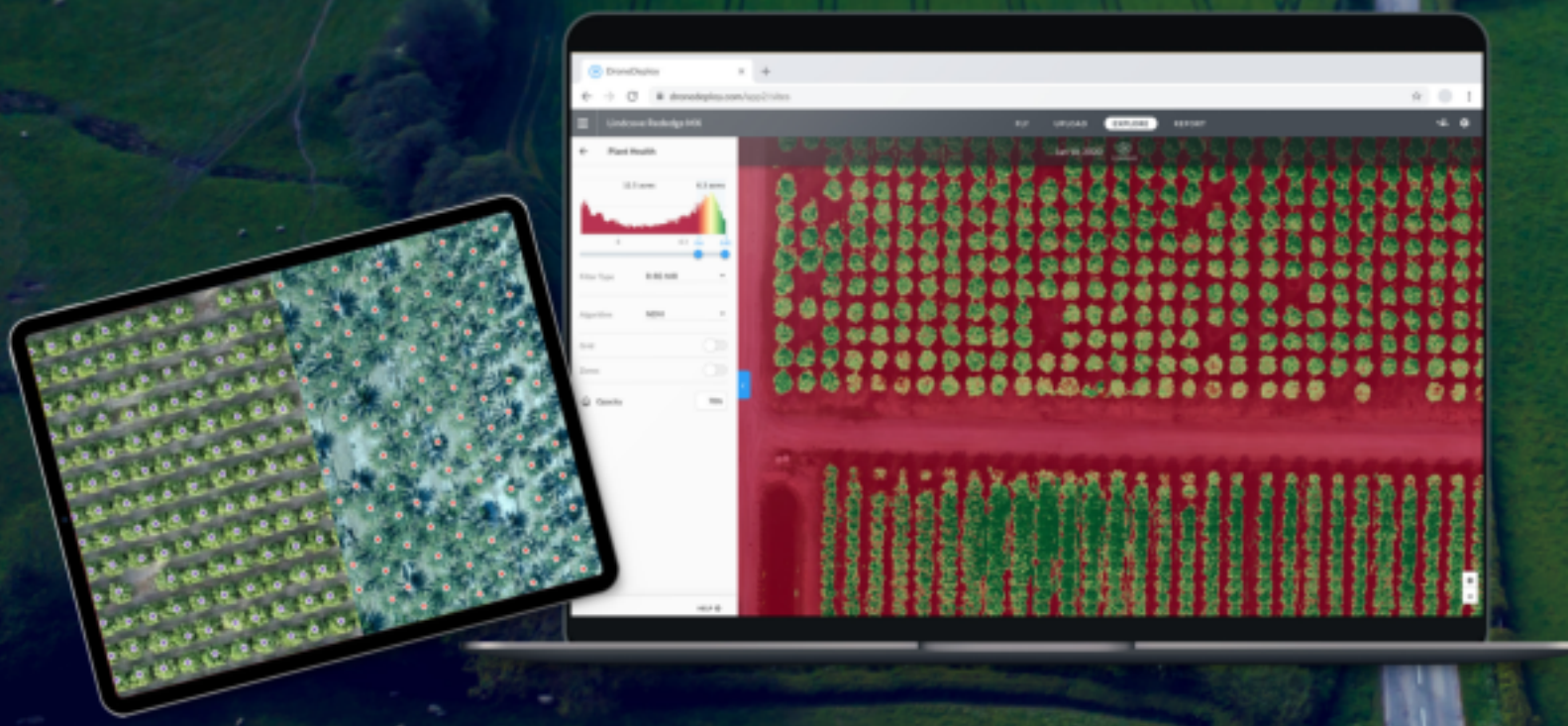
DroneDeploy

Drone Data Solution for **Agriculture**



Introduction

Today, thousands of growers, agronomists, and agriculture professionals use drone data solutions like DroneDeploy to create data-rich maps of their farms and fields. And it's no wonder why: drone software enables agriculture professionals to become more efficient in the field, make more informed crop management decisions, and better understand product performance.

DroneDeploy allows you to detect crop health issues in real-time, accurately assess losses after a significant weather event, and even generate variable rate prescriptions that can save serious cash with more targeted fertilizer applications.

Whether you already have a drone solution in place on your farm, or you are just starting to consider one, this ebook provides you with everything you need to know to successfully establish a drone data solution in the field this season.

In this eBook we will examine:

- **What is a drone data solution?**
- **The benefits a drone data solution for agriculture**
- **The key workflows where a drone data solution provides value**
- **How today's Agriculture innovators are putting drones to work**
- **How to get started with DroneDeploy**

Let's dive in.

