

PRECISION AGRICULTURE DIGITAL DIGEST



03

HOW TO FILL IN
AG DATA GAPS

07

A LOOK AT
AGRICULTURE
FROM SPACE

11

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MANAGING EDITOR

Denise Faguy
Denise.Faguy@Farms.com
888.248.4893 x293

ASSOCIATE EDITOR

Lindsay Gariepy

CONTRIBUTORS

Diego Flammini
Taryn Milton
Ryan Ridley

DESIGN

Greg Marlow

ADVERTISING SALES

Andrew Bawden
Andrew.Bawden@Farms.com
877.438.5729 x5030



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HOW TO FILL IN AG DATA GAPS

The ability to capture and share data has grown exponentially in recent years

DIEGO FLAMMINI
FARMS.COM

If farmers have good data, they can quantify what good practices look like.

That was part of Seth Crawford's message to attendees during the 2020 Farms.com Virtual Precision Agriculture Conference & Ag Technology Showcase.

Crawford is vice-president of AGCO's Fuse Connected Services and Digital Customer Experience.

Using corn production as an example, Crawford highlighted the discrepancies between harvests.

"We know that from recent record winners it's possible to get as much as 600 bushels per acre, out of one bag of corn seed," he said.

In 2019, David Hula, a producer from Virginia, harvested 616 bu/ac on his farm to win the National Corn Yield Contest.

But when looking at United States Department of Agriculture figures, the average corn harvest in 2019 was 168 bu/ac.

"That's a huge gap. How do we close that gap?" Crawford asked. "You don't need every possible variable mapped out, but it is important to leverage the data you do have to improve your agronomic performance in the future."

Growers can gain about 20 per cent of net farm income over the next few years if they manage data properly, Crawford said.

Focusing on making key improvements and putting insights to use are important to achieve that goal.

"Look at the data points you have and look at the ones you may want to enable with minimal effort or expense, and start leveraging the information you have so you have a continuous improvement process."

Next, a grower should focus on the data he or she has and where they would like to make the biggest gains or savings.

"With data in your hand, you can consult key advisers for advice on what will make the greatest impact," Crawford said. "And your advisers will be able to give you better information back because they're talking about real facts."

Automating as much as one can is another important step.

This helps ensure data is always up to date.

"The great thing about precision farming is you don't need to have everything at once," Crawford said. "You can add on bit by bit so you're automating and collecting the relevant data and putting it back to use."

"GROWERS CAN GAIN ABOUT 20 PER CENT OF NET FARM INCOME OVER THE NEXT FEW YEARS IF THEY MANAGE DATA PROPERLY."



WATCH THE VIDEO



PRECISION AGRICULTURE SCHOLARSHIP WINNERS ANNOUNCED

Farmers and industry members voted for scholarship winners in the United States, the United Kingdom, and Canada

DENISE FAGUY
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Voting for the Farms.com Precision Agriculture Scholarship has concluded and Farms.com is delighted to announce the winners of the scholarship in each of three countries.



The scholarship winner from the United States of America is **Austin Brown**, who is studying at Penn State University in Animal Science, with his submission "Phenomix & Animal Trait Measurement Utilizing Bio-imaging".



The scholarship winner from the United Kingdom is **Will Smith** who is studying at the University of Lincoln, with his submission "Can inter-row cultivation play a role in the future of sustainable weed control?".



The scholarship winner from Canada is **Nicholas Bannon**, studying at the University of Guelph for his BA Food, Agriculture and Resource Economics, with his proposal for a "Nationwide Precision Agriculture Education Program for Farmers & Input Suppliers".

The scholarship winner in each country will receive a scholarship valued at US \$2000. The theme for the 2020 scholarships was "environmental benefits of precision agriculture to protecting the planet". Scholarship entries were received at the end of September from students who submitted their research/thesis, via a social media video (YouTube, Twitter, Facebook).

The scholarship submissions were judged by a panel of industry leaders, sponsors and Farms.com staff members to choose the top three submissions in each country. The finalists were announced and then farmers and industry leaders were invited to vote for the student with the precision agriculture idea that they believed would have a positive impact on the environment and could be adopted by farmers.

