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Analyst Day

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MANAGEMENT DISCUSSION SECTION

Brent Norwood

Director, Investor Relations, Deere & Co.

Good morning and welcome to the John Deere 2022 Analyst Day, which we are calling Leaps Unlocked. My name is Brent Norwood. I'm Director of Investor Relations at Deere & Co. And our name for today's event refers to our recently announced goals and aspirations, which we call our Leap Ambitions.

Today's we'll focus on those leaps and how we intend to unlock value for our industry. We'll begin with the size of the opportunity, the \$150 billion incremental addressable market that we are uniquely positioned to unlock.

Next we'll do a deep-dive on four key technologies we are developing that will enable us to deliver on that \$150 billion. Lastly, we conclude with some thoughts on the sustainable and business outcomes we will generate from executing our strategy.

But before we begin, a few housekeeping notes, at the end of the presentation, we will have time for Q&A. Whether you are joining us here in person or at home or from the office, you will need to submit your questions at our microsite at leapsunlocked.deere.com. In the interest of time, I will ask the questions on your behalf. And if you haven't already, please do silence your cell phones before we get started.

As one final note, today's commentary and discussion may include forward-looking comments concerning the future of the company that are subject to important risks and uncertainties. These include the company's plans and projections relating to the company's products and services, strategy for customer retention, growth and market position, and planned acquisitions and/or subsequent integrations. And assumptions regarding factors that could cause actual results to differ materially is contained in the company's most recent annual report and 10-K and subsequent quarterly reports on Form 10-Q filed with the Securities Exchange and Commission (sic) [Securities and Exchange Commission] (00:01:02).

Except, as required by law, the company undertakes no obligation to update or revise its forward-looking statements. This event may include discussion of financial measures that are not in conformance with accounting principles generally accepted in the United States of America GAAP. Additional information concerning these measures, including reconciliations to the most directly comparable GAAP measures, is included in the company's most recent annual report and 10-K and posted on our website at johndeere.com/earnings under Quarterly Earnings and Events.

Without further ado, let's get started.

[Video Presentation] (00:01:39-00:03:15)

John C. May

Chairman & Chief Executive Officer, Deere & Co.

Good morning, everybody. I am pleased to welcome everyone joining us in person in Des Moines. And I'm happy to welcome all of those that are online as well. We've got a diverse group with us today. We've got customers. We've got investors and we've got employees. At John Deere, we run so life can leap forward. And today is about

technology that underpins that purpose. The technology which will help the world do more with less. The technology we can deploy to make our customers more profitable.

John Deere is uniquely positioned to unlock immense value for our customers, \$150 billion of value. And when we help our customers succeed, it helps us creating value for our investors, creating meaningful careers for our employees, and building a better world.

In my 25-plus years with this company, I have never been more enthusiastic than I am today about the opportunities in front of us. Our sense of purpose is motivating. It's motivating for our employees. And you will see throughout the morning just how motivated we are. You'll see how our business strategy drives both economic and sustainable outcomes for our customers. The world is changing faster than ever, specifically in agriculture. The challenges our customers face are growing in complexity, and society is asking more and more of them.

The days of abundant resources in farming inputs is over. Labor, fertilizer and crop protection inputs, just to name a few, are all growing in scarcity, and they're increasing in cost. Weather patterns are becoming more volatile. Governments are increasing regulations, and customers are increasingly interested in more sustainably grown food, fiber and fuel. And populations are growing, demanding greater food security, all while embracing a shared imperative to a lower carbon world. All of these factors driving increased volatility in our customer's financial outcomes. Older approaches to increase agricultural output are no longer viable. In the past, we would rely on planting more acres, increasing horsepower and applying more nutrients. In short, we could always do more with more. However, today in agriculture, we must do more with less. And our ambition at John Deere is to help our customers do exactly that.

These challenges are also opportunities for our customers, and Deere plays a unique role in helping them solve these challenges. A few years ago, we reorganized our business around production systems such as corn and soy, small grains, cotton and sugar. Said another way, we matched our organization to the way our customers do business. This gave us better insight into the challenges our customers face and the opportunities for us to create value. We assessed each production system. We mapped out every job a customer does, and then we determine the areas where John Deere solutions could unlock value, both economic and sustainable. The result was a \$150 billion identified as incremental adjustable market.

That figure includes every drop of herbicide or pound of fertilizer that our machines save through precision application. Every extra bushel our customers get from achieving uniform emergence in their crop, and every dollar saved on a job site due to less rework from smart grade technology. That's an enormous opportunity for John Deere, and building solutions to address it will underpin our revenue growth through the balance of the next decade.

And that's what our smart industrial strategy is all about. It's about more value per unit, not just driving more units. Today's focus will be more about the long-term growth than the particulars of the cycle. And we're going to dive into several technologies that will drive this growth. But don't think of these technologies in isolation.

It's the combination of these technologies on top of the best-in-class machines. Our product pipeline is full. The innovation will bring to the market over the balance of the decade will rival the transformation that took place when John Deere first began making tractors in 1918.

Our inflection point is now, and I've never been more convinced of the growth in front of us. At our last Analyst Day in 2020, we told you we were going to transform our organization to be a smart industrial. Since then, we reorganized our business, we centralized technology development, and we overhauled our capital allocation

process to skew more investments towards the solutions that are most differentiated, and deliver the most customer value.

The result is two outcomes, first, a structurally more profitable company. Second, an organization that is now prepared to deliver on the next opportunities or, as we call them, leaps ahead. Just like we accomplished the goals we set in 2020, we will do the same with our new Leap Ambitions. So, to kick things off and shed more light on the technology that we're creating, the technology leaps, I am pleased to welcome our Chief Technology Officer, Jahmy Hindman.

Jahmy J. Hindman

Chief Technology Officer, Deere & Co.

Thanks, John. As John just noted, we're at an inflection point in agriculture, but it's one that we've been preparing for. We began our precision technology journey nearly 30 years ago. We made it our strategy then to vertically integrate technologies that we viewed as core to our end markets. At the time, many of these technologies could have been outsourced to third parties, but we view them as essential components to what would ultimately become the John Deere tech stack.

While other industry players partnered, we intentionally developed proprietary technology because many of our end markets are unique and they require customization and also because we – seamless integration with a suite of equipment and a user experience that's tailored for our customers adds tremendous value. Over time, we've added more and more value to our tech stack making John Deere solutions uniquely effective and difficult to replicate.

A few years ago, some key developments in technologies revolutionized our ideas on the art of the possible for Precision Ag. Advancements in machine learning and computer vision, connectivity and compute, all enabled this concept of plant level management. You see, for generations farming decisions have been done at the field level.

Given there are 4 trillion corn plants grown in the US alone each year, how could anyone expect to optimize at the plant level? Today, we're closer than ever. Our tech stack provides machines with superhuman capabilities that not only make the job easier, but also do the job better than a human operator could ever hope for, over those 4 trillion corn plants. You see, the key to unlocking this value is Deere's full technology stack. Here's what I mean by that.

First, our core equipment portfolio, Deere is the leader in Ag in the Ag equipment industry with the largest installed base and the broadest suite of products that span full production systems. Revolutionizing Ag, starts with having the best agricultural machines because these precision technologies only add value if they can execute in the field.

For example, the See & Spray technology is perfectly integrated with the world's best self-propelled sprayer that incorporates a new carbon fiber boom and boom suspension system that simply makes the See & Spray technology work better. This combination of the world's best product portfolio, coupled with the best dealer network when you combine it with Precision technology provides a truly differentiated solution.

Next, our electronic hardware and software, we've been developing our own hardware and software since the 1990s, when we began manufacturing displays and writing code for the embedded software that controls our machines. While we often take this for granted today, this enables highly robust electronics hardware to operate in our harsh agricultural environments with a high degree of reliability.

As an example, both at Autonomous Tractor and the See & Spray sprayer rely upon a graphical processing unit, that runs at 30 watts of compute power, all while being passively cool. That's something nobody else in our industry, or frankly, any industry has the ability to replicate. This competency is a core part of our technology stack.

And then, came guidance. In 1999, we acquired NavCom, a leader in geospatial positioning that gave us our own GPS hardware and highly accurate signal correction solution. That's the foundational technology that gave us applications like Yield Documentation, AutoTrac and Section Control. And it eventually progressed to give us features like Turn Automation and AutoPath. We rely upon that proprietary guidance technology today to enable ever increasing value like autonomy, with speed only possible when you own the core technology.

And then roughly 10 years ago, we started a connectivity and digital journey. This layer of our tech stack is built on connectivity, cloud compute, real-time information, and this persistent connection that our customers can count on for both support and the ability to move their data from the field to the office and back again.

We then added our digital experience, the John Deere Operations Center. This has enabled our customers to organize their agronomic data and use analytics to make better decisions, and it enables both connected support and streamlined financial tracking through Harvest Profit, our farm profitability software. And finally, all of us live in the age of automation and autonomy building on these previous layers of the tech stack enabled the next generation of machine intelligence like Sea & Spray and autonomy. And we're going to spend much of our time this morning unpacking these next layers of the stack.

Importantly, these sense-and-act technologies deliver the most value when they're integrated with the foundational layers of the stack and paired with the best equipment and support in the industry. You see the sum is truly greater than the parts. All of this technology working together that leads to the \$150 billion addressable market and the cadence of the unlock. Let me give you a few examples of how this all comes together to create value. First, we'll deploy existing technologies in new geographies and in new production systems. For example, connectivity is becoming as important as sunlight to agriculture. Growers that aren't able to be connected are becoming more disadvantaged over time as they miss the opportunity unlocked by digital agronomy. We're going to continue to work with our telecommunications partners to provide cellular connectivity in areas that are underserved today, but we won't stop there.

We will also solve for global connectivity needs by leveraging the burgeoning activity happening in satellite communications. Next, we'll continue scaling some of the new-to-world technologies that are just now hitting the market, things like See & Spray and autonomy. See & Spray technology can help reduce the usage of contact herbicide by up to two-thirds.

With a global total herbicide spend of \$35 billion we're just getting started on this one. We've started with corn, soy, and cotton production systems, but the opportunity here is multidimensional. It not only extends to other crop types for herbicides like pulses and small grains, but it also extends to other crop care applications like fungicides and pesticides.

Having eyes in the field that allow for real-time application decisions is very fertile ground. Autonomy, labor is scarce, and it's becoming more costly by the day. The value of labor alone is \$7 billion for US row crops. Of course, the real payoff here is when autonomy enables customers to hit these optimal agronomic timing windows. That drives the biggest unlock through increased yield and while it's difficult to place a value on it and improve quality of life, as mentioned in every conversation I have with customers about autonomy.

And lastly, there's this pipeline of sense-and-act technology that you haven't seen yet. Think about a world where, a See & Spray sprayer is providing stand counter emergent information on the first pass it makes post planting. That pass can be used to help inform decisions on fertilization for that year's growing season, but it can also be used to inform the planting operations for the next season.

Decisions like seed depth, variety, population, starter fertilizer all are possible to change and to optimize with that information. Or consider, a planner in the spring of the year in Iowa, for example, sensing soil variables like nitrogen, phosphorus and potassium and maybe even carbon in real time, providing the high definition map of the current state of the soil and providing the necessary information to make more prescriptive decisions for the remaining crop or the following one.

So, over the course of the morning, you'll see many, from-to leaps that we will enable for our industry. Leaps that allow farmers to move from 40 chances to grow the perfect crop in their lifetime to analytics and decisions based on 40,000 lifetimes. They'll pivot from field level management to plant level management. And they'll be freed from the limits of labor to machines that work without limits. All of this driving the biggest Leap of all from doing more with more to doing more with less.

I'd like to ask Doug Sauder to the stage to overview digitalization for you. Welcome, Doug.

Doug Sauder

Director-Product Management, Deere & Co.

I'll focus on digitalization in agriculture and how data and digital tools are key elements in how we create a production system advantage for farmers. The key theme in our digitalization strategy is connect, because we're focused on connecting equipment to the cloud, connecting data to decision makers, and connecting the steps of the production system together.

Equipment connectivity is foundational to creating customer value across the production system. We have over 300,000 connected Ag machines today, and will more than triple that by 2026. Our goal is to enable farmers to easily connect every single piece of equipment on the farm. Connectivity allows data to get into the hands of key decision makers through the John Deere Operations Center.

As you can see, the farmer is at the center of our universe, and the Operations Center is our flagship digital tool that enables farmers to comprehensively manage their farm. We currently have more than 340 million engaged acres, which demonstrates the increasing breadth of farmer engagement with the operation center.

But it's also important to remember, most farmers don't farm alone. They often use trusted advisers who typically utilize specialized software tools to assist farmers. And we have over 250 connected software companies that are linked to the John Deere Operations Center through our API platform, making us the most collaborative system in agriculture.

Finally, we connect the steps of the production system together with a thread of data to create smarter equipment. We create a system level advantage when a machine in the field is not only equipped with onboard sensors, but it's also more intelligent because it uses data that was collected in a prior step. Data is this key digital thread that links these steps together to create a system level advantage.

