that much. And it's not the quantity so much as it is the quality of the data that's going to matter. Storage is cheap, but it's really extracting that quality.

And a couple of issues that were mentioned yesterday-- it's going to be extremely important-- data consistency. Walmart provides data via their retail link system. And Target has their own system, and Kmart has their own system.

I know that-- I haven't talked to Simon yet, but I know that I saw something in the news about Target and Walmart working on a program where there might be some efforts to make this data more consistent.

It has to be that way. I mean, we can't have every retailer with their own data format for this thing to work. And the same thing goes for suppliers. And then of course, data integration into one's own organization, I think we've got a lot of work there into pulling those into the enterprise systems that we have in place.

And again, with those things, if you pull in noisy or dirty data, it's very bad. So along the bottom, you see there the idea of filtering, cleanse, integrate, interpret, and understand. We've got to move toward that model-- of filtering that data, cleansing that data, integrating with what we have, interpreting what it means, and understanding. And that then will lead to action based upon that data.

Now making the business case, we could spend the rest of the day talking about this area and the opportunities that lay within. We had some questions yesterday. So in the interest of just keeping it brief, what I've done is I want to throw out a couple of things just for you to think about.

And again, this is necessarily very narrow so that you can understand the scope at which we could look at this. When we look at RFID, we can view this as an incremental technology. We can go in, and we can tweak what's already there.

And I'm going to kind of look at primarily the store level, maybe a little bit at the DC level. But one thing we could do is say, we'll take RFID, and it will just-- we'll just use it to make our process a little faster, a little more efficient, or we'll use it to make our process a little better. Maybe our process isn't broke-- it's just bent a little bit, and we'll use it to just tweak it.

Very incremental. We're not we're not radically changing anything. So I just gave some examples there under the heading of process efficiencies, for example. Promotions-- we may be good at promotions, but if we don't get it out to the shelf in a timely manner, it doesn't matter.

So we can use RFID there. And I think there's been some-- you probably have all seen this-- the early studies-- I know Gillette released some data from a study they did work with MIT on some opportunities for improvements just based upon promotions.

Out of stocks is another one of those. Again, getting it to the shelf when the customer wants it in a timely manner. So just speeding up that process that's already in place.

We can also use it incrementally to fix a process, or make that process a little better. Product rotation-- again, we know how to do product rotation. It's not a matter of timeliness, it's a matter of are we doing it correctly.

Well, with RFID, we know what's coming in, what's going out. We can maybe fix some of those problems. Better use of merchandisers. Instead of sending merchandisers to various stores just at random, or better-- or worse yet just on a set schedule, maybe target those merchandisers to where we see product in the back room, or when we see an out-of-stock event based upon the RFID data.

Target those merchandisers. Again, improving that process. The manual orders that, for example, that Walmart is doing with RFID. Trying to restrict those overrides or those manual orders when we know that something's in the back room.

Electronic proof of delivery at the DC, for example. Trying to fix that process where we really see what's coming into the DC. And then also I'll put out-of-stocks under the idea of effectiveness of not only getting out there as an efficiency-- getting out there in a timely manner-- but also improving that process.

There was some data released earlier in 2005 from Walmart that suggested that 1 out of 12 products was actually making it from the pick list to the shelf. And somebody might have to correct that stat if it's not entirely correct. But something on a busy Saturday, by the time it got on the pick list and then got to a shelf, 1 out of 12. Well, that that process can be helped with RFID.

Now again-- so if you view it as an incremental technology-- and some companies are doing that. They look at it and they say, OK, RFID is just going to help us improve the speed of our process, or help us tweak or process a little bit.

Others are viewing it more as a radical or disruptive technology. And that is giving us an opportunity to use RFID as a process enabler. Let's go in and create new ways of doing business that were never before possible using RFID as that technology that drives that.

And just give you some examples there. It may be that we could use RFID to radically change the way that retail stores stock their sales. I don't know what that process might look like, but that might be a possibility.

Obviously, as we move on down the line, the idea of the contactless checkout. That would radically change that process of going up and handing your stuff off to a cashier that swipes your items and puts it back in the cart. It radically changes that.

Sanjay mentioned yesterday the idea that paper scanners radically changing that relationship between suppliers and retailers, changing that supply chain, where we get direct store deliveries, and the retailer simply acts as a facilitator or a broker of those goods until they're sold. That's a radical change.