"The number of votes we received for the scholarship far surpassed our expectations," says Farms.com President and CEO Graham Dyer. "We were impressed by the quality of the scholarship submissions we received, and each of the finalists was deserving of a scholarship. The farming community was engaged by the ideas presented and have now chosen the winners in each country."

"Congratulations to Nicholas Bannon," says Darcy Herauf, Director FCC AgExpert, and sponsor for the Canadian Scholarship. "The passion from each of the Canadian submissions as well as scholarship submissions from other countries demonstrates the bright minds that will be the future of the industry. FCC AgExpert recognizes the importance of ensuring young people are engaged in the agriculture industry and we were delighted to support this initiative."

"THE PASSION FROM EACH OF THE SUBMISSIONS DEMONSTRATES THE BRIGHT MINDS THAT WILL BE THE FUTURE OF THE INDUSTRY."





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EOS Data Analytics Inc.

EOS Data Analytics, a part of the Noosphere Ventures investment portfolio, is a trusted global provider of AI-powered high-resolution satellite imagery analysis. The company is headquartered in Menlo Park, California, and operates worldwide, partnering with governmental, commercial, and scientific organizations. The scope of the company's technologies encompasses earth observation solutions for smart decision making in agriculture, mining, oil & gas, military, among other applied fields upon request. One of EOS Data Analytics' major goals is to employ cutting-edge space-driven technology to lay a foundation for a more sustainable future for the planet and humanity.

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Granular is Farm Management Software (FMS) that is helping thousands of farmers to build more profitable and efficient farms today and steward their lands for generations to come. As the world's leading FMS, Granular uniquely combines an industry-leading support team with the most recommended suite of easy-to-use powerful software to help farmers and their teams run all aspects of their farm business. From financials to agronomy to operations, farmers are now able to make data-driven decisions with greater confidence in an increasingly challenging environment.

A LOOK AT AGRICULTURE FROM SPACE

The Canadian Space Agency wants to help producers by providing helpful data from space-based observations of Earth

TARYN MILTON
FARMS.COM



The Canadian Space Agency wants to step up to the plate to provide farmers with more data to support their management decisions.

Eric Laliberté is the director general, space utilization at the Canadian Space Agency (CSA). His presentation at the 2020 Farms.com Virtual Precision Agriculture Conference & Ag Technology Showcase on Nov. 17 highlighted how the CSA can help farmers.

“The whole purpose of looking at agriculture from space is basically to help with on-the-ground decisions,” he said. “The goal that we seek is to collect data that’s needed to support the development of analytical software in order to generate information required to support decision making and ensure the information is available.”

One way the CSA can do this work is through satellites. CSA can use this technology to support the ag industry in seven ways:

- **monitor plant growth**
- **assess soil and crop health**
- **better forecast precipitation and risk of crop disease**
- **assess soil moisture**
- **avoid waste of fertilizer, pesticides and water**
- **maximize crop yields**
- **facilitate sustainable management**

"This is all about data transformed into actionable information and space-based data is combined with aerial and on-the-ground measurements to develop this information," said Laliberté.

Companies in Canada use space-based observation of the Earth and advanced analytics to develop online services customers can use to pinpoint and better manage unproductive or problematic areas of farmland. This use and capability of type of technology is expected to grow and help farmers in the future, said Laliberté.

Canadian farmers of up to \$1.3 billion over the next decade," he said.

The CSA will focus on collaborating with different sectors in Canada, including the ag industry, to help improve technology.

"We're changing the table around and making sure that we're not building a satellite for the sake of building a satellite, and certainly not trying to push their capabilities onto users. We want to make sure that we're building the capability that responds to identified needs," said Laliberté.

The hope is communication between the ag industry and CSA will continue to improve to help everyone involved.

"We need to understand your needs and you need to understand the capabilities," said Laliberté. "Don't be strangers. Let us know your challenges so we can help you feed the passengers of humanity's spacecraft."

"...COULD PRODUCE COST SAVINGS FOR CANADIAN FARMERS OF UP TO \$1.3 BILLION OVER THE NEXT DECADE."