Now before we go too far, I'd like us to put ourselves for a moment in the shoes of one of our customers so that we can grasp the operational and agronomic complexities that our customers face. I want you to think about Ted Johnson, who farms about 6,500 acres of corn and soybeans here in Iowa. Ted has 80 fields spread out over 30

miles, has a fleet of 15 pieces of equipment, a team of 7 that support him. In one season, Ted's team will operate equipment for over 2,000 hours, working ground equivalent of 40,000 football fields. He'll plant 500 million seeds. He'll apply 3,300 tons of fertilizer and harvest a million bushels of grain, which is almost a 1,000 semi-trucks. Our aim is to help farmers like Ted, manage the operations of his farm like a well-oiled machine.

Now, in addition to these operational challenges, Ted's ultimate goal is to optimize the profitability of those 6,500 acres, which are highly variable. He has nine soil types, plants 16 seed varieties and will apply 12 different fertilizer and crop protection products this year. And what makes the challenge of farming unique is that each season's weather can be different and so many of these key variables will change each year. Realistically, Ted has 40 chances in his lifetime to optimize the economics of his farm and to pass a profitable and sustainable operation to the next generation. Our aim is to help farmers like Ted accelerate their learning through the power of data and multiply their chances for success. What if Ted could learn from 40,000 other lifetimes through powerful insights gleaned through the digitalization of the farm?

Historically, when we've talked about leveraging data, we were primarily focused on machine data and using that for predictive expert alerts to reduce machine downtime. But increasingly, we are expanding our data sets for analytics to incorporate the operational and agronomic data that comes from the farm so that we can create more value for our customers.

The Data Foundation for Advanced Insights comes from the John Deere Operations Center. In fact, I'd like you to start thinking of the Operations Center as the digital twin of the farm. We create a digital representation of each farmer's equipment, fields, the products that are planted and applied, the field operations that are performed, and the yield outcomes that are achieved. And this data set is what's used to create smarter equipment and to enable better decisions for our customers globally.

I'd like to give you a few examples of the power of data and digitalization at work. The first is a guidance solution called AutoPath that we launched last year. We take the high resolution planting data from the planter. We send it to the Operations Center and we create a digital representation of where each seed was planted in the field. And this knowledge of the planting lines is then sent back down to sprayer and back down to the combine, so that when they enter the field, our equipment can navigate the field using the precise location of each plant that was recorded in a prior step.

For the operator, this simplifies a lot of the complexity that exist with different implement widths or handling situations where the plants are had to make some unplanned maneuvers. AutoPath has been extremely well received in the market, and we're continuing to expand and enhance it. For example, we're now working on use cases where historic planting data may not exist, but we can use the digital field boundary, and other data to optimize the path plan of the field.

Increasingly, our future guidance solutions will be enabled by the digital twin of the farm that is in the Operations Center. Another example of digitalization at work, is how new product development is leveraging the intelligence of our global fleet.

Historically, when we created automation algorithms, we were typically limited to using small data sets from our engineering machines to train our models, commonly using dozens of machines worth of data. But over the last couple of years, we've invested in collecting more data at higher resolution from each customer machine, and bringing that data to the cloud.

And so our next-generation automation algorithms can now be created using the power of tens of thousands of connected machines globally. That's a Leap from tens of machines to tens of thousands. See, the best algorithms

are created by the biggest data set, and we're focused on using fleet data to create smarter equipment for our customers tomorrow. A final example of how we're harnessing the power of data is in the area of agronomic insights. Historically, each farmer's knowledge was really limited to the data that they had access to, typically, the results of small on farm experiments that they conducted themselves or perhaps local university trials. But this spring, for the second year in a row, John Deere published regionally relevant aggregated analysis across millions of acres of soybean yields.

Our data policy with farmers in control give us the ability to create insights based on this aggregated dataset. And these insights really turn the conventional wisdom on its head, upending decades old practices of planting corn first in the Midwest and showing the upside to early soybean planting. These insights represent first steps in how the power of a broad aggregated dataset can be used to help farmers with insights gleaned from beyond the borders of their own farm.

Well, now let's focus specifically on the John Deere Operations Center. The Operations Center is central to our digitalization strategy because it's the user interface where customers engage with their data to receive insights on the farm. Now, it's important to understand the difference between the Operations Center and the historical farm management systems in the industry.

Historically, these systems were really focused on analyzing data after the fact to make agronomic decisions for next year. They typically aren't easy to use, commonly run on desktop computers, and they often import data manually from USB sticks.

The Operations Center is different. It is a forward-looking operational and agronomic command center for the farm. Our approach is mobile first, real time, cloud-based, and it's deeply integrated with our onboard technology. And this creates a powerful, differentiated experience for farm managers, for equipment operators and for trusted advisers. And we're laser-focused on the user experience, so that our tools are easy to use for farmers of all ages and technology skill levels.

To give you a sense of the scale of our digital platform, on a typical day at the peak of planting season, we process about 70 million messages from over 250,000 machines worldwide. And these numbers are growing fast. What I'm going to do next is highlight just a few of the capabilities of the Operations Center so that you can have a better sense of the value it provides farm managers, and then, you're going to get to hear from a real customer and how he uses it on his farm.

So first, farm managers are able to know the real-time location and working status of each piece of equipment on the farm at a glance. Idle equipment means lost time and money, and so real-time visibility of the fleet and the team are crucial to optimizing productivity. When fieldwork is going on, the ability to keep a finger on the pulse of both productivity and job quality is critical, and so remote managers can use the Operations Center Mobile app to ensure that the right products are being applied at the right rate.

They can have confidence that the job quality is being maintained by visualizing key performance metrics from our equipment, and they can also get an up to the minute view of job progress without having to make a phone call. It's also easy to keep an eye on the health of equipment and take action as necessary. Diagnostic trouble codes are categorized and surfaced. And in the future, farmers will have access to even more diagnostic tools and the ability to perform secure software updates.

As fieldwork progresses, the agronomic data from connected equipment is received and processed automatically in our data platform. Farmers can share that data easily with trusted advisers, either in a simple PDF report, or

they can share the underlying data files. When farm managers are in the office, the web version of the Operations Center provides a bigger screen experience to view the entire form – farm and perform more advanced functions.

Farmers often run experiments, like this A/B test to understand which seed variety perform best in this field. Our field analyzer feature allows farmers to easily analyze the results of experiments like this to gain insight into agronomic outcomes. These insights can be aggregated up as well, so that farmers can understand the yield performance of each variety that was planted and harvested across thousands of acres on their farm.

The Operations Center also allows farmers to understand the impact of new technology. This is a spray map of See & Spray Ultimate. And in this field, over 84% of the area didn't get sprayed because no weeds were detected. These visualizations allow farmers to easily measure and understand the economic and ecological impact of new technology like See & Spray.

Another – one of the key ways that agronomic data is put to use is to create variable rate prescriptions for next season. A prescription is a geospatial instruction set where a field is divided into zones, often done using last year's yield data, and farmers or their agronomists can prescribe less seeds in the lower producing areas of the field, and more seeds in the higher producing areas. And they can also vary the amount of nutrients that will be applied to each zone, so that they can optimize each acre of the field.

Prescriptions are one part of having a plan created in advance for each field. And planning field operations in advance is critical for operational efficiency so that operators can hit the ground running in the heat of the battle. The Operations Center allows farm managers to create work plans in advance and then send those plans wirelessly to the equipment, so that the operator simply needs to pull into the field and confirm the plan on our display, saving time and ensuring high quality data collection.

As you can see, this unified off board and onboard experience is increasingly taking tasks off of the plate of the human operator, which is crucial as we enter a world of autonomy. Our autonomous tractor is not only monitored, but it's also controlled by the Operations Center Mobile app, giving remote managers the ability to initiate equipment motion as well as view a live video feed of the autonomous tillage operation. So, I hope that gives you a better sense of the capabilities of the John Deere Operations Center and why we call it the operational and agronomic command center for the farm.

And as exciting as all that is, we're really just getting started. The future of the Operations Center is to turbocharge its capabilities with data science and analytics. In the future, we'll release more powerful planning tools that provide greater insights into field readiness and workability as well as predicting the time needed for jobs to complete.

Later this season, our monitoring tools will not only show where equipment is right now, but will also predict the time remaining to complete the field operation. In the future, we'll predict time to empty and provide other insights to help farmers improve the logistics of the farm. All of these forward-looking predictions and insights are powered by the digitalization of the farm and the ability to create machine learning models from a vast dataset of machine and agronomic data that was transmitted to the cloud through connectivity. So, I hope it's clear how connectivity and digitalization are key parts of our tech stack and critical elements in creating differentiated customer value.

What is exciting is how this system gets better as time goes on and more technology is adopted. The data flywheel gets more powerful as we connect more equipment, collect more data, and generate insights that are not available to individual farmers alone nor to our competitors. Today, we have John Deere Precision Ag hardware install on an estimated 0.5 billion acres globally.

Our Leap Ambitions to connect 1.5 million machines and expand to over 500 million engaged acres over the next few years will spin this flywheel even faster to create better outcomes for our customers through the power of digitalization.

Well, now we're excited to have you hear firsthand from a real farmer with a really good story about how we've helped him scale his operation and increase the size of his farm through the power of digitalization. And so, I'd like to welcome our customer, Clint Reiss and his daughter, Jayde to the stage.

Good morning. Thank you, Clint and Jayde for joining us here today. Maybe if you could start, just tell us a little bit about your farming operation.

Clint Reiss

Partner, Southwest Family Farms.

Sure. Southwest Family Farms is located in the far southwest corner of Kansas. It's operated by the Reiss family. There's four partners, my parents and my brother that are partners in that operation. We are the fourth and fifth generation of the Reiss family that's farmed. We have two locations. Our home base is in Seward County, Kansas, and we have 5,000 acres of irrigated ground there that is consisted of a crop rotation of either corn-soybean rotation or corn-cotton rotation. Then we have 3,000 acres of dry land in Seward County that is in a corn-wheat fallow rotation. So two crops in three years. We get about 18 inches of rainfall there. So, the third year we let it sit fallow, so it can help build subsoil and moisture.

Then we have another farm that's 10,000 acres. That is all dry land. That is 80 miles to the west. So, there's 80 mile spread between these two farms. And it is all dry land like I said. And it is in a wheat milo fallow rotation out there. Milo is a little bit more of a drought-tolerant crop than corn. So, that rainfall out there is only about 15 inches. So, that's what we do out there. So, that's our farm.

Doug Sauder

Director-Product Management, Deere & Co.

Great. Well, maybe can you tell us a little bit about your use of digital tools over the last years? And what is most important to you?

Clint Reiss

Partner, Southwest Family Farms.

Sure. We use lots of digital tools. We've been big believers in technology on our farm ever since we started doing this. We think it's the way to continue to improve what we do. Some of the biggest things that have allowed us to grow here in the last few years is the ability to share coverage between sprayers. Spraying is probably the most difficult operation on our farm because variables change every time depending on what you're spraying, what's next to you. You don't want to drift on and kill a neighbor's crop. So, there's a lot of variables there. And so we were almost to the limit where one sprayer wasn't enough. And training somebody to run a sprayer is very difficult. So, we bought a second sprayer. But in order to train that individual, I needed to be on there with him.

So, with shared coverage now, we can have both of our sprayers in the same field and they can be seen where we've applied and it shuts the sprayer off if it goes over an area that's already been applied. And so I can monitor that second sprayer from the cab. And so I can be in the field with him. I can help train them that way. So, that has made that much easier to train those individuals.

And then the other thing that we use is we use remote display access. And so I can look at his screen from my phone whenever I'm in my sprayer or driving around the farm and see what type of issues you had. And Jayde got a pretty good example of how Remote Display Access has been good for her whenever she come back to help us.

Jayde Reiss

Intern, US Department of Agriculture-Agricultural Research Service

Yeah. So the Remote Display Access has been absolutely instrumental as I've integrated into the farm as I've grown up. So, in March of 2020, I was kicked out of college due to COVID, and went back, and was living at home, and started helping on the farm. Our H-2A employees were not able to make it in in time to help with planting due to COVID. So I got put on a planter. I was still in school. Thanks to AutoTrac, I was able to do some homework whilst planting.

I had never planted before and the remote access really made it easy for us. We were spread pretty thin at the time. And so Dad got on with me for a couple hours to teach me the ropes and how to start planting. And I was pretty comfortable being on there by myself and – but if I had any issues, he was able to get on my screen remotely and see what was going on and help me figure out, I need to push this button or I need to get out and look at this. So that kept us from having to stop what we were doing so that he could physically come out to the field and help me, which really helped us keep our operation running smoothly.

Doug Sauder

Director-Product Management, Deere & Co.

That's great. Thanks for sharing that. We talk a lot about helping farmers like you be more profitable and more sustainable. I'm interested. Tell us what sustainability means to both of you.

Clint Reiss

Partner, Southwest Family Farms.

Well, sustainability is something that I think farmers have always done. Farming is not a just a business. It's kind of a way of life for us. And so we always – the goal of every farmer I know is usually to pass it to the next generation. So I think farmers have always thought of things as being sustainable. It's kind of a buzzword that maybe is put a word to it, but we've all thought that's about our operation. We want it to be sustainable because we want the next generation to come back.