Drone Data Solution

For a wide array of industries, drones can capture an enormous amount of data through photos, videos, panoramas, and even multispectral and thermal imagery. But once all of this information has been captured – which can be hundreds to thousands of files – it is imperative companies use a software solution that can comprehend this information and make it digestible for your field operations, R&D team, and clients. DroneDeploy, the only complete drone solution, interprets all drone data by helping companies capture, analyze, and take action.

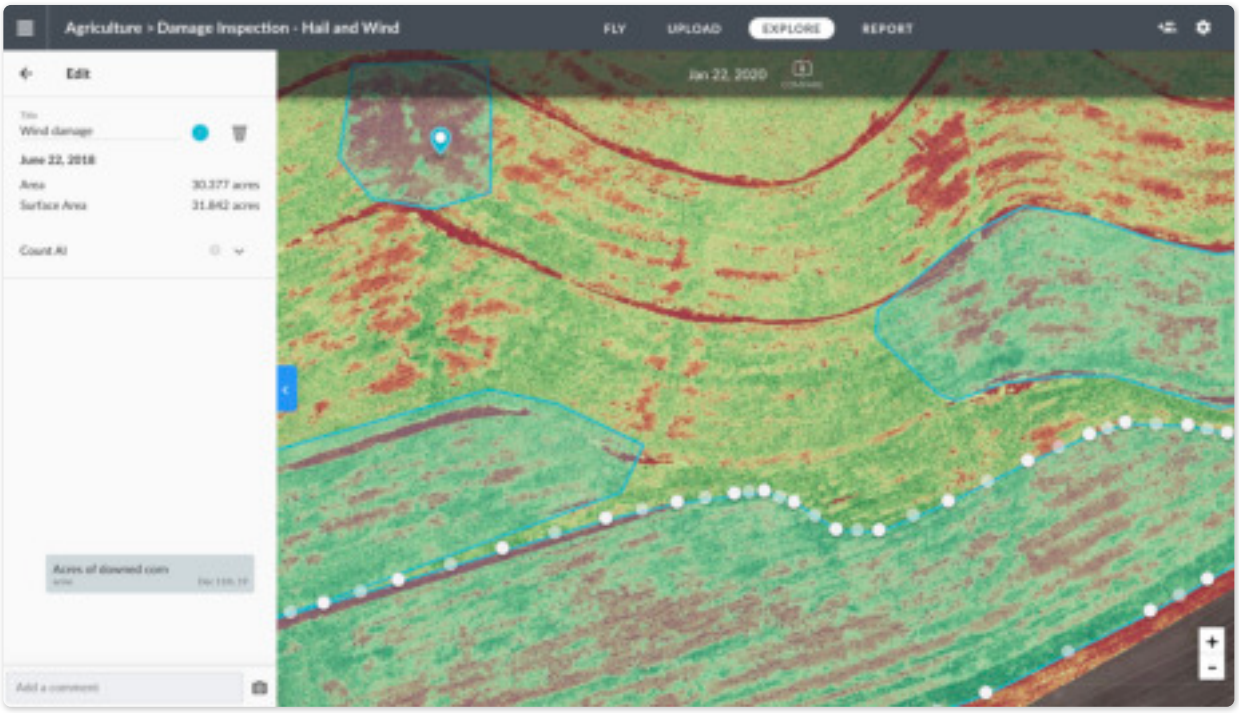


Figure 1. Capture, process, analyze and take action with DroneDeploy

Key Benefits of a Drone Solution:

Eliminate field threats: Detect variability and prevent in-season crop loss across thousands of farms.

In the world of agriculture, timing is everything. Diseases and invasive species spread fast, but in the days (and, in some cases, weeks) it takes to schedule and process imagery captured by a human-crewed aircraft or satellite, what began as a small problem can spread to something much more significant.

Figure 2. Powerful plant health tools, such as the ones built directly into DroneDeploy, allow you to visualize issues and make decisions on the spot

Drone data solutions, on the other hand, give you a high-resolution map of your field in a matter of minutes. Powerful plant health tools, such as the ones built directly into DroneDeploy, allow you to visualize issues and make decisions on the spot. No more guesswork or costly waiting periods: just actionable data in real-time.

Maximize yields: Identify field management opportunities faster and more reliably with real-time drone data.

In agriculture, it's all about understanding what is happening in the current conditions of the entire field, in-season, all while increasing yield and efficiency and maximizing return of inputs. Using drone data to identify areas for specific management, like replanting and nitrogen application, helps you make more accurate yield projections across hundreds of acres. Drone data can also help you determine which products performed the best in your fields, allowing you to make the most informed decisions when purchasing inputs for the following year.