"It is estimated that the increased use of space-based Earth observation technologies within the Canadian agriculture sector could produce cost savings for

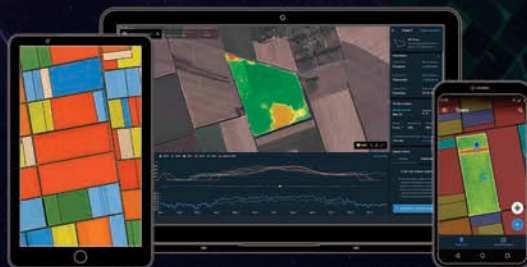


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The logo for Climate FieldView, featuring the word "CLIMATE" in small blue letters above "FIELDVIEW" in large orange letters, with a green leaf icon to the right.

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The logo for Olds College, featuring a stylized leaf icon above the text "OLDS COLLEGE" and "1913" to the right.

OLDS COLLEGE
1913

The logo for xarvio, featuring a purple location pin icon with a white 'x' inside, followed by the text "xarvio™" and "Digital Farming Solutions" below it.

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The future of farming is digital. That's why xarvio offers farmers digital farming solutions that help to identify the highest production zones in your field so you can avoid treating areas with no economic benefit.

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With 30,000+ visitors from more than 50+ countries visiting, Canada's Farm Show promotes innovation, collaboration, education and growth in the agriculture industry. The show attracts world-class manufacturers, exhibitors, speakers and entertainment to Regina, Saskatchewan each year.



ON THE FARM, MICROMANAGEMENT IS A GOOD THING

Two John Deere precision agriculture experts discuss data, automation, connectivity and ease-of-use

RYAN RIDLEY
FARMS.COM



Are you making data-driven decisions on your farming operation?

This is easier said than done, but the results of implementing a precision agriculture strategy will not only be beneficial today, but for years, and even generations, to come.

We had the privilege of receiving advice from two John Deere experts at the recent 2020 Farms.com Virtual Precision Agriculture Conference & Ag Technology Showcase.

Their presentation highlighted John Deere's precision ag strategy, diving into what is expected in the future and what this means for farmers.

John Deere has been a key player in the precision agriculture landscape for many years – going back to 1996 and its first GPS receiver, which was nicknamed 'green eggs and ham'.

"Simply put, our precision ag vision is that our customers will be the world's most profitable and sustainable farmers," explained Doug Dickman, Project Manager – Precision Ag Technology at John Deere. "When I talk about profitability, that means that customers with our equipment and precision ag technology experience higher yields, lower cost and lower risk, year-after-year."

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“When we talk sustainability, that means that our technology will help farmers be even better stewards of the land, reducing waste and helping them do more with less – and as it speaks to financial sustainability, being able to have a profitable farm to pass along to the next generation.”

John Deere's Smarter Equipment and Better Decisions precision ag strategy is comprised of three main areas:

- plant level management,
- simplified farm management, and
- enabling data-driven decisions.

The focus when it comes to plant level management is helping farmers become better micromanagers through the use of sensors, machine learning, robotics and automation.

“When you think about micromanagement, you generally think that it isn't a good thing – but in agriculture, it really is. We want to be able to monitor and control millions of seeds that are planted on the farm in a way to optimize things for the farmer to increase productivity and precision,” said Dickman.

Simplified farm management refers to a farmer's ability to access the right information, at the right time, and from anywhere – including and especially in the cab of a tractor.

“We know that most farmers aren't sitting behind a desk in a command center watching a large monitor all day – in reality, they're probably in the cab or out in a pickup truck. For us, we need to simplify that farm management process, which means a mobile experience that allows them to manage his or her farm from their phone,” stated Dickman. “We're investing heavily in this technology today, and you're going to see significant changes in the future.”

The third pillar in John Deere's precision ag strategy is to enable better decisions by harnessing the power of data and analytics.

“The promise of precision ag has been that as a farmer, I can learn from the data that comes from my farm. I think we haven't quite delivered on that promise yet,” said Dickman.

He explains that data is still too fragmented and difficult to navigate.