So the first thing, though, for sustainability for us is profitability. We have to be profitable in order for our farm to be sustainable. So that's number one for us is we have to be profitable. And that can be achieved in different ways and different areas. We would not be profitable growing oranges in Southwest Kansas. We need to be growing corn and cotton and soybean. So, whatever your area is or whatever you need to do on your farm that's profitable that's the first thing to sustainability.

And then growing those crops the right way and by the right way I mean, this will be the second part of sustainability would be doing it the right way would be being smart with your fertilizer usage and your pesticide and not over applying things, taking care of that land, because I need that land to be productive not only for me, but for her, and for the future generation. So that's the second part of sustainability in our opinion.

And then the third part is kind of unique maybe. It's the community that we live in. We need that community to be sustainable. We need that community to thrive so there's a reason for my kids to come back, and want to be part of that community, that there's good schools there. And so it's important that we focus on contributing to our

community, and also trying to bring some industry into our community that will provide other opportunities for kids that maybe don't want to farm but still want to be in the area. So, we have good schools, and other activities for us to do.

Jayde Reiss

Intern, US Department of Agriculture-Agricultural Research Service

Yeah. Like my dad said, sustainability is a big buzz word right now, especially in agriculture industry, but sustainability is extremely personal to farmers, and farming families. And as much as we talk about it now, growing up, and getting more involved in the farm, I've always known that we are stewards of our land and we are sure to do sustainable practices and I know that it will be there for me, and I hope to continue that for generations to come. And I think that some of this new tech that's coming out, especially with John Deere, will really allow us to continue to stay sustainable and have great land, and produce great crops for many years to come.

Doug Sauder

Director-Product Management, Deere & Co.

That's great. Well, Clint and Jayde, we really appreciate you sharing that with us, and being here with us today. Clearly, the impact of digitalization is significant for our customers, and the ability for them to scale, and sustain their operations. Now we're going to shift our focus to another key area of technology that allows farmers to harness the variability of the farm through sense-and-act technology. And so, I'd like to welcome my colleagues, Deanna Kovar and Jorge Heraud to the stage to tell us more about that.

Deanna Kovar

Vice President-Production & Precision Ag Production Systems, Deere & Co.

Thank you. As Doug mentioned, real-time data from connected machines truly is the fuel, helping farmers make better decisions and helping them to become even more environmentally sustainable, all while unlocking our incremental addressable market. Data and connectivity are focused on documenting the variability in agriculture, in order to manage it at an entirely new level.

You see, a farming environment is not homogenous. It's like outdoor manufacturing. There's natural variability even within a single field with different soil types, elevation changes and weed pressure. There's also weather patterns that drive variability. Then there's hundreds of choices that farmers make every single year that generate even more variability into agriculture. All of this creates significant variability in profitability as well.

A recent University of Minnesota benchmarking study showed that the profit on the lower 20% of corn acres was one-third that of the highest performing acres. In the past, farmers managed with one plan at the farm or field level, effectively treating everything the same despite all the variability they experience. Because of the data evolution that Doug shared, more and more are now managing by zones within the field. Data tools, like the John Deere Operations Center, have made this possible and made it easier. But now, we will go to a whole new level through sense-and-act technology.

Sense-and-act is plant level management at scale with ease in real time. To put it in perspective, Doug noted about 40,000 seeds per acre. Using US corn acreage, for example, those roughly 90 million acres represent nearly 4 trillion seeds and eventually 4 trillion plants. That's 4 trillion opportunities for our machines to make decisions and 4 trillion opportunities to optimize outcomes every pass. Sense-and-act moves farming from managing variability to taking advantage of variability, driving better profitability and sustainability for farmers.

As we move to sense-and-act, we start with sensing, uniquely understanding each plant and its surroundings. Building off of our product leadership and years and years of automation, we then act. Automation technology, executing a specific action in real time that increases yield, reduces waste and creates better outcomes for growers.

For example, sensing soil and plant conditions in real time will give the machine the superhuman capability to act to ensure every one of those 4 trillion seeds is placed precisely based on its unique needs and the variability it experiences, so that it can emerge as a healthy plant and reach its optimal yield.

To give you a taste of how the machine senses the environment in real time and acts accordingly to optimize output, let's do a short exercise. How many of you spot fungus and mold? Anybody see beetles [ph] stock bores (00:49:35)? Do you see a nitrogen deficiency? Do you notice any pigweeds? Pretty good. Almost like an operator who's multitasking as they traverse through the field.

Now, here's what the machine sees. Each insight is valuable and helps farmers make the most out of their time in the field. We've been building the sense-and-act foundation for multiple decades through the tech stack that Jahmy walked through earlier. What's new is how automation is progressing with sense-and-act capabilities, enabling us to automate down to the plant level through machine learning platforms by sensing new things, by making more decisions in real time and executing them at every square meter, all allowing us to unlock tremendous identified incremental addressable market for the industry, for our farmers, and for John Deere.

The products we have in the market today give us confidence that customers will adopt even more intelligence and automation tools. Customers who utilize Combine Advisor today can expect to reduce their losses and put 1% more yield in the tank. For our customer, Ted, that Doug talked about, at current prices, using Combine Advisor means an additional profit potential of \$80,000 on his farm every single year.

See & Spray Ultimate, which launched in March, is another great example of our sense-and-act journey. A See & Spray Ultimate sprayer traverses through the field and identifies the difference between a weed and a healthy crop plant and it only sprays the weed. What's most interesting and what makes this generation of See & Spray truly ultimate is not just the technology. This whole solution was created in concert between John Deere and two recent acquisitions, Blue River Technology and King Agro.

The technology of the cameras, compute and machine learning is unparalleled in the industry today. This system is ultimate, though, because of the integration of the Blue River Technology with the best sprayer from John Deere, made even better through the capability to apply two different products at the same time through a dual product system.

Plus, the industry's most stable boom manufactured by King Agro. It's strong enough to carry the technology but light enough to keep the machine nimble. It is this integration of our teams and not just the machine or the tech, but the machine and the technology together that truly makes See & Spray Ultimate ultimate.

Sense-and-act is happening now and it is a huge part of our future. It's our opportunity to build on the technology of the past while creating even more value for our customers and for John Deere.

I'd like to now introduce Jorge Heraud, who'll go deeper into the technologies of our sense-and-act toolkit. Jorge?

Jorge Heraud

Vice President-Automation & Autonomy, Deere & Co.

Hey. Thank you, Deanna. This year, we're shipping See & Spray Ultimate and Combine Advisor, the two products that Deanna just spoke about, as well as the autonomous 8R tractor that we released at CES. And these products are transformational and they utilize robotics and they utilize artificial intelligence and that is just the start of our journey.

We are this year also in advanced testing at customer sites with four additional products in the sense-and-act family. Two of them are in harvesting, one is in planting, and one is in construction. And there's more coming on later. This technology, robotics and artificial intelligence, are going to really be propelling us to the next stage. This is why I'm here to tell you that John Deere is quickly becoming a world-leading robotics and artificial intelligence company.

To give you a feel for what we're doing, I'm going to discuss three different technologies that are – that we're working on and that are utilized across this family of products that we're coming up with. Number one product I would like to talk to you about is cameras. These cameras are a basic sensor that we use in order to be able to see what is happening and to enable these new products that have the ability to understand what is happening with every single kernel, with every single situation the machine is in, and with every single plant the machine is seeing. I equate it to the eyes of the machines.

We've designed a camera that is custom to John Deere. This camera is a high dynamic range camera, so it can see plants both in sunlight and in shadows, even if they are in the same image. It also has a custom sensing element that can measure the best wavelengths that are good for not only seeing obstacles in the field but seeing plants and understanding them. It's sealed, it's ultra-rugged, and it's used across not only agricultural equipment but also construction equipment.

In able to this cost effectively, we've leveraged our volume. As an example, See & Spray uses 36 cameras in every sprayer. The autonomous tractor we're going to be talking about uses 12 cameras in every single vehicle, right, and with more products coming down the pipeline, we are rapidly moving to increase our volumes. We're going to be getting close to 1 million cameras sold every year with our equipment. And that larger volume is what makes our custom cameras affordable.

The second area I would like to talk about is edge computing. Most machine learning is done in the cloud. There is vast amount of computational power you need in order to make sense of what the cameras are seeing. At John Deere, because our machines are used in rural environments where connectivity is not always great and because decisions need to be done very, very fast, we've decided to approach this problem by creating edge computing. It's the only possible way forward.

We've created an ultra-rugged, ultra-fast processing unit based on NVIDIA GPUs or graphics processing units. In the case of See & Spray as an example, our machine covers 2,100 square feet in every single second. In that second, we cover and capture about 3 billion pixels. These are submillimeter pixels that allow us to see with high resolution every single plant. To process this, we need very, very fast processors and we use our compute that has a total of 330,000 billion operations every second, and that's what is needed for the system to be able to make decisions in real time as the sprayer is going across the field and seeing plants through its 120-foot wide boom.

And just like in the case of our cameras, this ultra-rugged compute is not only useful for See & Spray, but it's also the core that we use across every single automation and autonomy product. The same applies to the software that is running in this system and in this hardware. And by the way, this software just got a lot better with our 27 new employees that came from Light and we just announced two weeks ago, and they're helping us make perception better.

The third technology I would like to talk about is what we call Mesa, our machine learning platform. This is a collection of software applications that allow us to do many things to accelerate machine learning. It does everything from collect images and ingest images to search images and curate images to label images and then deploy trained models based on these images back to the machines. All these are fundamental capabilities that are needed by all our products. We developed this set of tools for See & Spray initially, but we've been using now in a generalized way across all our products.

Mesa allows our – us to develop these new products much faster because we already have a lot of the tools that we need. And we're able to obtain performances that are much higher and in much shorter time than we were able to do this before. So, those are three technologies that we're using across all our product lines. But in addition to these three technologies, what I would like to tell you a little bit about is the advantage of scale. We have the ability to use our fleet as data collection rigs. The more machines we put out with cameras, the better we're able to collect images and train our models. And not only that, not only do we get better models that help farmers, but we prepare for future applications that can come up in the products that we've already launched.

So, let me give you an example. Now, going back again to See & Spray, we decided to start with three crops: corn, soybeans and cotton. And that's what we were supporting in our first release. But these same machines are going to be used by our customers, not only in this See & Spray application in these three crops, but they're going to be used across multiple other crops in conventional mode. We are able to collect images from these sprayers as they drive through these other crops and start the creation of new models to support these new crops.

And also in the future, we're going to be able to move not only through field spraying herbicides, but also spray other chemicals that our farmers use in with that same sprayer. We're going to be able to support in the future insecticides, fungicides and nutrient application. And we're going to be able to do that faster because of the data we're already collecting with those machines.

So, using all this hardware is very powerful and it's already installed in these – in the machines. And the outlook that you might draw is – you might be familiar with is Tesla. Tesla talks a little bit about this advantage. They're using the power of their fleet to collect images, but they have – if you think about all the cars in the road, Tesla has a relatively small percentage of the vehicles; we have in agriculture a significantly larger installed base. This allows us to collect a larger database that allows us to make our products better, deliver more value to the customers, keep improving them, and develop new products and solutions faster. This is a flywheel that we're able to keep turning and make our products better. And the more we make our products better, the more customers we attract, which feeds back into more customers and better models.

So, with these three technologies, cameras, edge computing, machine learning, as well as the scale of our fleet, we're able to develop new robotics and artificial intelligent products much faster than anyone in the industry. And this sets us up to unlock the \$150 billion of incremental addressable market. Building on our 180 year old roots as a world-class manufacturer, we are now set up to become a world-leading robotics and artificial intelligence company.

Back to, you Deanna.

Deanna Kovar

Vice President-Production & Precision Ag Production Systems, Deere & Co.

Thanks, Jorge. So, what's next? Where do we go from here? As far as we have come, we still have tremendous opportunity in front of us to unlock over \$150 billion of identified incremental addressable market for our

customers. Building upon our past, the future, the next decade is all about smart automation, expanding the tools we've launched, sensing new attributes in the field and automating more of the work at scale.

As Jorge mentioned, we'll be focused on expanding our capabilities with products like See & Spray. Well, we'll take the product across more machine forms, new mounds of actions, new geographies and new crops. Also, expect to see further See & Spray retrofit solutions.

Beyond just See & Spray, we'll continue to take our leading technologies from North America and extend them in geographies like Brazil, Argentina, Europe, and other locations. With our next technologies, we will follow the success we have had with extending technologies like ExactEmerge planter technology and ExactApply sprayer technology, as well as continue to leverage our precision foundation globally.

In addition, we have innovations developed specifically for one production system that will expand to others, creating significant opportunities to scale. We are using sense-and-act technology to focus on our customers' most significant challenges and to unlock the greatest amount of economic and environmental value across all the jobs in the field.