Innovate with precision: Manage trials and efficiently analyze results at scale.

Compare results from seed and chemical trials across multiple geographies while overseeing product performance at every stage of the life-cycle. This data can then be shared with agronomists to leverage new technology quickly. You can increase profits by using drone data in conjunction with precision fertilizer applications, testing new hybrid varieties, validating fungicide performance, and early assessment after weather events.

Key Workflows:

Stand Establishment

The powerful analytics of DroneDeploy can replace traditional scouting methods by delivering a comprehensive set of aerial data for your entire field. No more guesswork or extrapolating in a matter of hours, you can get an accurate classification of the problem, empowering you to make the most informed decisions.

Pre- and Post-Treatment Validation

A field issue was identified after drone-facilitated scouting. Use this drone map to quantify the extent of the damage and determine how much product is needed to treat the issue. Fly the field one or multiple times after the event to ensure the treatment worked.

Planning for Current and Next Growing Season

Reviewing drone maps from past growing seasons is a valuable tool to help with planting plans for the year ahead. Spot trends by using your drone maps to visualize crop emergence and plant health over time, then compare this with historical information like soil and yield maps.

By comparing a mid-season map of his potato field with historical weather data and yield maps, one grower in North Dakota was able to determine which variety of potatoes resisted heavy rainfall most efficiently. Using this data, he made an informed decision about next year's planting and potentially saved his operation tens of thousands of dollars in future crop losses.

Variable Rate for Nitrogen Prescriptions

Generate a variable rate nitrogen prescription using an in-season image as part of your dataset. A flight completed shortly before side-dressing nitrogen can identify areas low on nutrients, enabling you to adjust your side-dress prescription to account for the most up-to-date fertility status of the field.

Crop Counting

Counting thousands of trees requires walking the field, taking hours, and sometimes days. Thankfully, DroneDeploy's Count AI uses machine learning to make this whole process simple, with fully automatic tree counting for Almonds, Palms, and other orchard varieties. Count AI will automatically identify every tree in the areas you define, so you can rapidly quantify insured assets and estimate potential yield with high confidence. You can also use the counting tool to manually count anything visible and distinct on the 2D Orthomosaic image, elevation map, or plant health image.

Toshiro Aoki is an agriculture consultant for a private farm in Northern California. During last year's growing season, hundreds of thousands of tomato plants were transplanted on a 74-acre field by an outside organization. Toshiro wanted to make sure the company was billing them only for the established plants, so he used DroneDeploy and **Agremo** to quickly and easily get a plant count report that helped him hold the company accountable.