“We know that as farmers, you don't want to be a data scientist – you want to be a decision maker. That's where we're really focused on how to surface the value from the data in an automated and simplified way so that you aren't required to dig for it yourselves,” he added.

In today's digital age of farming, John Deere's strategy is focusing on connecting equipment with decision makers and partners, across the entire production system.

“Data is really the fuel of our strategy – not the exhaust. We need to utilize the data that is coming in,” stated Dickman. “The investments we've made in connectivity are really the backbone of the strategy. Our strategy for smarter equipment is that we can leverage spatial intelligence from other passes as well as other resources – that's going to bring that automation intelligence down to the equipment where it can complement our onboard sensors to create the smartest, most automated machines possible.”

Dickman discussed how data is fueling smarter equipment across the entire production system from soil prep to harvest.

“The fusion of off-board data, spatial intelligence and real-time, on-board sensor data is the fuel that's going to create smarter equipment that creates more value for our customers,” he said.

“MICROMANAGING AT THE PLANT LEVEL MEANS THAT THE GOAL IS TO COUNT EVERY SEED, THE GOAL OF SPRAYING IS TO MAKE EVERY DROP COUNT, AND THE GOAL OF HARVESTING IS TO MAKE EVERY GRAIN COUNT.”



“Micromanaging at the plant level means that the goal is to count every seed, the goal of spraying is to make every drop count, and the goal of harvesting is to make every grain count.”

Does it seem futuristic for a sprayer to become more intelligent because it's utilizing information that it's gained from prior experience? Well, John Deere recently released a new precision ag application called AutoPath™ which does just that.

“When using AutoPath™, guidance lines are automatically created from a map of crop row lines for each field. These mapped row lines are used to automatically create guidance lines for the entire field for all other in-field passes, such as spraying, nutrient application or harvesting operations, later in the year,” explained John Mishler, Tactical Marketing Manager – Precision Ag at John Deere in the release on November 17.

Mishler went on to discuss the foundational technologies that are required to fully take advantage of the capabilities John Deere is currently building and plans to build in the future.

“We understand that getting started with precision ag can be daunting and if you have begun the journey, sometimes knowing what step to take next can be a bit unclear,” said Mishler. “At Deere, we're trying to make it as easy as possible by including a solid foundation with all new large ag machines that are purchased from our dealers.”

John Deere's newest machines are built with an integrated StarFire™ 6000 Receiver that is pre-calibrated from the factory and is priced with SF3 accuracy included.

“The integrated StarFire™ 6000 Receiver helps you get started more quickly and delivers the accuracy you need for whatever precision field work you have planned,” said Mishler.

Inside the cab is the 4600 CommandCenter™ Display which has foundational precision ag applications built in, including AutoTrac™, documentation and data sync.

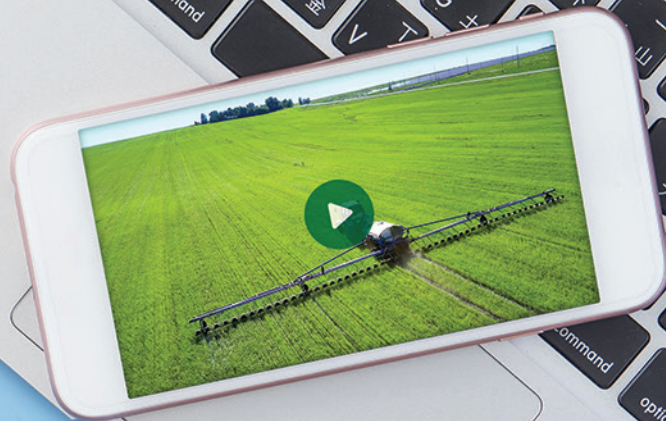
“AutoTrac™ is essentially the application upon which all other more advanced precision ag applications are built,” added Mishler. “We also include documentation so that the work that you do – tillage, planting or seeding, application and harvest – are easily documented. That documentation serves as the basis for better decisions.”

All large John Deere machines come with connectivity built in and include 5 years of JDLink™.