For example, we introduced a product called ExactRate last year. We have the only OEM solution that enables our customers to combine the planting step with the application of liquid fertilizer more efficiently through a solution on both the planter and the tractor. Currently, many of our growers apply fertilizer in the fall because that's the only time they have to get that important job done. Many of our customers will apply nitrogen fertilizer right after harvest, even though the seed won't need that fertilizer for months to come. And the global fertilizer market is estimated to be just under \$200 billion, highlighting a significant opportunity to improve farm economics through increased efficiency.

ExactRate gives our customers an option to reduce or forego the fall fertilizer pass. Instead, applying a precise stream of liquid fertilizer beside the row while planting making it easy for the plants' roots to find and use the applied nitrogen.

Some customers using this practice have reduced nitrogen rates by up to 5% to 10%. Importantly, many of these solutions will be software or machine learning enabled, lending themselves well to recurring or per usage monetization models. This too is an important innovation for our customers. We can help customers adopt technology for lower upfront costs.

Through this, we will time the cost of these technologies with the value they create for our customers. And finally, we will ensure that we continue to add new customer value to the products over time. And while the technology is critical, the integration with the hard iron is the differentiator for Deere. There is a lot of investment moving into ag tech, but ultimately solutions need to be paired with equipment that execute in the field and are supported. Our decades of experience integrating technology into our products, combined with our world-class dealer network, uniquely position us to unlock the long runway of opportunity ahead.

Now, I'm honored to introduce the owners of Silent Shade Planting Company, Jeremy and Elizabeth Jack who will share a story on how John Deere technology gave them meaningful time back with their family. Welcome, Jeremy and Elizabeth.

Welcome Jeremy and Elizabeth. Thank you so much for sharing your critical time with us. Could you maybe...

Jeremy Jack

Chief Executive Officer & Chief Operating Officer, Silent Shade Planting Company

Thanks for having us.

Elizabeth Jack

Human Resources, Public Relations and Compliance Officer, Silent Shade Planting Company

Thank you.

Deanna Kovar

Vice President-Production & Precision Ag Production Systems, Deere & Co.

...start out by giving us a little bit of a background on your operation.

Jeremy Jack

Chief Executive Officer & Chief Operating Officer, Silent Shade Planting Company

Sure. Silent Shade Planting Company is a corn, cotton, soybeans and rice farm located in the Mississippi Delta. We have about 12,000 acres of all irrigated ground.

Deanna Kovar

Vice President-Production & Precision Ag Production Systems, Deere & Co.

Awesome.

Elizabeth Jack

Human Resources, Public Relations and Compliance Officer, Silent Shade Planting Company

We have five family members that are involved with the operation. Jeremy acts as our CEO and COO and runs the day-to-day operations. His sister, Stacie, is our CFO. I handle our human resources and safety and public relations. And his parents, who were the founders of the farm, are still very involved in the day-to-day operations and provide us with historical knowledge each day, and under us we have about 5 managers and 14 employees that work with us day to day to get the crop planted and harvested.

Deanna Kovar

Vice President-Production & Precision Ag Production Systems, Deere & Co.

Truly a family farm. It's awesome. Well, can you tell us a little bit maybe with a farm your size, I understand you have a lot of inputs that you deal with, seed, herbicides, fertilizer. How do you manage those on your farm and how has that changed over time and maybe how are you navigating through this very dynamic environment?

Jeremy Jack

Chief Executive Officer & Chief Operating Officer, Silent Shade Planting Company

Sure. So, to understand where we are today, you have to understand where we used to be, you had a plan for the farm and you created the whole plan. You planted your cotton this way, your corn this way, your rice this way. And you just – once you got started, that's how you did the whole farm. Then, as technology changed, we learned like well, this variety needs to be on this field, this fertilizer on this field. And then we made the next step is like, okay, when we came back to the operation, we could really see that we need to make plants and fields and we could take prescriptions. And that's how we managed every one of – all those things. So, we could just we could plan out the whole farm in the off season. And then we had the plants when we went to the field.

And today, now with See & Spray, we're actually saying, okay machines, we want this to be done as you're going through the fields. and the machines were actually making those plans for us. So, we're giving the guidelines to the machines making those reactions as they're going across the fields, so. And especially that's really important on today's timeline. Today with inflation, chemistries, crop protection, fertilizers doubled or tripled in price or can you even get them. So, we have a limited supply, so we have to have – this is all we have. We have to make it stretch through the whole crop year and through this technology of See & Spray, we're able to make those products work for the whole crop.

Jorge Heraud

Vice President-Automation & Autonomy, Deere & Co.

Hey. That's excellent. Thank you for sharing that. The – you've been one of the early testers of Sea & Spray through the years and gotten a chance to get to know you both. Thank you very much for your help. Can you tell us maybe a little bit about how See & Spray is going for you? What are your early observations and why the value that it brings is important?

Jeremy Jack

Chief Executive Officer & Chief Operating Officer, Silent Shade Planting Company

So, the big question I always get is how does it work and does it work. This machine's going across the field at 12 miles an hour with 120-foot boom. It's covering a lot of ground. How do you know it's working? Well, we can put that in the machine; and as it goes across there, then you can see it's kind of like this is what it did. And when we first got the machine I would say, it's like, okay, we're going to hit weeds this big and that's going to be great, we're going to kill all the big weeds. And then as we get going through and watching behind the sprayer and walking, we could see these little square blue dye spots what was sprayed. Then all of a sudden we found one that, well, there's no weeds here. The machine over-sprayed. I'm about 6'4". I'm a little – it's a long ways down to the ground. I actually had to get down and we had found a weed that was probably just a couple of hours old that the machine could see and spray at 12 miles an hour. But from our eyes standing up, we could not see till we get down on our hands and knees and can find the weed.

So, it's just unbelievable how technology works, but also the speed and the efficiency it works. Now, that the sprayer might – it only sprays 10% of the field. Well, then that sprayer goes 10 times further between fill-ups or the machines are much more efficient. We're getting the crop taken care of, we're protecting the crop in a much more efficient way in those small windows that we have of today's farming.

Elizabeth Jack

Human Resources, Public Relations and Compliance Officer, Silent Shade Planting Company

And tell about the example of sometimes it can be your eyes in the field and see things that you don't realize that are actually there.

Jeremy Jack

Chief Executive Officer & Chief Operating Officer, Silent Shade Planting Company

So, we've had fields that were like, there's no weeds out here, we're just going to go out there and clean it up. There's a couple of spots and then we know that the spray – machine is spraying it all the time, like machines are broken. So then, we go out to the fields like, no, there's a bunch of weeds that came up yesterday that we did not see, it did not know. So, we – as the sprayers go across the field, it sends back maps of what it actually did, report

cards, if you would say. And we are learning more about our field, soil types, weed pressures. And so, we're able to produce a bigger crop by knowing more of what's out there...

Elizabeth Jack

Human Resources, Public Relations and Compliance Officer, Silent Shade Planting Company

In real time.

Jeremy Jack

Chief Executive Officer & Chief Operating Officer, Silent Shade Planting Company

...in real time. The great thing about it is we're utilizing less to do it.

Jorge Heraud

Vice President-Automation & Autonomy, Deere & Co.

Thank you. This is very insightful. We put a lot of work into making sure that we can detect those small weeds and we don't miss them. The cameras are low to the ground. We have this millions of pixels that we capture. It's all so that we can capture those little weeds.

Jeremy Jack

Chief Executive Officer & Chief Operating Officer, Silent Shade Planting Company

Yeah.

Deanna Kovar

Vice President-Production & Precision Ag Production Systems, Deere & Co.

Awesome. Well, thank you, Jeremy and Elizabeth, for being here with us today. And thank you for sharing a bit about both the professional and personal impact of sense-and-act technologies like See & Spray.

Now, we'd like to turn it over to Willy Pell, who's going to talk about a key to our automation journey, and that's autonomy, one of the last steps in automation, automating the task of driving our machines through the field without an operator. Willy?

Willy Pell

Vice President-Autonomy and New Ventures, Deere & Co.

Thank you, Deanna, Jorge, Jeremy and Elizabeth. As we've already established so much of the economic returns in farming come from getting a job done in a tight agronomic window that Mother Nature allows each year. The window is variable and unpredictable, but getting it right has significant impact on your profitability.

As Doug already pointed out, data is now able to quantify just how valuable time is to a farmer's economic health. Last year, we published yield loss data for planting corn late. For an acre of corn, planting outside the optimal window may cost you up to 1% a day. That's significant when you realize that each day a farmer may plant up to \$500,000 in crop. That's a 1% that drops straight to the bottom line.

Each season is a race against the clock, despite the enormous economic payoff that comes from getting jobs done in the right timeframe, farmers frequently miss out on this payoff because of one very significant challenge, labor.

Growers are constrained by their own labor. Since they can't operate 24/7, they're constrained by the ability to hire labor. As the population continues to migrate to urban areas, this problem is getting worse, not better. Further complicating matters is the significant spikes that occur in demand for labor at critical points in the season. Jobs like planting and harvesting all require a significant surge in labor to getting the job done in the optimal window. And, unfortunately, there's no Uber surge pricing that magically brings labor to the rural Midwest for two to three weeks during these busy periods.

One of my favorite farm site visits was during the harvest season and during the season the farmer needs to operate Combine, an operator/driver grain cart, an operator to drive an 18-wheeler, and then another person to till fields right behind all that.

Our team – our engineering team had worked a really long day, and I drove into town to try to find some food for everybody. And I found that the town's only burger joint was closed, and that's because everybody who should have been cooking burgers was out harvesting. So, there was literally nowhere to eat. Instead, I picked up some peanuts at a convenience store for dinner, and this poor engineer named [ph] Rahul (01:15:18), that was his dinner, sorry, you deserve better. But it was in that moment that I realized just how important this problem is to solve and how tight things are.

Autonomy runs 24/7. It never calls in sick. It never migrates to urban areas. And most importantly, autonomy scales perfectly at the exact time you need it, turn it on in a second and you can triple your head count and turn it off when you don't need it. The payoff is dramatic. Sure, farmers no longer need to pay for surge labor, but that's only the floor of its value. Most importantly, they'll be able to get the jobs done in the optimal window to get them done. That economic return is enormous. It's moving from a constraints and time to limitless labor.

Before Deere, I worked in the autonomous car industry, and there were two things that drew me to ag in general. First, as I discussed, is the – just the value – the size of the value creation that we could unlock. Second is the nearness of the opportunity in ag. So, a farm is just this perfect place to do autonomy. I knew this problem would be commercially available in agriculture long before it would be in automotive, and I want to see my projects come to fruition within the near term. And that's what's happened at Deere.

There's some major advantages to solving autonomy in ag versus other environments. First, the number of variables is fewer. Our machines primarily see skies, trees, dirt and the occasional piece of farming equipment. And our machines are moving slowly, so that puts a lot less pressure on processing speeds and having to detect objects at long range. We're also in a much less dynamic environment on a farm. So, our machines can stop for anomalies and there's no risk of getting rear ended.

Robots basically need a way to be wrong and have it be okay. So in farming, it's great. You can just stop. If you're uncertain about anything, you can stop. And that sets us apart from automotive. It allows us to get products to the field much sooner and much more safely, and these products improve over time. The more data we get, the more experience we get.

So, what does a robot have to do? They really need to be able to do two things. They need to be able to perceive the world and make good decisions about what they perceive. To do that, we have six stereo cameras in the tractor, which give us 360-degree obstacle coverage. Stereos cameras work just like the human eyes. You have two eyes and only one image. And what your brain is doing is finding the common points between those two images – between those two points and triangulating the depth. And it calculates depth for each point and passes this output into ML algorithms which are running on GPUs.

Also, our tractors know where they are due to the GNSS guidance systems they've had for years and they know where they have authorization to be. We do this with a geo fence, so we prescribe a boundary where the tractor can drive and where it can't. It never leaves this area and we continuously track it through GNSS systems. And we have redundant safety systems to make sure it's always running properly. This means that if any core assumption in the system fails, we basically can cut off the system and stop. Comes back to this ability to stop, which just makes the system much, much, much easier to build.

So, let's dig in a little bit into the machine learning, and what's actually happening in the machine learning stack. You start with four raw images, one from each camera, one exposed bright, and one exposed dark. And this is called HDR imaging, and it's similar to what you see in an iPhone when you take a picture of someone at sunset. You can see their face, and you can still see the golden sunset behind them.

Similarly, we take these images and fuse them and we can handle an incredibly wide range of lighting conditions, such as someone high – someone's truck's high beam is pointed directly at the machine. So, those images are passed into a neural network which is trained on hundreds of thousands of ground truth images. And we classify each one of these pixels in about 100 milliseconds.

These GPUs were originally designed for video games and NVIDIA pivoted and co-opted them for computing on the edge, and it's just been fantastic. What Deere has done is hardened this system. They've taken this NVIDIA system and hardened it. We've gotten this thing called the VPU, and it's a one of its kind. It allows us to achieve a very high degree of safety and productivity.

And while we have less variables in farming than on the open road, it still requires a world-class research team to get these results. Our machines produce many images, and our algorithms rank these images to what is more likely to add value to a model. So, any kind of new circumstance that we encounter, we can detect that that's an interesting new situation, upload it, get it labeled, and put them in a training set, and the system continually improve. So, the goal with any ML strategy is to make a self-optimizing system, a system the more you use it, the better it gets. The more you use it, the better it gets.