But what I think that we're seeing-- and if you start looking at the case studies closely, what you'll find is that some companies are treating it as an incremental, and necessarily so. There are many companies-- and I've worked with several the suppliers that are very, very, very good at what they do. All the low hanging fruit has already been picked.

So you have to look hard to find that incremental value. Now that doesn't mean they can't use it as a radical technology, but they first look for that incremental change. Other companies, however, have actually purposely used RFID as a way to radically change their business.

They weren't very good at what they were doing, and RFID then actually becomes an excuse to really change what they're doing. And as with most things, the higher the risk, the higher the return. So with those following that radical or disruptive path, the opportunity for return is greater, but the risk is higher that it won't work.

Now the third element that we have to keep in mind here is who are the beneficiaries of these changes? It could be the retailer, it could be the supplier, it could be the logistics provider, it could be the consumer.

Now we did an out-of-stock study working with Walmart, and we necessarily looked at one particular area that would provide benefit to several beneficiaries-- look at a fairly constrained or fairly narrow area-- and that was how we kind of tweak that out-of-stock process to make it just a little bit better using RFID. And in this case, creating those automatic pick lists for them to go to the back room and find that product, and take it to the shelf. So we tweaked it just a little bit.

And so I wanted to put it in context of what we studied. And many of you I know have seen the white paper that was released. Because it's important that you put this thing in perspective. Keep in mind that what we looked at was an incremental use of the technology in a very narrow domain. It did help. I mean, out-of-stocks can help the supplier, it can help the retailer, it can help the consumer.

So the beneficiary side was great, but the fact that we found changes that we could attribute to RFID tells us a lot, because we were looking at a very narrow thing. Now to me, that's extremely encouraging because if you've narrowed it down to this much, and you still found a fairly big difference, then what if we expand it on out?

I think the possibilities-- I think we've only set a very, very small bar to clear, and we cleared it easily, but there's a lot more there that we can get at. And also keep in mind that this idea of incremental versus radical, it's going to vary by the company.

We're looking at a very abbreviated supply chain at this point. This is from the DC basically to the back room of the store. And so far, the logistics segment has been largely overlooked. And you notice that they're listed there, but there's not a lot going on when we talk about the supply chain and how it's involving logistics arm.

And just very quickly on the out-of-stocks, keeping in perspective of where that was on that chart-- the fact that we were able to find improvements between pre and post RFID, and then and in between the pilot and control stores, we found those differences even though we were constraining ourselves to an incremental change in a very small area. That just gives you some things to think about there.

I want to very quickly run through-- also it's important we're doing the research, but we're also teaching students and others about RFID. We're trying to turn out people. [INAUDIBLE] said last year-- the CIO of Kimberly Clark said that there's such a dearth of experience out there that if somebody walks by a reader and says RFID and not RI-FID, that makes them an RFID expert.

Well, we're trying to stamp out some of that ignorance by training people. And so we've got dedicated courses in the business school, which I personally teach, where we have students from across the college and graduate students as well-- so it's undergraduate and graduate. They're doing live projects for companies. We've got dedicated courses in computer science and computer engineering, and then interwoven into a lot of different courses. So we've got about, this semester-- our last semester, we had about 80 students involved in RFID in some form or fashion. It's over 100 this semester.

We also provide testing and training services to the industry. One of the things that we do is we help companies determine tag and tag placement on their products so that it's ready to go through an RFID enabled supply chain.

And we started coupling our testing with training. One of the things we found out was that people would just send us a box of their product or a pallet of their product, and say here, help me figure this out, but they didn't understand RFID. And our most successful projects were when they actually came in and spent time with us going through the testing and understanding RFID.

So we've actually started coupling that now formally where we bring the companies in-- they spend a couple of days with us learning about RFID as we test their products. Our lab facility there at the University of Arkansas, we're actually off campus a few miles in a working warehouse and manufacturing environment.

We have about 8,000 square feet in Hanna's Candle company, which they manufacture, and then their distribution center is there as well. And that's-- unfortunately, it is in the distribution center part, so there is no control over the temperature, so the temperature inside is plus or minus 10 degrees what it is outside.

So we also have-- when we have to test stuff in the cold chain, we've got about a 4,500 square foot facility in Zero Mountain, which is a cold storage facility. And we've got two labs there-- one at 36 degrees, and one at minus 10 so we can test stuff there.