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FARMERS DISCUSS PRECISION AG STRATEGY

Precision Farmer Panel explores precision agriculture techniques implemented on their operations

RYAN RIDLEY
FARMS.COM

Attendees of the 2020 Farms.com Virtual Precision Agriculture Conference & Ag Technology Showcase tuned in to the Precision Farmer Panel – a farmer favorite – at the end of the three day event on November 19.

The expert panel featured four farmers who are implementing precision ag techniques on their operations and shared their experiences with conference attendees:

Clinton Monchuk – Monchuk Farms

Grain and layer operation in Saskatchewan as well as cattle ranch in Oklahoma

Justin Hiebert – Hiebert Farms Ltd.

Farm corn, soybeans, wheat and some asparagus in Long Point, Ontario

Mark Brock – Shepherd Creek Farms Ltd.

Grain and oilseed operation and produce lambs for the Ontario red meat market in Hensall, Ontario

Beau Jacobson

Jacobson Farms and President of Premium Ag Solutions in the United States

Monchuk Farms

The session kicked-off with Clinton Monchuk who says the top priority at Monchuk Farms is to improve soil health.

“From our soil, everything else happens. Our aim is to always improve the soil,” said Monchuk. “My background is economics, so I always feel that you can’t manage what you don’t measure.”

Soil profiling is something that is continuously done at Monchuk Farms.

“This little bit of better soil profiling every year on each piece of land, we find gives us a better edge in terms of being able to adapt to where we need to go,” added Monchuk.

Using a mid-row banding system for its planter, Monchuk Farms directly injects NH₃ into the furrows which lowers the loss of nitrogen. The farm is also using precision openers for seed and seed placed fertilizer, as well as a Trimble 2050 display system.

“We use a Trimble 2050 which allows us to have our variable rate in there, as well as our sectional control. Working through the numbers, it saves us roughly

WATCH THE VIDEO



about 9.5% on our fertilizer costs every year – it's more environmentally friendly and it's pretty easy to use," explained Monchuk.

For spraying, Monchuk Farms recently purchased a Case IH with AIM system and Pro 700 display and moved from 90' booms to 120' booms, which reduced spraying costs by about 2-5% (depending on field). They are also using Case IH combines with Pro 700 monitors with GPS and mapping.

"We like to keep current with information and technology, but it has to fit with sustainability on our farm. At the end of the day, for us to pay for it, it needs to make sense," said Monchuk.



Hiebert Farms Ltd.

Hiebert Farms Ltd. is always on the lookout for new technologies and processes, says Justin Hiebert, a third-generation farmer.

"This winter we re-built a planter with Precision Planting gear on it. It's really impressive technology and was significantly cheaper than pricing a new planter... it's a great way to save money and I think we are technology ahead too," said Hiebert.

Technologies used on Hiebert Farms' planter include: DeltaForce, FurrowForce, vSet/vDrive, SpeedTube, FurrowJet and Conceal, vApply HD, SmartFirmer and CleanSweep.

"Some of the things that we're doing using precision ag on the farm includes variable rate corn population, we've been trying some variable rate beans to reduce white mold pressure, we have done some primitive variable rate fungicide in beans, we built our own asparagus planter, we've done some variable rate lime scripts, and use FieldView," explained Hiebert.

Hiebert also discussed some pitfalls or areas to watch out for when implementing precision agriculture:

- Backup all your data
- Plan ahead
- Data management
- Cost
- Yield monitor differences

Shepherd Creek Farms Ltd.

Mark Brock and his wife Sandi farm 1,700 acres of corn, soybeans, edible beans and winter wheat on a mostly strip-till or no-till basis and maintain a 450 head sheep operation that raises 700-850 lambs per year.

"We've gone down the path of precision ag for quite a while now – we've had a yield monitor since 1999, but have only really gathered good data since 2012," said Brock.

What other precision ag tools is Shepherd Creek Farms currently using?

- **RTK Guidance**
- **Section control on all planting and application equipment**
- **Fully customized planted with Precision Planting upgrades**
- **Tile plow**
- **UAV (drone)**

"There's some really cool hardware and equipment technology out there on the precision ag side and we've just really incorporated as much as we can, whenever we can because we always see that there is value in it," added Brock.