Recently, we've just acquired the intellectual property and almost 30 employees of a company called Light. And what these people give us is the ability to run wider baseline stereo cameras. And they do this by calibrating the poses of each camera on a per frame basis. And what this'll allow us to do is have smaller, cheaper hardware on the system that is more performant and gives us a better sense of depth at range. The goal finally being that all tractors that ship – all large tractors that ship come with this autonomy kit on board.

With that, I'll hand it over to Iginio, who's going to talk to you about go-to-market.

Iginio Cafiero

Co-Founder & Chief Executive Officer, Bear Flag Robotics, Inc.

Hi, everyone. I'm Iginio Cafiero. And I'm one of the founders of Bear Flag Robotics. So, as a Silicon Valley startup, Bear Flag develop autonomous technology for farm tractors with a recurring revenue go-to-market strategy. And I have to say, since we've joined John Deere through acquisition last fall, I've been absolutely blown away by the sheer horsepower of this company to translate cutting-edge technology on the laptop to value in the field. The impact that we will have here together is both inspiring and palpable. And here's why.

So, at the highest level possible, autonomy makes farmers more profitable. And the most obvious way it does that is not – by not requiring the farmer to be in a cab or to pay someone to be in a cab. But the value creation extends beyond that, of course. Jobs are done deterministically. A farmer knows the time it'll take to complete a job, which

helps with planning, but it also helps them operate in increasingly tighter weather windows. Things like job quality are done consistently day in, day out, regardless of the skill of the operator who may or may not be in the cab. And of course, the operation is always run as safely as possible.

Now, the value that we're creating through autonomy isn't intrinsically linked to a specific form factor. Yeah, we started with the 8R in tillage. That makes sense. But that same technology will eventually be deployed to the entire fleet and to other jobs as well. Furthermore, autonomy will include high-value crops like orchards and vineyards and even combines and harvesters. Even more exciting is the possibilities that autonomy unlocks with new form factors like cabless machines. No other John Deere technology will scale as quickly or as deeply across the installed base as autonomy.

And like Doug said, with over 0.5 billion engaged acres every year, the transition from hard metal to software presents a massive opportunity for Deere. So to that end, we plan to have a fully autonomous corn and soy production system by the year 2030. That means spring tillage, planting, spraying, harvest and fall tillage, all done autonomously.

Now, in order to accelerate that adoption, we plan to include the required autonomous sensors and compute in the base configuration of the 8R tractor in the next few years. And what this is going to mean for a farmer is at the top of a screen, they can unlock the full potential of autonomy on that tractor that's already sitting in their yard. Autonomy will be the aspirin a farmer needs right when they need it most. And listen, the cool thing about this SaaS go-to-market is we can experiment with other go-to-markets like freemium models that allow us to fuel adoption at a viral pace.

So, autonomy doesn't just help farmers in the field, it helps the economics of their operations, too. And what I mean by that is traditionally farmers have made large capital investments in their equipment. And this makes sense, right. Farmers can finance the equipment and then use tax optimization strategies that make sense for their business. But autonomy changes that. Farmers can pay for the actual value being delivered by that piece of equipment in their field. And for – what this means for Deere is that we're more tightly coupling the value creation with the value capture.

But what it means for a farmer is instead of using that credit to finance equipment, they can use it in other parts of their operation, like buying more land or updating their infrastructure. So, autonomy really does unlock new ways for farmers to think about their business that just didn't exist before.

So, all this being said, the most important benefit of autonomy will be realized over a longer time horizon. And what I mean by that is the same sensors that we're using for safety are also being used to collect all kinds of information about the fields that they're passing through. And over the billions of passes that John Deere equipment makes every year across the world, we're gathering insights that will help farmers be orders of magnitude, more productive than previous generations.

And so, if there's one thing to remember from what I'm saying here today is this. Through autonomy, John Deere is creating a system of record in agriculture. Through autonomy, John Deere is creating a system of record in agriculture. And the impact to that is delivering value to farmers today, but it will deliver value to farmers tomorrow in ways that we haven't even imagined yet.

And so, as we as humans are faced with this exponential challenge of growing food, fuel and fiber for our children and our children's children from the almond orchards of California to the corn and soy fields of Brazil, John Deere will be one of the most important technology companies for the next 100 years. That's why our team is here. That's our mission, our hearts in the work. Thank you very much. The future is an exciting place.

So, for an even more important perspective, we'd love to bring in Taylor Nelson to share his experience on the power of autonomy, and I think Willy is going to come back up, too.

So, Taylor, we know each other pretty well. But just for the broader audience, would love to hear more about your operation, how you think about farming.

Taylor Nelson

Farmer/Small Business Owner, Nelson Farms

Yeah. So, I'm a fifth generation family farmer. We farm corn/soybean rotation in Northeast Nebraska. Irrigated in dry land, we cover about 9,000 acres or so. As my generation made – is making its way back to the farm, and as – I attended college at the University of Nebraska-Lincoln, and I came back, I really evaluated where can I add value and what sorts of things could I do to help move our operation forward.

And so, this role that I kind of came into is really similar to like a chief technology officer. And so what I do is I evaluate different technological opportunities, and then I decide is this opportunity right, and if – is it going to add value. And then if we do this, how can I implement some of these different strategies and get people trained and make sure that we're getting the outcome that we desire. So as I made my way in, that's kind of been my role on the farm.

Igino Cafiero

Co-Founder & Chief Executive Officer, Bear Flag Robotics, Inc.

Awesome.

Willy Pell

Vice President-Autonomy and New Ventures, Deere & Co.

What's your biggest pain point? What do you want us to build next? We've started with autonomous tillage and I'd love to direct this team towards the next biggest thing for you.

Taylor Nelson

Farmer/Small Business Owner, Nelson Farms

Yeah. So, I'm sure that my wife, probably my dad, and anyone in our operation is tired of hearing me say it, but labor is our biggest pain point. I mean, we're extremely short of labor. And as we look to the future, we need autonomy to help us fill those voids, the seasonal demands when we – during the busy seasons of the fall and the spring where we need that extra help, that labor crunch is something that's really becoming debilitating.

And then the other thing is how do we use technology to bring forth generations of intuition that I might have as an operator in the cab, but if we bring somebody without the experience, how can I ensure that this job is going to get done consistent with what we consider to be a good job, and how we would do things. And so this tech of not only filling the – taking somebody out of the seat, but ensuring the quality of the job is going to be there and then ensuring that we're going to get it done in that optimum window so that we're not having to have a trade-off.

Igino Cafiero

Co-Founder & Chief Executive Officer, Bear Flag Robotics, Inc.

Yeah. Absolutely.

Willy Pell

Vice President-Autonomy and New Ventures, Deere & Co.

It's outstanding.

Well, can you tell us for a second just how much your operation has grown, because you have an incredible growth story here.

Taylor Nelson

Farmer/Small Business Owner, Nelson Farms

Yeah. So, in one generation's time, essentially we've – our operation has grown nearly tenfold. And what's incredible about that is we're doing it – seasonally, it's taken more labor than it did back then. But throughout the rest of the year, we're doing it with a similar force, and it's all because we're able to leverage technology and updated farming practices and some of the different agronomics that we're using today. And we're just covering immense amounts more acres and still hitting those windows and doing things the way that they need to be done. So, it's really allowed for us to scale over time and we look forward to being able to do more so.

Willy Pell

Vice President-Autonomy and New Ventures, Deere & Co.

Looking forward to be able to provide these things.

Taylor Nelson

Farmer/Small Business Owner, Nelson Farms

Absolutely.

Igino Cafiero

Co-Founder & Chief Executive Officer, Bear Flag Robotics, Inc.

Thanks so much for joining us. It's awesome to see you.

Taylor Nelson

Farmer/Small Business Owner, Nelson Farms

Yeah. Happy to be here.

Igino Cafiero

Co-Founder & Chief Executive Officer, Bear Flag Robotics, Inc.

Thanks.

Taylor Nelson

Farmer/Small Business Owner, Nelson Farms

Yeah.

Willy Pell

Vice President-Autonomy and New Ventures, Deere & Co.

Thank you.

Igino Cafiero

Co-Founder & Chief Executive Officer, Bear Flag Robotics, Inc.

So, of all the exciting technology we've shared today, there's a final layer that unlocks even greater customer, societal, and environmental value. And to speak on that, I'd like to introduce Aaron Wetzel, who will electrify the crowd with some background on electrification.

Aaron Wetzel

Vice President-Small Ag & Turf Production Systems, Deere & Co.

Thank you, Igino, Willy and Taylor. And good morning. I'm Aaron Wetzel, Vice President of Production Systems for our Small Ag & Turf business. And as you just heard Willy explain, our customers are facing a variety of challenges, from the lack of skilled labor to the ever-tightening planting window. Through technology solutions like autonomy, we're delivering value to our customers in ways never possible before. So today, I'm going to talk to you about another solution we're rapidly developing and prioritizing as part of our broader tech stack strategy and that's electrification.

You've already seen electrification revolutionizing the automotive industry. Rather than a futuristic ideal, it's become today's expectation. Importantly, electrification is most valuable to customers when paired with a comprehensive tech stack including connected machines, digitized operations, sense-and-act, and autonomy. Much like electric car manufacturers tout their entire ecosystem, we'll offer a comprehensive experience that will leverage the entire Deere tech stack to maximize customer value. It's why we are certain we'll have the best electric offering because we'll combine our battery electric machines with the industry's most powerful tech stack for a solution that's truly differentiated.

Let's start first by looking at the example of high-value crop customers, a key customer segment for our Small Ag & Turf business and one primed for electrification. The high-value crop customer segment is on the cusp of a technology revolution. While customers in corn and soy have seen major technology advancements, the basic farming practices for high-value crop customers remain largely unchanged from how they operated in the 1960s. Due to the crops they grow such as grapes, almonds, and apples, and the vineyards and orchards they nurture, they are restricted in machine-form size where customers boost efficiency and productivity through increasing their machine size, these customers don't have that luxury due to the tight IOAs and overhead hanging crops. High-value crop customers are motivated and have an immediate need for sustainable solutions. Their investors and end customers, such as the Costcos and Walmarts of the world are demanding it. State and federal government regulations are also coming into play, especially for growers in California, where regulations are more rigid.

They are also more ready and willing to adopt. In 2017, only 17% of US auto customers said they wanted electric vehicles. And on today, our research shows that between 60% and 70% of our high-value crop customers say they were ready to purchase an electric offering. Compared to rural lifestyle and other customer segments, high-value crop customers are leading the way in terms of desiring electrification technology to solve their challenges. And like many customers, skilled labor is hard to find. And for the high-value crop customer specifically, it accounts for more than 30% of their total production costs.

For almond customers alone, autonomy could save them billions in production labor costs annually. And so for these reasons, our high-value crop customers are primed to leap forward with us on our electrification journey, especially when we pair these battery electric vehicles with the rest of the John Deere technology stack, inclusive of autonomy. In fact, our electrification journey will help support autonomy capabilities because all of the control systems can be integrated electronically. These customer needs, combined with the rapid acceleration of battery

development, technology advancements and decreases in cost, make battery electrification and autonomy a prime growth opportunity.

The technology is now more accessible, convenient, and affordable than ever. It's also desirable with performance benefits and attributes not possible with diesel such as improved ease of use, the ability for rapid enablement and scaling of autonomy and reduction in noise pollution.

With electrification, John Deere will provide sustainable solutions and a substantial impact to our planet and our customers' bottom line, reducing their total cost of ownership from fuel to service, qualifying our customers for government incentives and subsidies, and allowing them to tap into onsite renewables. With the battery electric vehicle machine form, we will deliver the John Deere technology stack and value unlocked opportunities that come with sense-and-act technologies and the John Deere Operations Center.

Our electrification journey is rooted in user value. How do we make our users more efficient and profitable? Where customers are trained to think of diesel in terms of its negative impact on their wallet, electrification switches the gears going from economics or electrification to economics and electrification. Instead of penalizing customers, electrification incentivizes their bottom line. Battery electric will enable technology while unlocking performance improvements and the operational ease of use critical to high-value crop customers. But it is bigger than just this customer segment alone. We will leverage our learnings with high-value crop customers to take this electrification across our entire enterprise portfolio.

In turf, we see consumer preferences for electric-only growing in demand. Customers are looking for equipment that's easier to operate and maintain, performs better, runs more efficiently, more quietly, and requires less maintenance. At the heart of our electrification journey is user value. That is why earlier this year, John Deere made a commitment to electrification, announcing our 2026 Leap ambitions, in Small Ag & Turf, we announced plans to offer electric options in each of our turf and compact utility product families, and an autonomous battery powered electric agricultural tractor.

In our Construction & Forestry division, we committed to 20-plus electric and hybrid electric product models across our Deere and Wirtgen products. When we provide solutions to our customers' most demanding and difficult challenges, customers see us not just as an equipment provider, but as a trusted business partner. And with the strength of our enterprise tech stack and our majority investment in Kreisel Electric, we are well-positioned to tackle our electrification goals. Kreisel is the leading innovator in the development of high-density, high-durability, electric battery modules and packs, and a supporting charging infrastructure platform that utilizes their patented technology.