Our lab is set up to replicate really everything that a box sees at this point through the previous supply chain. And we are one of only four labs at this point that's accredited by EPCglobal as a testing facility, and the only academic lab in the world.

And just to give you some quick pictures here of our lab-- and I've got 2 minutes to wrap up-- that's the outside of our lab-- a truck backed up to our dock. That's the inside of the lab looking out that that same dock door view from our lab the conveyor system that we have in there.

We actually are fortunate to have a conveyor system that was custom designed and built for our lab that replicates sorting, and merging, and up to 700 feet per minute, the whole works. And then pallet rack and back room storage facilities, forklifts, et cetera.

At this point, I believe the next on the agenda is Simon, so I'll turn it over to you Simon. And let me--

SIMON

LANGFORD:

Thanks, Bill, and good morning, everybody. I want to touch on the opportunities and issues that we see in the retail supply chain. Before I do that, just to step back a little bit and see what we've all accomplished in the last few years.

So in 2001, 2002, we had the auto-ID center field trials, and installation points around the dock door, for instance, took hours to install, and probably minutes to destroy, or simply to go move those things. So it wasn't scalable, wasn't deployable, and certainly wasn't supportable.

But a lot of learning came out of that for us all then to focus on what we needed for deployable solutions. And the one key message that we were putting out at the time is that they should be future proofed as far as possible, knowing that Gen 2 was on the horizon-- that we wanted to deploy things that were software upgradeable.

And in 2004, then we really stepped up a notch to drive for mobile solutions, whether that be handheld solutions, and particularly solutions, which is important both to the retailer and a lot of suppliers. A lot of those things are still in the early stages, especially around mobile solutions.

So our current situation is we have robust fixed reader solutions allowing us to deploy up to 20 read points in a store in a matter of hours-- in a couple of hours. So taking that time down from days to hours, that reduces the cost of deployment.

So the cost of deployment isn't just around readers and antenna. A lot of the cost is in cabling and actual installation of the equipment. So it's a little bit like tags. It's not just the IC chip that we can take cost out of, it's the whole process.

Driving for common operating systems so that we can support it centrally-- maintain the robustness of that system. We're starting to deploy handhelds in the next few months. So getting the first mobile devices out there.

And I think that's when our store associates will start to see some of those transformational changes rather than just the iterative process changes that we've had out there in the store so far. Things that they can actually touch and feel and see the difference with RFID.

So our fixed rate points are collecting data in the background, and suggesting items to pick. But really, to a store associate today, what is RFID doing? They don't know. They don't see that as visible. Sure, they're picking more product and moving it out to the floor quicker, but once we get these mobile devices in their hands, then that will help them home in on where that product is, and really start to streamline their process.

We're very close to deploying the first forklift solution in our enterprise to read pallet tags and location tags, so we can have a pallet locating system in our Sam's Club operation, for example. Taking that learning then, we can then take that to our distribution centers to see how we can use location tracking, and putting pallets away and dropping them down, and start to streamline processes there as we move forward in the future.

But even those forklift solutions are still at the early stages. So we can read a pallet today. In the future, we need to be able to read cases-- or the same amount of cases we do today on a dock door from that pallet read on the forklift. That way, we can start to eliminate deploying readers around dock doors, and reduce our overall costs, and just have those readers on forklifts.

But at the very early stages-- the infant stages of wearable solutions. So whether that be something that an associate would wear on the belt or within a vest, and the system is reading in the background, and talking back to them, and giving them work to do.

And as Bill mentioned, Gen 2 is starting to roll out. We're enabled in our supply chain and starting to receive product on Gen 2 tags. And prices are falling. Tag prices are falling through the floor.

So what does all that technology deliver so far? What are the benefits of that? So it's allowed the first sort of automation of tasks around picklists and manual order controls, and associates to work more efficiently. That's improved our customer service and our offering of product on the shelf at the right time.

It's really taken the theory out of the lab environment into the real world. And I think once you take that step, that's when a lot of the real learning comes about. And Bill mentioned the study that they performed on our first changes, where out-of-stocks were reduced by 16%.

So you can see from a non-RFID environment and the different store formats here. To a partial implementation that we did, we had some caps on the number of auto-picks that we've actually suggested to our associates. And then to a full-blown RFID solution on those products that were enabled at the time.