Shepherd Creek Farms uses several tools to collect data from its operation, including FieldView, Farmers Edge, Agrimatics and Harvest Plus.

"On the farm internally, we use Ag Leader's SMS Advance software to do our yield mapping, to look at soil data, making our prescriptions and pulling in our as-applied maps," explained Brock. "And also, the water management module to do some tile layouts and look at elevation."

Brock went on to discuss satellite imagery, topography, comparisons, drone imagery and how he strives to turn data into dollars.

"When we look at our farm and its future direction, my emphasis is really on looking for tools that mitigate risk. I think that's the biggest challenge we have on our farm – just trying to figure out and identify what our risks are and then trying to find tools to mitigate those," said Brock.

Jacobson Farms

Beau Jacobson is a partner at Jacobson Farms with his brother where they operate 15,000-16,000 acres of mostly corn and soybean with some wheat and dry beans. Jacobson is also the owner of Premium Ag Solutions.

"All of our planters are set up with Precision Planting – we've been doing high speed planting since 2015... In the sprayer world, we're running the AIM Command system on the sprayers – cutting our costs down to a minimal amount," explained Jacobson.

Jacobson discussed harvest, tillage methods, tile, variable rate and the different data platforms they are currently using on their operation.

INNOVATION ADVANCING THE FUTURE OF AGRICULTURE

Big tech showing more interest in agriculture

DENISE FAGUY
FARMS.COM

John Harnett, Founder and CEO of accelerator THRIVE, joined the Virtual Precision Agriculture Conference from Silicon Valley in California. He explained that the worlds of agriculture, technology and innovation were not all naturally connecting together, the industry was very fragmented, which is why he created Thrive.

Hartnett believes controlled environments or vertical farming will be an important area for agriculture in the future, he does not believe it will replace traditional farming, but feels that it will likely incrementally solve some agriculture problems in the future. Solving labor issues in some cases.

Why is there an ag tech revolution happening? Hartnett says because, "We must produce more with less." Also, he says there are greater challenges to the ag community: water, cost of labor, arable land shortages, feed safety issues. "All are significant issues the industry is facing."

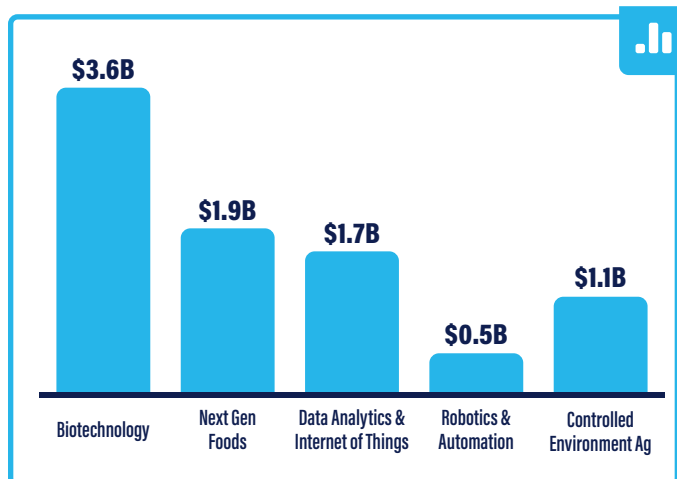
According to Harnett, another important factor is changing demographics. 50% of the global population is Generation Y and Z; where 42 % of that demographic say they will stop relationships with business that negatively impact the environment. They are very aware of health and nutrition, and their top concern is climate and the environment.

Harnett says consumers want to know where their food is coming from, they are looking for trust, quality, health, and sustainability when they make their food purchases.

COVID has accelerated key areas such as digital marketplaces and online buying. It also uncovered many challenges in the food supply chain.

How can Innovation solve some of these problems? Harnett says, "We can't keep doing the same thing, we have to innovate. It has to be transformative."

What are the top investments being made in the agri-food industry? Harnett shared his research that large investments have been made in Biotechnology (\$3.6B US), Next Gen Foods (\$1.9B US), Data Analytics & Internet of Things (\$1.7B US), Controlled Environment Ag (\$1.1B US), and \$0.5 billion in Robotics and Automation.





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