Their proprietary technology is cutting-edge, delivering high performance and durability in demanding off-highway applications. The company has a differentiated battery technology and battery buffered charging infrastructure offering and currently serves a global customer base across multiple markets. Most importantly to John Deere, Kreisel brings capabilities and expertise we can apply across the variety of applications we serve.

Their portfolio of work shows their batteries and charging technology have been tested in rough and rugged conditions where customers demand peak and uncompromising performance. The majority investment in Kreisel Electric will allow Deere to optimally integrate vehicle and powertrain designs around high-density battery packs while leveraging Kreisel's charging technology to build out infrastructure required for customer adoption, making electrification accessible and convenient for our customers.

Battery electric is about thinking bigger and broader than ever before. It's taking a giant leap. We're not just talking battery electric vehicles. We're talking about the entire ecosystem. By broadening our horizons and

evaluating the entire electric vehicle ecosystem we'll open new value streams to our customers, to our dealers, and to John Deere. Through that ecosystem, we'll enable autonomous applications and new digital business models. We'll also see the impact on a global scale connecting farms around the world digitally and electrically. We have ability to bring optimal product with optimal ecosystem, but also the ability to sell and scale battery electric products with global manufacturing footprint and unrivalled channel.

Our teams are already proactively preparing for the new services and support for our dealers and will offer the new skills and training required of them to support this new electrification ecosystem. Our customers are ready, our industry is ready, and John Deere is ready for our next leap into electrification. Building on our legacy of innovation and excellence in tractors, we will revolutionize agriculture. And no one is more qualified to tackle this challenge than our teams and our talent at John Deere. Leveraging the industry's most powerful tech stack into the heart of the electric vehicle ecosystem and harnessing the power of our global manufacturing and scaling capabilities will differentiate our products from the competition and new start-ups entering the electrified ag space. But we won't do it alone. As they've done for over 180 years, our world-class dealer channel will provide us our competitive advantage. While many companies may be rushing to bring their electrified solutions to the market, only John Deere can provide the level of service and support our customers expect and the confidence to take the next electrified leap.

No one knows their customers better than John Deere. We know their economics. We know their performance demands. We know their challenges and most importantly, their opportunities to unlock future value. The time is now. We cannot underestimate the significance of electrification to our business. This is a monumental shift on par with the transition we made in 1918 from horse-drawn plows to introducing our very first tractors, the John Deere Tractor and Waterloo Boy.

Just like then, the stakes to get it right are high, but the rewards for our customers, for our dealers and for John Deere will be greater. And to share a little bit more about exactly what those rewards are, I'd like to bring to the stage Marc Di Pietra of Treasury Americas, who's going to share more about our Deere partnership and how feats in electrification are helping him solve some key pain points. Marc?

All right. Well, Marc, thank you very much for joining us this morning here in Des Moines. I think we'll start off. Just tell a little bit about yourself and your company.

Marc Di Pietra

Regional Service Maintenance Manager, Treasury Wine Estates

Thank you and glad to be here. My name is Marc Di Pietra. I work for Treasury Americas. We are a subset of Treasury Wine Estates, Australian-based. One of the largest wine companies in the world. We've a footprint in 70 countries. About 30,000 acres planted worldwide, relatively small until we hear from corn and soybeans earlier. However, we're going back and forth every 10 rows, right, or every 10 feet up and down the row. So, I am the Regional Service Maintenance Manager, so my day-to-day job is making sure our fleet in the field is up and running, but the long-term part of my job is to understand where we're going in the future, trying to see what technologies out there and how we can change the way we're farming to be more efficient and effective in the future.

Aaron Wetzel

Vice President-Small Ag & Turf Production Systems, Deere & Co.

Great. You know, yesterday we talked a lot about some of the trends that are impacting your business. Maybe share a little bit some of the concerns you have of what macro things are coming at you?

Marc Di Pietra

Regional Service Maintenance Manager, Treasury Wine Estates

Look, I'm going to say the same thing you guys have heard all morning, but it doesn't make it any less important. Labor is an issue. Rising costs are an issue. Finding quality labor right now has been a struggle. We are paying people more than double minimum wage, and still having trouble finding the people we need. So, that's where the autonomy piece comes in that you talked about.

The chemical cost have gone up significantly, up 30%, I believe in the last year and a half alone. So, these are huge impacts to our bottom line and we work for corporations, so that's important. You guys understand that. However, I also think about what's happening in the field and the safety of our operators along the way. And I think a lot of what we're talking about today is going to help with that as well.

Aaron Wetzel

Vice President-Small Ag & Turf Production Systems, Deere & Co.

Great. So, you had yesterday a chance to go out and visit the farm, see a lot of the technology advancements we're making. Looking at your business, where do you see John Deere being able to bring technology to your operations?

Marc Di Pietra

Regional Service Maintenance Manager, Treasury Wine Estates

Sure. So, I'm part of the supply chain, so I'm just one piece of this puzzle, right? I need people like John Deere to help me get to where we need to go. I can't do it without our business partners, and like you said, I look at you guys as a business partner and not somebody who sells us tractors.

Aaron Wetzel

Vice President-Small Ag & Turf Production Systems, Deere & Co.

Great. Well, thank you so much. Marc, really appreciate you being with us today. You've heard the leaps were unlocking through the tech stack. However, none of this is really possible without our people. And so, I'd like to take the opportunity now to welcome my colleague, Andrez Carberry to shed light on how Deere is crafting a diverse future looking, and empowered employee base.

Andrez Carberry

Head of Global Human Resources (Regions, Divisions, Strategy, HROPS), Deere & Co.

Good morning. Our most important and differentiated asset is our people. And we know we go as far as our people will take us. And as our CEO and Chairman, John May, has said, we want to attract the best talent, have the best teams and the best place to work. And we approach each day striving to empower our people and create a more inclusive, diverse and equitable environment where our people thrive. And you've met some of that remarkable talent today. And they are, but a small representation of our global workforce that's over 75,000 people strong, a team that is passionate about our mission, our higher purpose, and our customers.

And I could be biased, as John was earlier, but we build the best products in the world. We build the best machines and solutions that help our customers be more profitable, productive, and do so more sustainably. And some of you might be wondering how is a 185-year-old iron company able to attract and retain the talent you've seen today, and how will Deere continue to compete for the talent to accelerate our smart industrial strategy and our leap ambitions. Well, it's basketball playoffs in the US and how we would say it is, game recognizes game. Smart people want to work with other smart people. They want to work on big challenges and they want to work

on technology that will make a meaningful difference and have a positive impact on the land we call home. That's Deere. That's who we are.

Our mission, our higher purpose of feeding the world, and creating an infrastructure to support a growing population and helping our customers do so more profitably and sustainably resonates with our employees, our customers, our communities, and our shareholders. And interestingly, that higher purpose resonates resoundingly and is a key differentiator with all talent. But particularly when we talk to technology talent, because they know that their contributions will be in the market and put to use now.

So allow me to walk you through our four-point talent acquisition and development strategy. First, we leverage M&A as an accelerant. It's no secret. We are aggressively targeting the best companies out there with the brightest minds, people, and culture that are aligned with our smart industrial strategy. And we merge that talent with our own. Let me provide you a few proof points.

You heard from Jorge and Igino, founders of Blue River Technology and Bear Flag, who have not only agreed to join the Deere family, but are playing critical roles in our path to our autonomy. Talk to them and they will tell you. Deere's higher purpose and the real challenges and opportunities to make a meaningful and sustainable impact on humanity and the planet drive them and their teams every day. We followed a similar strategy with other companies including Kreisel that Aaron just spoke about. And a strong indicator of our success is that the talent up and down these organizations choose to stay with Deere and are helping us to accelerate our technical journey. And we'll continue to explore these opportunities as they become available.

Second, we strategically recruit technological accelerators and we develop a deep technical pipeline. We strategically recruit individuals in critical areas of the business, whose expertise can be an accelerant to our business goals. And to do this, we frequently map tech company structures and their profiles to gain deeper insights into the talent market. And we vigorously pursue those people who we've identified as technology accelerators.

Let me give you a few proof points. You met Doug Sauder here today. You heard from him. And he's an expert in leading software development who we recruited to help us accelerate our digital journey with our customers. This year, we also added an executive to our production system who's steeped in electrification and are building those business models in that space. He came to Deere with over 179 filed patents. Over half of those are related to battery technology and electrification. And we are using this strategic talent sourcing approach as we stand up our recurring revenue part of the business to ensure that we understand how mature companies in this space are structured and in a similar way identify the capability and the talent we want to pursue in key areas like customer success and pricing.

Let me also share with you a few points on how we're developing that deep pipeline with what we call 10Xers. So, in the last 18 months or so, we have significantly shifted our talent recruiting strategy so that we're sourcing over 50% of our technical roles from the external market, focusing on differentiated software and technology skills. Several of our more recently hired colleagues have come to us from the tech companies who's devices we all have in our pockets, the search engines, and the streaming companies that many of us use every day.

Next, we go to markets that are rich in the technical talent we need. So, critical to this successful shift in building our technical talent, our pipeline requires us to go to markets that are rich in diverse technical talent. So, we're no longer relying on who is willing to come to one of our current locations around the world. We are going to the locations where the technical talent we must attract to Deere live and work every day. So, let me provide you with what that looks like.

We've recently announced our new offices in Bangalore, India, Austin, Texas, and Chicago's West Loop area. These locations give us access to thriving tech talent. These markets are, in addition to our footprint that we have in the Bay Area, Research Triangle, and similar markets across the globe. And we continue to explore other locations to add to that footprint.

Next, we invest and we develop our people. Of critical importance to our long-term success, we invest and develop the skills of our exceptional global team. How do we do that? Later this year, we will launch a learning experience platform or LXP as it's called, which uses machine learning and artificial intelligence to hyper-personalized the learning path of each employee. The LXP enables us to deploy a built talent strategy to future proof our workforce so they are equipped with skills and the technical experience to match the rate of technological change. And importantly, late last year, we announced our global framework for the future of work at Deere.

Now, more than ever, we know that people have choices about where and how they will work. And increasingly their decisions are not just made on compensation, but on mission, on purpose and a culture and an environment where they can have an impact and thrive. That's Deere. That's our core. That's who we are. So, that's how 185-year-old company is attracting and developing the talent to deliver our smart industrial strategy and our leap ambitions. But don't just take my word for it. I want you to hear directly from a few of our new tech employees.

[Video Presentation] (01:55:27-01:57:02)

And there's a longer video that will be made available online as well. As you can see, we have great people and we continue to recruit great talent, particularly in technology roles. Our people are driven by purpose, the opportunity to deliver solutions to big challenges, which just a few years ago would have been like science fiction. Our equipment, through technology, helps to unlock boundless possibilities that will help our customers feed us, do so profitably, smartly, and with less impact on the only land we have. That's not theory. That's how we will continue to differentiate and bring value to all of our stakeholders. And to show the magnitude of these outcomes, I'd like to welcome to the stage Josh Jepsen and Julian Sanchez, who will share how Deere is on the frontier of sustainability in agriculture.

Thank you.

Joshua Jepsen

Deputy Financial Officer, Deere & Co.

Thanks, Andrez. The mission and purpose that Andrez spoke about not only resonates with employees but with customers as well. The Jacks' you heard from earlier today, they experienced this first-hand this year. As a result of rising cost and scarcity of inputs, they were faced with a very practical need to reduce the use of chemicals. Leveraging See & Spray, they were able to better use the limited inputs they had, which resulted in significantly less herbicide used. This is a great example of the relationship between driving improved economics for our customers and sustainable outcomes in the John Deere strategy.

Now, for a long time, Deere has delivered environmental benefits through our products, technologies and solutions. The Smart Industrial strategy increased the focus on delivering improved farmer economics and environmental outcomes through technology. As we've executed the Smart Industrial strategy and leveraged production system thinking, we've been able to identify and have begun quantifying the impacts our solutions can have on the environmental side. The Leap Ambitions highlight this tight linkage between our strategy and sustainable outcomes. These Leap Ambitions which you've heard a lot about today based on the notion of

unlocking \$150 billion of incremental addressable market and the executional drivers which create that value and deliver these outcomes.

The outcomes I'd like to focus on today are the Ag customer outcomes of improving nitrogen use efficiency and crop protection use efficiency by 20%, while also reducing customer CO2 equivalent emissions by 15%. So, how do we do this? How do we get there? By executing the strategy, we'll drive 75% of our engaged acres to become sustainably engaged acres by 2030, meaning they're using multiple solutions or practices which deliver environmental benefits.

ExactRate is a fitting example, dosing only the seeds with nitrogen as they're planted, when needed, and only in the furrow versus broadcast. This addresses not only one of the larger components of the growers cost structure, but also its carbon footprint. On an acre of corn, nitrogen and fertilizer represents about 35% of the variable cost structure. And about 75% of the acre's greenhouse gas footprint. So, solution like ExactRate improves on both of these simultaneously.