Measuring the out-of-stocks in the control stores versus-- the pallet stores versus control stores, those RFID stocks performed 63% better in stocking the shelves than the control stores did. And within the same store, within the pilot store, looking at tagged product versus non-tagged product, we saw those replaced three times faster-- those products with RFID tags. So as Bill said, those first iterative process changes were starting to deliver dramatic results on the tag product we had in those stores.

So what about the issues and opportunities? Well, the issues remain the same as they did four years ago, 10 years ago. It's all about data accuracy and real time data.

Data accuracy drives both availability of product in the whole supply chain. The speed of that merchandise flowing through the supply chain, and the amount of inventory we have to hold, it has a direct relation to cost.

And as Bill said, it's important to see how we use that data. That we don't get swamped with data. We're using it-- it's actionable for store associates, for replenishment associates, and for our suppliers.

But it opens up a new world of granularity, new windows that we can see into the supply chain that we just didn't realize before. We're starting to drive efficiencies around manual processes, but lots of inefficiencies still exist today.

And a lot of changes will only occur [INAUDIBLE] distribution center once we start to get a critical mass of product flowing through those facilities. We've got a big opportunity to reduce lead times in the whole supply chain.

So in the short-term, as I've mentioned, we're rolling out handhelds. But the choice of handhelds today is limited. The functionality of those handhelds is limited.

We need to move to wearable mobile devices, systems that help us fast track product to the sales floor. It's always that least 50 yards in the store where we're most inefficient.

So how do we get [INAUDIBLE] one-way stock? It comes in, goes straight to the sales floor to the shelf, it's put on the shelf, and the box is thrown away. We don't get this double, triple, quadruple handling back and forth from the back room to the sales floor.

Bill mentioned about execution tools for promotions, new item launches. So how can we work more efficiently in that respect? And that's not just a supplier's responsibility or a retailer's responsibility. It's how do we collaborate together and make that work?

So driving execution. As I mentioned, the new windows and the new data streams that RFID gives us. How do we use that to drive that execution?

So in the real world today, people tick boxes and make reports look pretty, and say they've done tasks when they may not have done that task. RFID gives us that ability to see whether that task has been done. Whether that new modular has been laid out on the shelf, whether those new items have made it out to the shelf without anybody having to go in and take a check sheet.

Bill mentioned electronic proof of delivery. Big efficiency gain for both the supplier and retailer. So how do we make that happen across all retailers, all suppliers, with a common understanding?

I mentioned about a pilot locator system for Sam's. The benefits we're starting to see today, as Bill mentioned, it's a very small sort of subset of products and area that we've started to change. So that is truly the tip of the iceberg.

But many benefits are reliant on the technology continuing to develop and mature, and reducing the cost of deployment so we start to get that critical mass of product flowing through. Gen 2 is showing step change in performance. A real step change.

And all us end users, when we came together, we all said, well, we need a global tag. But there's no point in developing this tag if it's just an iterative process. We need a real step change. I'm pleased to say Gen 2 is delivering that today. But we still need to drive for cheaper, faster, better, and added features.

So what are some of the barriers to continued adoption and accelerating adoption? I think if you ask most suppliers, tag cost is the primary barrier. Many process efficiencies require that critical mass I've spoken about.

And we need to be smart of how we introduce RFID into areas so we're not running dual processes, and turning people's worlds upside down. That's what we started to do with our picking list. So it's behind the scenes, and it's just dovetailing with the current process. And as we move forward, we need to minimize impact on associates throughout the supply chain to enable us to execute and to get buy-in.

So what are the kind of things that we're looking-- that we need to work on and we need to collaborate on? And it's those transformational changes that Bill spoke about.

So sensor tags. Seems like we've been talking about culture and compliance, and sensor tags since the year dot. And it's not really becoming a reality yet.

So you look at semi-passive tags, and they're far too expensive currently to put into a deployable solution. So we need to move that up a notch. We'll start piloting some proof of concepts this year, again, just to show everybody what the benefit would be.

But looking at passive temperature sensing. So what is a true real business case? Is that we want to, with a passive sensor tag, read that temperature as it passes certain read points? Or in a trailer that may have RF equipment on board already for things like GPS that we can tie into.