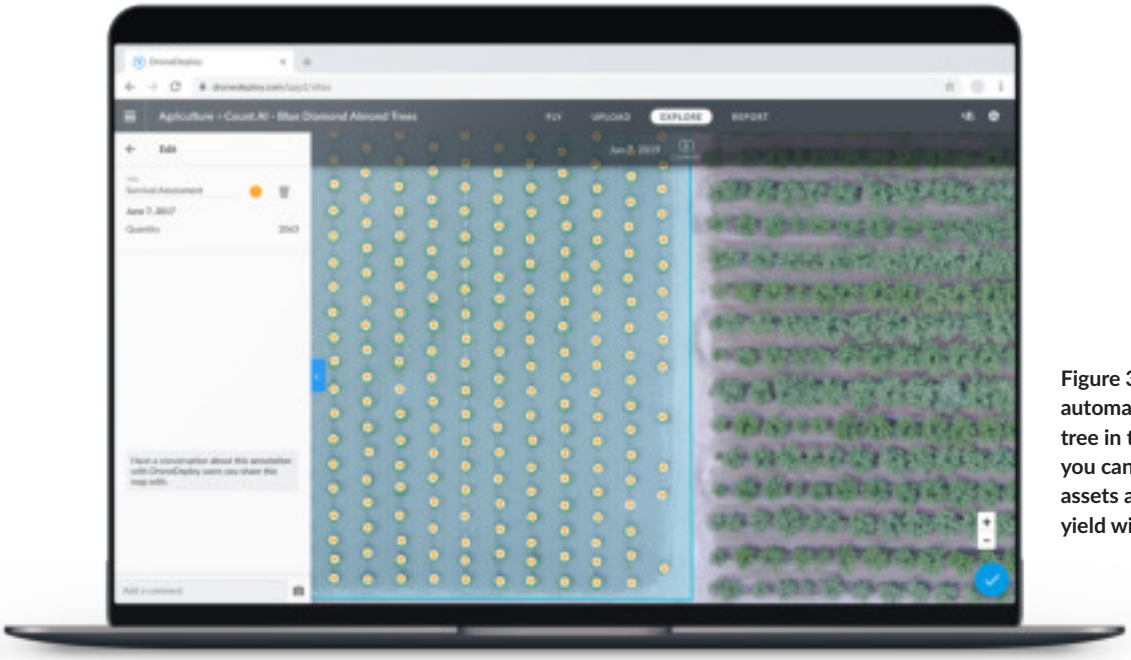


Figure 3. Count AI will automatically identify every tree in the areas you define, so you can rapidly quantify insured assets and estimate potential yield with high confidence.

"The plant counting seals the deal. It saves us the trouble of having to go out and count the whole field."

— Toshiro Aoki, agriculture consultant

Using Drone Data After A Major Weather Event

One major weather event, or an unseasonably rainy year, can decimate a crop and leave you with considerable losses to bear. Aerial imagery helps growers and adjusters quantify the damage quickly so that action can be taken to mitigate the loss.

In situations of extreme crop loss, it's often time to call a crop insurance adjuster. But adjusters only have time to walk small sections of a damaged field, so gaining an accurate picture of the loss can be difficult. When heavy rains destroyed nearly 100 acres of a Kentucky tobacco farm, drone service provider **Gregg Heath** produced an annotated crop health map of the entire field. This map convinced an insurance adjuster to re-inspect the area after an initial loss estimate fell short of expectations. Thanks to the detailed information provided by Gregg's drone map, the adjuster took a second look at targeted areas and offered a far higher loss percentage. The tobacco farmer ultimately recouped an additional $110,0000 in crop losses.

Corteva Agriscience™ Deploys The Largest Agricultural Drone Fleet In The World
The world's largest agricultural drone fleet is transforming the way farmers manage their crops.

Through a collaboration with **Corteva Agriscience**™, an agriculture division of DowDuPont, DroneDeploy's advanced mapping software is powering Corteva Agriscience's fleet of more than 400 DJI drones across the company's global teams, including:

- Seed Production
- Supply Chain
- Pioneer Strategic Account Management
- Agronomy

Spanning three continents, DroneDeploy's Live Map technology provides Corteva Agriscience's UAV fleet of drones with immediate insights to diagnose and correct agronomic, disease, and pest concerns, as well as suggest locations for optimal product placement. Combined with DroneDeploy's user-friendly platform for real-time sharable drone maps and 3D models, farmers and agronomists across the globe will be able to carry out data-driven actions to keep fields full, healthy, and ready for seasons to come.

The Equity: Alleviating Farming Challenges with Drone Data

The Equity, one of the largest independent agricultural cooperatives in Illinois, have long offered their customers a range of products, including grain services, feed & livestock, and hardware. But over the past few years, The Equity has begun offering customers a variety of agronomy services called GoSmart, that utilize drones and DroneDeploy as their main agricultural tools, knowing the data processed through DroneDeploy's platform would be fast, accurate, and reliable. This is especially important at The Equity because the goal is simple: utilize farm data to make better decisions.

They use DroneDeploy's Live Map to have on-site conversations with growers and provide detailed field documentation, allowing GoSmart team members to spend more time in the field with growers, rather than waiting for data to be uploaded and analyzed. From there, they can inform their clients on everything from what seeds to buy, to what nutrients to use, to different corn and soybean hybrids. GoSmart does everything to optimize overall yield potential.

"Using DroneDeploy, we were able to use data to provide sound agronomic advice as well as minimize grower risk by optimizing the controllable variables."

Adam Garretson
GoSmart Manager, The Equity

Figure 4. Currently, 225 growers use GoSmart, spanning more than 325,000 acres. Across all customers, The Equity found a 5-10% higher client retention rate on GoSmart as compared to traditional agronomy services. They also saw a 7% higher increase in sales since its inception.

Bowles Farm: Adding Drones to a Precision Agriculture Program to increase profits during the cotton harvest

Bowles Farm paired DroneDeploy and John Deere Operations Center to track their 12,000-acre cotton operation and generate a variable rate map for a targeted respray. Without comprehensive information about an entire field, it's difficult to know if the defoliant is drying the cotton evenly — and exactly when it will be ready to harvest. Using DroneDeploy's Plant Health analysis, Bowles Farm was able to determine the most economical product to apply while taking into consideration how green the plants are and how much time until the anticipated harvest.

"Defoliant spraying is another $11–15 per acre, so for every acre, we don't have to spray, we increase our net profit for the harvest."