You'll see in spray, we've talked about today has a very similar impact on herbicides driving improvements in crop protection use efficiency. Maybe one last example of how we create profitability, productivity, and sustainability is changing how production systems are approached by solving customer pain points. The CH950 two-row sugarcane harvester which was highlighted in our 2021 sustainability report, delivers such significant efficiency to our customers operations that the entire production system can be optimized.

On a model farm in Brazil of about 42,000 hectares, this converts to savings of over 1 million liters of fuel, reduces CO2 equivalents of 9 million passenger miles driven while adding significantly higher tonnes harvested by reducing losses. So, these examples show that we're not only driving economics, but also putting a dent, a significant dent in the carbon footprint on the farm as well. We're very excited about the opportunities that we have to deliver sustainable outcomes for our customers and feel like we are uniquely positioned to do so.

So, now I'm going to turn it over to Julian Sanchez, the Director of Emerging Technologies to talk about how we do this for our customers.

Julian Sanchez

Director Emerging Technology, Deere & Co.

There's been a recognition that there is a tremendous opportunity for agriculture to unlock sustainable outcomes. So, I'm just going to spend a little bit of time telling you about what those opportunities are at the moment. They're emerging opportunities. I want to tell you a little bit about the complexities surrounding them, what John Deere's role is in helping overcome those complexities, and a few activities. We've been busy here the last couple of years in this topic, so I want to kind of highlight some of the key activities around there.

So, opportunities, let's talk about this. Again, all of these are emerging. And so, no particular order here, carbon sequestration is one that we hear a lot about, right? So, that's the idea of changing your agronomic practices to take carbon from the atmosphere, put it into the ground and keep it there. All right. The estimates, the friendly estimates suggest that, you know, about – you could do about 1 metric ton of CO2 per year, per acre if you make full, aggressive changes to your agronomic practices. So, if you start doing the math there, it's quite a bit of an opportunity, right.

The end game there is, if the grower does it all those things, they document all that data, you can eventually mint that into a carbon credit and sell it to somebody that's trying to offset their emissions, all right? So, that's carbon sequestration. There's another area that's similar. It's carbon intensity of crops. So, in this case, you're not

actually measuring and trying to model how much carbon is sequestered. You're simply tracking what is the carbon intensity of a crop for a specific field. So, let's say you grow an acre of corn right here, and then next door you grow an acre of corn, but you use ExactRate so that you put less nitrogen on it, so that crop would have a lower carbon intensity number. And the end game there is to be able to get a premium for lower carbon intensity crops.

There is another area similar, but now you're going beyond carbon and I'll give you example in this on cotton in a second where you're basically tracking any regenerative Ag sustainable practice to grow your crop. And then there is markets, for example, in cotton where you're maybe gain access to new markets for buyers that are looking for sustainably grown crops. And then, there's areas like water management, which we're keeping an eye on and seeing how they evolve. They may evolve similar to the carbon sequestration conversation, but again those are still really, really, really early on, okay.

So those are some of the buckets of opportunities. Now, there are complexities associated with those. All right. The first complexity and you heard from Clint and Jayde earlier about sustainability. I was talking to them last night, you know, about cover crops. And it's like, hey, what do you guys think about cover crops? Clint said, you know, I'd love cover crops but here's the deal, right. Where I am in Kansas, if I put down a cover crop in the fall, it's really going to put too much pressure on the moisture of my ground. So it's good to put a cover crop down. But now I'm sort of playing with a variable of moisture.

So it's just an example where, you know, every farmer is looking at the opportunity, but they're also looking at the risks of making those radical changes in some cases to their practices. Remember, most farmers have spent their whole life optimizing and tweaking both agronomic practices, labor, equipment, everything they need to do to farm just right in their land. And so, any kind of change from year-to-year is something that carries risk, okay? So that's the one complexity, and there is good news there in a second.

The second complexity is around data, okay. And I'm going to an example from cotton. So in the cotton industry, there's something called a cotton trust protocol that was established two years ago which is like hey, document all of the practices that you use to grow sustainable cotton and then you get access to premium markets or new markets that want to source sustainable cotton. You're going to start seeing a bunch on screens here. Here is the issue with data right now across all of these things is gathering the data is hard, and we're working on that, but there is still a lot of manual entry for a lot of these protocols and a lot of these programs. So, you're seeing here, clicks and clicks and dropdown boxes and checkboxes, just entering a field to participate in this program takes dozens and dozens of steps, right?

Now, good news is for that specific example, just by leveraging the power of op center, we were able to win a few months' worth reduce the number of steps by 60%. But again, I share that example with you because that's sort of one of the complexities right now, is that you talk to a farmer and they say, yeah, this sounds interesting, but I have to fill out 100 data fields for every single field, every single time. And it just adds a lot of burden, complexity.

All right, so what is John Deere's role in helping overcome those complexities? Well, the first good news is first order principle, which is farmers are lifelong experimenters, right? So again, Clint and Jayde, they're going to be wanting to try or willing to try something new from an agronomic practices perspective. Now, they're not going to go scale it across their farm on day one. But you talk to any farmer, they're always willing to try something new in 100 acres and see how it goes. And then, if it goes well, 200 acres and then on from there. So, John Deere's role there, and especially with our operation center, is to help basically show the insights of those experiments and help them understand is this working in my land or not, right.

Second good news is there is a good correlation, science-based correlation of regenerative ag practices and healthier soil. If you start implementing a lot of these practices over time, the quality of your soil goes up, better soil, better yields, better land quality, better land value. And so, again, the role for John Deere there is helping farmers see the changes on their yield, the changes on their outcomes when they implement some of these practices, okay.

And the third one, and this is really, really the key one, is around making the data gathering and the data synthesis easier, right. About 10 years ago, just as part of our design philosophy for technology, we embraced the design philosophy called Walk Up Easy and it's just what it sounds like. You walk up to it and it's easy and it's intuitive and you don't have to do a lot of setup and stuff just works. So we're trying to now apply that mindset to the space of the sustainability opportunities. It's the same thing. I don't have to walk up – you know, if it's carbon sequestration, I'm a farmer, I'm worried about so many things. I don't need to worry about what are the 100 data fields that I need to make sure I have two months from now. We need to make an easy button for that as an industry. And that's something again – the example I showed you with cotton that we're already well on our way to try to unlock some of that.

We've been busy, so there is a few things that we've been doing in the last couple of years. The first one is we launched a number of pilots across the Midwest with dozens of farmers. So keep in mind, even the carbon sequestration or carbon intensity, all of this is still nascent, right. So what we've been doing in our pilot is, we've been simulating kind of an end-to-end market with a grower and saying, hey, grower, if you're willing to try these practices, we're going to make sure that we understand what data needs to be collected. We're going to model that data to understand how much carbon was sequestered. And then, we're going to "mint a credit" and understand what are your behaviors in terms of the value creation for the grower and dealing with those credits. So we've been busy experimenting with all of that and really understanding everything from on the ground behavior and attitudes around all of this to how would this possibly work downstream.

We also just submitted two weeks ago a couple of proposals for the USDA. So the USDA put out a request for proposals about three months ago, around this topic of regenerative agriculture. So, we submitted a couple of proposals last two weeks ago. We'll know in September. If those come through, that would really help us scale and understand this at a broader – in a broader sense. And understand basically the tipping points that we think are necessary in order for this to scale and for it to make economic sense for growers.

One of the cool things about going through that process with the USDA proposal was the number of requests we got from other folks in the industry asking John Deere to put together a letter of support. And the letter of support, genesis of those was, hey, we understand and we know the value of your equipment on the ground, collecting the data of what is done, how it's done, when it's done. And we think that you're going to continue to be at the key of unlocking all of the potential value and all of these sustainability efforts.

The third thing we've been doing is investing in real-time soil health sensing. Remember, all of this ultimately comes down to is your soil healthy and is it getting healthier or is it not getting as healthy over time? Right. And so, if we can develop over time on the go, real-time sensors that let the farmer know what is the quality of my soil right now in this specific area of the field versus another specific of the field? We know that that will unlock tremendous value for them and that will really begin to give them the understanding of, when I make some of these agronomic changes, what happens to my fields, what happens to my operation.

I will now turn things over to Ryan Campbell. He's going to talk to you a little bit about the business outcomes we expect to deliver. Ryan?

Ryan D. Campbell

Chief Financial Officer & Senior Vice President, Deere & Co.

Thank you, Julian. When you step back and look at the content today, it tells a story of our strategy. I hope you're as excited as I am. I truly believe there is no industry more ready for positive disruptions through technology than agriculture, and no company better positioned to deliver for our customers in a differentiated way.

The Smart Industrial strategy organized our company around production systems. The production systems teams went to work to identify ways that we can use our equipment and tech stack to deliver solutions that can create over \$150 billion in customer value. You heard today about four technology platforms. Those platforms build upon our existing tech stack and are key to unlocking that value. Importantly, the platforms will deliver precision over multiple products and production systems and come together with a common thread of customers doing their jobs. The products and solutions taken individually are powerful drivers of customer value. Taken together and integrated, they feed upon each other to deliver even greater value. Said in other way, the parts are valuable. The sum of those parts is even more.

And that's how we think about where our business is going in the future. It will be about a system of solutions working seamlessly together to produce tangible outcomes for our customers, not just the tractor [ph] or the combine (02:13:37), but the integrated system of growing a crop. The new value creation will also provide opportunity for us to add different elements to our business model over time.

Since inception, Deere has primarily relied on a business model that monetize products at the point of sale. However, the nature of our solutions are changing. They combine the equipment which will largely remain on a point-of-sale model with machine learning and an ever increasing software component. These new features can improve over time and will be updated over the year in many instances. Selling them through a SaaS-like model matches their underlying characteristics and ties payment more closely to value creation. Ultimately, moving us from a point-of-sale to creating ongoing value for customers. We believe this can increase adoption and scale more quickly across our installed base. Customers benefit from a lower upfront cost compared to the value created and can receive improved functionality over time, making them more adaptable to continuous improvement.

Josh, why don't you join me back on stage?

Joshua Jepsen

Deputy Financial Officer, Deere & Co.

Thanks, Ryan. So, as we move forward, we're not simply focused on driving more units, but instead on increasing the value each machine delivers over its lifetime. That's what's going to drive not just customer value, but shareholder value. For Deere in the first quarter, we announced our goal to achieve 20% through cycle margins by 2030. Put differently, if you average our margins in a cycle from peak to trough or trough to peak, we'd expect an average margin of about 20% with higher margins during periods of more robust demand.

Just a few minutes ago, Ryan laid out a number of benefits of matching creation to monetization for our customers. This will also have important implications to Deere. It will enable us to dampen the amplitude of our cycle through a predictable recurring revenues that are tied much more closely to the jobs our customers do which in most years is very similar as the same acres get planted, sprayed, and harvested year-in and year-out.

As reflected in our Leap Ambitions, we expect about 10% of our total revenues to be recurring by 2030. This will increase the consistency of our three-cycle earnings. And when you combine this SaaS-like recurring revenue

with some other forms of more stable, less cyclical revenues like service parts or John Deere Financial, we see a future where nearly 40% of our revenue is recurring or less cyclical and the percent of earnings tied to these more stable revenues will be even higher.

While it may take us a few years to building out a base of recurring revenues, we have few examples today. See & Spray Ultimate is a great hybrid example where the cost in machine is incurred at point of sale, but the usage of the green-on-green machine learning platform will drive a per acre or per usage fee. Autonomous solutions, on top of our underlying machine forms will be recurring and the enabling components will move into base equipment over the next few years. Customers will have the option to pay for it when they use it and again, on a per usage or per acre basis. These are just a few examples of the transformations that are happening right now at Deere.

I'll turn it back to you, Ryan.

Ryan D. Campbell

Chief Financial Officer & Senior Vice President, Deere & Co.

Thanks, Josh. Lastly, this transformation is consistent with our capital allocation philosophy. You'll continue to see us prioritize our commitment to our mid-single A credit rating, [ph] thin (02:17:19) growth investments, both organic and inorganic, followed by our dividend and share buybacks. What has changed over the last few years with our smart industrial strategy is our growth investments are skewed more toward the products and solutions that we have the most opportunity to differentiate and create value for our customers.

Today you heard about how four technology platforms will combine with our equipment and tech stack to unlock significant incremental value. Execution against our objectives will drive significant economic and sustainability value for our customers and will allow us to begin to grow a more recurring, less cyclical business. Again, I hope you're as excited as we are given the incredible opportunities in our industries and our unique position to lead for our customers. We're now ready to take your questions.

QUESTION AND ANSWER SECTION

Brent Norwood

Director, Investor Relations, Deere & Co.

Q

All right. So, for the final segment of the day, we're going to engage in a little bit of Q&A. I want to thank everybody who has submitted questions on our microsite today. In the interest of time and in an effort to get through as many questions as possible, I'm going to read them on your behalf and we'll engage our panelists for some answers here. So, first up, we got a question from Kristen Owen at Oppenheimer. She asked, you mentioned more than 340 million engaged acres growing to over 500 million acres, which is one of our Leap Ambitions. Within that 340 million acres, can you talk about the degree of engagement? In other words, how many of those engaged acres are using multiple products within the JD op center? How important is that for unlocking the full potential of the John Deere Operations Center as a digital twin platform? And I think that's a great question for Doug. So, maybe we can ask Doug to come join us for that question. Thanks, Doug.