Theft prevention systems. A lot of work was done on this through the [INAUDIBLE] center in the labs probably four or five years ago. But how do we really replace AIS systems, because that will start to reduce costs in that aspect.

We can't have AIS and RFID tags on the same product, because that's just increasing costs. So how do we get down to 1 solution that will achieve both?

True sortation at high speeds. So we're close to 600 feet a minute on our sortation systems. How do we singulate tag reads to know it's that case that needs to go to store 50?

I spoke quite a bit about mobile devices-- about robust, deployable mobile devices. And international-- we need true global tags. I mentioned about Gen 2 being a global solution. But I think what you'll see out there today with Gen 2 is those tags attuned to each geographic area.

So the tags that we're testing here are sure attuned to the US. The tags that we're testing in Europe are attuned to Europe. That's not going to work. That wasn't the idea of Gen 2. So we need to tune the tags to one sort of format that will work around the world. And we need to move the EPC network from theory and PowerPoints into reality.

I'll just about pharma, and I think there was a separate session yesterday on pharma which I wasn't able to make. But in the UHS space, there's been a lot of focus on case and pallet, and large form factors of tags. Little emphasis on the small form factors.

But we need to work on that. There's initiatives happening right now showing some good results in labs. But again, we need to move this out to the field to get real world learning. And then have a proper debate whether HF or UHF is a correct method to move forward with.

And a big need not just for pharma, but other areas as well for security. So what are the security measures that we would want and need on such products? Mentioned about international on the EPC network.

And direction. This is probably my number one objective for this year is through RFID to sense direction. So Bill mentioned about read rates not 100%, and we don't need them to be 100% today.

But having direction-- knowing that something is either leaving this room or coming into this room then actually gives us a much more accurate data than we have today. The last thing I want to do is tell an associate to go and pick a case that's sat in the background of a store, and then go there, and it's not there-- can't be found.

That discredits the whole system. So the cleaner data we can get, then the better position we are, the better execution we'll get. And direction will give us that.

And there's various theories and solutions thrown out there from using RFID and complimentary technologies such as sensors that we could use, or things like the Doppler effect that we could use through readers. But we really need to get out there and try for a four or five of these different methods to see which is most appropriate and cost effective.

And then some of the Holy Grails. Reading all cases on a pallet-- not possible today. But how can we achieve that in the future? And how do we get to the sub \$0.05 tag so that the automated checkout becomes a reality in the future?

What do we need to keep doing? We need to keep educating. We need to keep educating governing bodies around the world so that Gen 2 is endorsed in every region, every country so that global tag can be used.

We need to educate end users. What are the benefits of RFID? How best to deploy it, where to start? There's some great work being done in this area already.

And as Bill mentioned, developing and nurturing people today to help in the future build these systems and manage these systems. And quality improvements. The cost isn't just about this tags costed me \$0.12. Yield rates are important too because that cost gets passed on somewhere down the line. And testing for true interoperability. Testing for what is the best tag or the intended design for that product that you're shipping?

And Bill shared with me a while ago an interesting story from a supplier where it was two cases of a product-- one of our suppliers, and it was the same product, except a different flavor. And they were getting good read rates on one and poor read rates on the other, and couldn't understand why that was. And went along to Bill and said, can you help us with this?

And after some trial and error, and swapping the product between the two boxes, found out that one of the flavors had some metallic paint within the packaging. It was that that was causing the poor read rate on that second product. So to a supplier, it was the same product, same packaging as they thought, same density of product inside, but two different results. So how can we test and get best practice out there so every supplier doesn't have to go through that learning process? Because that reduces costs overall.

And we should all be mindful that as we move forward to the sales floor, to items, to theft prevention, that we need to ensure that privacy concerns are taken into account and addressed. This should only equal lowering the cost of implementation.

So just to wrap up, we're just scratching the surface today. We need to get mobile devices out there so that people can go about their everyday job, and the system is just talking to them, and giving them work to do in a prioritized way.

We need to lower the cost of deployment. And then finally, we should never lose sight of why we're using this technology, why we're pushing this technology and driving forward. It's all about the customer at the end of the day.

So whether you're a supplier or a retailer, at the end of the day, we need to service our customers better. And whether that's working more efficiently and taking cost out of the supply chain that then can be passed on to the customer, that's our end goal. Thank you.