Doug Sauder

Director-Product Management, Deere & Co.

A

So engaged acres is really a measure of breadth. As we think about our Leap Ambitions, we're really focused on highly engaged acres, which has a couple of different components. The first is depth of acres and that's where we have data collected over multiple passes, over single growing season. But even more important is the concept of utilization. And that's our customers actually utilizing those tools whether they be digital tools or onboard technologies to really realize value because that's when value is realized. So you'll see us continue to emphasize utilization metrics and this highly engaged acre concept to get a richer view of how customers are receiving value from our technology.

John C. May

Chairman & Chief Executive Officer, Deere & Co.

A

You know, maybe, Brent, just add to that. The thing that really makes me excited about Doug's answer is, if you go back to 2012 as a company, we made the decision to put a telematics gateway in every one of our pieces of large ag equipment, had that same strategy around the world. And the way I want you to think about that, is that – that's the rail that we laid in. And in order for us to quickly accelerate the amount of engaged acres and the depth of acres, it really takes a large population of vehicles that can communicate back to us and back to the operations center. And by far, John Deere has the largest population in the industry, and we're really excited about what we can do by capturing more and more data and improving the quality of the overall acres. So, I absolutely agree with you, Doug. Great answer.

Brent Norwood

Director, Investor Relations, Deere & Co.

Q

Yeah. And let's just stay on the digitalization theme. We've got another question from Steve Volkmann at Jefferies. So historically, some farmers may have resisted sharing their data with others. How do you overcome this to aggregate large amounts of data and do you charge farmers for these insights? And if so, how do you do that? Doug, do you want to start off there?

Doug Sauder

Director-Product Management, Deere & Co.

A

Sure. The first important principle is that the farmer is in control of their data. We have – we give them the ability to have permission control, so if I as a farmer want to share my data with my agronomist so that they could help me, I'm in control, and have fine grain permission details to be able to do that. When we talk about aggregated insights, those are anonymous aggregated insights created over a broad dataset that we give options for farmers to opt out of some of that as well. And then, lastly today, today, we monetize the operations center capabilities really through our core equipment and the technology that it's onboard.

Brent Norwood

Director, Investor Relations, Deere & Co.

Q

Awesome. Thanks, Doug. Appreciate it. Next question from Alex Derbes at GGHC. Especially in markets like Brazil, do you need to work with connectivity partners to supply sufficient Internet connections to tractors to unlock demand?

Jahmy J. Hindman

Chief Technology Officer, Deere & Co.

A

Yeah. It's a great question, Brent. You know, if you've been to Brazil and you've been to Mato Grosso or [ph] the Cerrados (02:22:53), you've seen the vastness of the country and you sort of intrinsically understand, I think, the challenge that we have with connectivity. We have and continue to work with telecommunication providers in Brazil to grow the edge of connectivity in the country, but it's also, I think, a really interesting place for us to experiment with alternative ways to connect customers, things like private cell, things like you'll see us in the next few months release an RFP for satellite connectivity that we can put on our equipment. Those sorts of opportunities are out there. And in particular, there's a ton of technology development that's going on in that space at the moment that give us, I think, great optimism for the ability to connect to those customers that are in very remote regions of agriculture.

Brent Norwood

Director, Investor Relations, Deere & Co.

Q

Thanks, Jahmy. This next question is probably a great one for Jorge Heraud. So I'll invite him on stage as I ask it. This is a question from Dmitry at ClearBridge. What are the gating factors to using See & Spray technology for applications in chemicals other than herbicides? And when will it be introduced at scale?

Jorge Heraud

Vice President-Automation & Autonomy, Deere & Co.

A

Yeah, perfect. That's a great question. So we're starting with herbicides. That's the number one crop protection product that is used by farmers, particularly in the US. But beyond that, we want to move to fungicides, to insecticides, and also into nutrition to applying nitrogen selectively. Those are all chemicals that are applied by the same machine, the sprayer, right, the self-propelled sprayer is a machine that uses – that is used to apply all those chemicals. We're putting in hardware to compute. We're putting cameras to compute that are going to allow us to detect when there's deficiency in each one of those chemicals or there's a need to apply each one of those chemicals. And we're going to be applying them.

The second one we have in that journey, the second one we have beyond herbicides is going to fungicides. We're consciously focusing on releasing See & Spray. See & Spray was just announced this year and it's hitting customers. The first thing we're going to be doing is making sure that that release goes smoothly, scaling up not only to the US where we have it this year, but having it cover worldwide going to Brazil, going to Argentina, going to Europe. Those are all very important things to us, increasing the number of coverage, crops, but right after that

is fungicides. We think it's probably two years after herbicide that we'll be able to release fungicide. After that, comes insecticides and nutrients.

Jahmy J. Hindman

Chief Technology Officer, Deere & Co.

A

Maybe, Brent, I'll add onto that one a little bit, tying back to John's point about the importance of connectivity on those machines. That's how – that's what enables us to get the data that enables us to create these models for fungicide as an example. And then, to be able to push those models from a software perspective onto that installed base and unlock that value. So, it's important to understand the foundation that we've got in place already to make that possible.

Brent Norwood

Director, Investor Relations, Deere & Co.

Q

Awesome. Thanks. And Jorge, if you don't mind sticking around, I think, I got another one for you. This is from Tami Zakaria at JPMorgan. So, you mentioned working on construction equipment and leveraging – in terms of leveraging Sense and Act capabilities. Can you expand on that? What kind of equipment and what would be used in those cases?

Jahmy J. Hindman

Chief Technology Officer, Deere & Co.

A

You want me to start?

Jorge Heraud

Vice President-Automation & Autonomy, Deere & Co.

A

Yeah. Why don't you?

Jahmy J. Hindman

Chief Technology Officer, Deere & Co.

A

Yeah. So, I love that question, because it speaks to the power of the organization. Our ability to leverage the technology investment that we've made in production precision ag into construction is vast. There's a handful of examples that we can point to already, things like, John mentioned, the telematics gateway, the connectivity devices from a hardware perspective and all the backend to get the data into the cloud and in a useful format in the form presented to the customer. So, that's just one example. But also in addition to connectivity sense and compute, things like inertial measurement units, things like graphical processing units, those things are highly leveraged role for us, not just within ag across products, but also from agriculture into construction.

Jorge Heraud

Vice President-Automation & Autonomy, Deere & Co.

A

Yeah. That's perfect, and from the product standpoint, what we're focusing on is a product we already have in development. We call it Obstacle Intelligence. It's the ability to see obstacles and understand which obstacles are important to avoid. You see in construction, there's a lot of things that are there and these machines in many cases, climb over piles, right, go over holes. So, not every single obstacle is a real obstacle for a construction machine, right. In many cases they are continuously routinely driving into things like dirt piles, rock piles, and it's very important to differentiate that versus obstacles that you do want to avoid like cars or people, right. You don't want to be going over that. And some of these machines get driven a lot of the time backwards and forwards, right. Think about a loader, for example, it's doing, they call it a V Path. It's loading, going back, and dumping it

into a truck, and doing that all day. So, it's very easy for something to get all of a sudden in its path, especially when they're backing behind.

So, we have a new product that we're working on that has the ability to detect obstacles, and classify them into obstacles that are worthy of stopping for, and obstacles that are just regular obstacles that are – that the construction equipment is expected to go over. So, anyhow, that's one first product that is being tested this year with customers at customer sites. It's still not commercial, but it's being – is being developed and to the point where we're getting input from customers is very important. Beyond that, there's a lot of opportunity for autonomy, making vehicles driverless. A lot of the operations in construction are highly repetitive, particularly in road building. There's a lot of very repetitive tasks that could be made driverless. So, we're looking into that and that's probably a little bit further along, but huge opportunities.

Jahmy J. Hindman

Chief Technology Officer, Deere & Co.

A

And maybe to add to that, [ph] the way (02:29:36) to think about it is the hardware, the infrastructure can be consistent between ag and construction, but the data and the machine learning models that we create are different, right. And so there's a need for us to collect that information in those different use cases, but they're deployable directly to the same hardware stack that we've got across agriculture.

Brent Norwood

Director, Investor Relations, Deere & Co.

Q

Perfect. Awesome. Thanks, Jorge. I appreciate it. Our next question was addressed to Igino, so I'm going to ask him to join us on stage. It's from Jerry Revich, Goldman Sachs. Igino spoke of a fully autonomous row crop production system in 2030. Beyond tillage, what are the major product introductions on the path to that fully autonomous production system in 2030?

Igino Cafiero

Co-Founder & Chief Executive Officer, Bear Flag Robotics, Inc.

A

So [ph] we're yet to (02:30:21) announce new products?

Jahmy J. Hindman

Chief Technology Officer, Deere & Co.

A

Yes, go for it.

Igino Cafiero

Co-Founder & Chief Executive Officer, Bear Flag Robotics, Inc.

A

No. Okay. So if you look at the stages of the production system, we have spring tillage, planting, spring harvest, fall tillage, makes sense we start with tillage, right? Like spring tillage and fall tillage sort of look like the same sport from an autonomous perspective. From there, we have, planting obviously like massive economic benefits to a farmer to get the seeds in the ground, right, when they need them in the ground. But then, more excitingly, you look at grain cards. This is probably one of the most complicated human computer interactions at scale that non-NASA scientists will be able to solve...

Brent Norwood

Director, Investor Relations, Deere & Co.

Q

Right.

Igino Cafiero

Co-Founder & Chief Executive Officer, Bear Flag Robotics, Inc.

A

...like to deal with in the field, right. We have huge pieces of equipment move around in a well synchronized orchestra and we're going to deliver that to farmers. That's really exciting. And then, beyond it and I'd – I'll just tease this, the implications of Sea & Spray plus autonomy are astounding. I've been privy to some thoughts there. It's remarkable what we can do. But even then, we're like, okay, great. We've solved the autonomy and automation part. It still comes back to what can you do on top of that? And when I say, we're creating the system of record in agriculture, we're actually doing this creating a system that's greater than the sum of its parts, right. So, better than just being able to get these operations done at the right time. Now, we're linking insights from the seasons to drive outcomes that really do have headroom that we aren't able to quantify yet. Like that's the Promised Land. That's where we're going. That's what's really exciting. And then, lastly too, it's not just the story about corn and soy. As I mentioned, it's other crops too. As Aaron Wetzel mentioned, high-value crops, orchards, vineyards provide for tremendous potential and we're working on that as well. So, it really is exciting.

John C. May

Chairman & Chief Executive Officer, Deere & Co.

A

And maybe just add to this, Brent. I said when I kicked off my – kicked off the event and talked to all of you that, in my 25 years, this is with Deere, this is probably the most excited I am about the future in this area that Igino just spoke about. Really, it creates that excitement. And the reason I say that is, we're talking about a suite of technology, whether it's software or a suite of sensors that are relatively inexpensive, that can be very similar to what we talked about, telematics gateways, where you can envision this sort of technology in base, which will allow us to scale it rapidly across a lot of acres around the globe. And it's a really, really exciting technology, mainly because it's going to make our customers a lot more productive, a lot more profitable, and help them do the jobs they do in a much more environmentally sustainable way.

Brent Norwood

Director, Investor Relations, Deere & Co.

Q

Awesome. Thanks, Igino. Yeah. So, I think we have time for one last question. And we got this from many of you, so I won't attribute it to anyone specifically. But the question is, it comes in various forms, but in general, it goes like this. You are targeting a 20% through cycle operating margin by fiscal year 2030, what do you expect your peak and trough margins to look like as we go through various cycles?

Ryan D. Campbell

Chief Financial Officer & Senior Vice President, Deere & Co.

A

Yeah. It's a great question. And, philosophically, the journey we've been on when we went from 12.5% to 15% at mid-cycle that the implications there and what we worked on is to raise that 250 points – basis points at all points in the cycle. Now, we're on that journey from 15% to 20%. The implication on what we're working on is all points of the cycle have an improvement in it. What's unique about this time and a little bit different is some of the business model changes that we have that we've all talked about today and Josh hit on, is going to allow us to take some of the standard deviation around that 20% out. So, when we went from 12.5% to 15%, we raised the – all points in the cycle by 250 basis points. We will raise, again, commensurate with the 15% to 20%. But execution of our business model strategy will take some of the standard deviation out around that 20%.

Brent Norwood

Director, Investor Relations, Deere & Co.

Awesome. Thanks, Ryan. So, that concludes our time for today. We don't have time to get through all of the questions, but I know I'm going to have time to interact with everybody here later on in the day. I want to give a

special thanks to everybody who joined us. I know folks traveled a long way to join us today. Thank you very much. A very special thanks to our customers who were able to join us as well. That was really special to have them as part of this day with us. For those who are here in-person, we are going to depart immediately. We've got buses outside and we're going to go straight to the test farm. For those joining virtually, we will post clips of that at a later date, so you'll have an opportunity to participate. Thank you, everybody.

John C. May

Chairman & Chief Executive Officer, Deere & Co.

Thanks, everybody.

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