— Justin Metz, Technology integration specialist, Bowles Farming Company

How To Get Started with DroneDeploy

Visualize Crop Health In Real-Time

When your crops are in jeopardy, every minute counts. Even the few hours it takes to upload and process a typical drone map can make a difference in your response time. DroneDeploy's Live Map generates a drone map in real-time on your mobile device screen. You don't need a laptop or internet connection: just plan a flight, take off, and see maps render on your tablet or smartphone. Once your drone completes its mission, you can immediately review your field's crop health and start ground-truthing your findings. Plus, all your data syncs to the cloud for sharing and collaboration.

Crop Variability Analysis

DroneDeploy's built-in Plant Health analysis allows you to quickly adjust the contrast on your drone maps to highlight crop variability and visualize problem areas, turning a drone map into actionable data.

Advanced Crop Analysis

DroneDeploy's multispectral mapping solution for cameras enables you to detect and diagnose potential causes of plant stress much earlier than just using an RGB camera. Your R&D teams can create a robust, cloud-based workflow from start to finish; upload, process, analyze, and export multispectral data captured on the MicaSense Rededge-M, MX, Altum, and DJI P4M sensors. You can spot crop stress up to 4 weeks earlier than RGB data, allowing growers to treat problems beforehand and increase yield.

Review Side-by-Side Maps for a Historical Perspective

DroneDeploy automatically organizes and stores your maps by date and geographical location, so it's easy to track a crop's progress over time. This is a chance to dig a little deeper into problem areas, take a closer look at patterns, and visualize how crop emergence and plant health played out through the entire growing season.

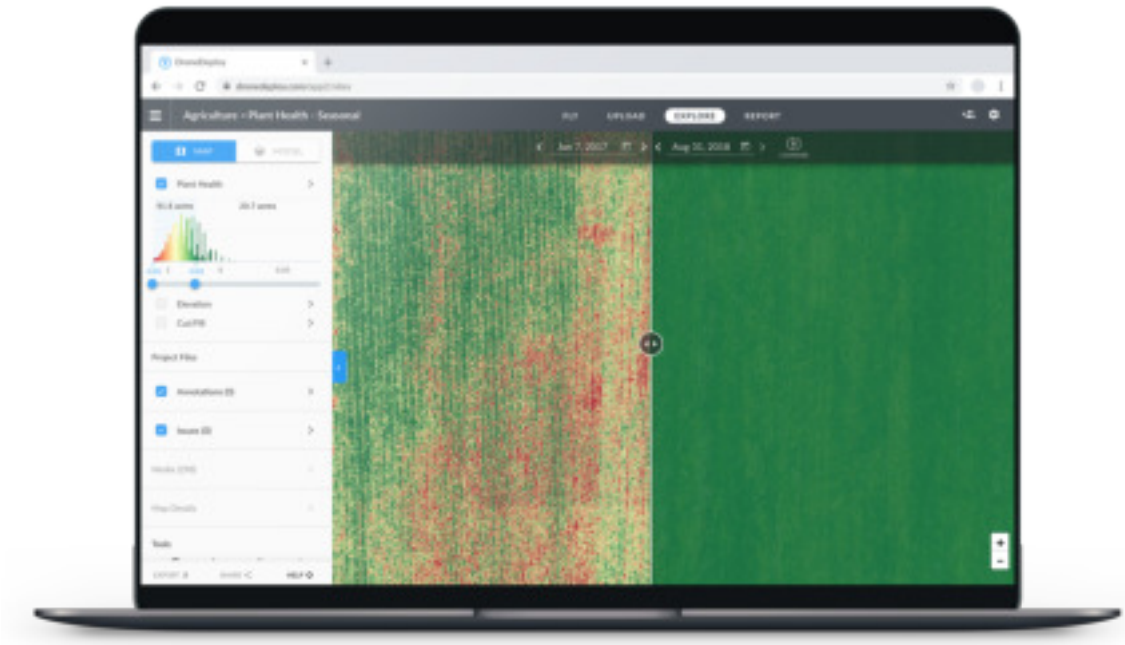


Figure 4. Spot trends by using your drone maps to visualize crop emergence and plant health over time, then compare this with historical information like soil and yield maps.

Using Side-by-Side on your DroneDeploy dashboard, you can quickly see when you flew a mission over the same site—and compare changes over time.

Integrate Drone Maps with Field Data

If you want to dial down even further, compare your drone maps with other information like harvest, yield, variety, and spraying maps. All of this is done seamlessly by exporting orthomosaic, plant health, and elevation maps into software like AgLeader, SMS, or John Deere Operations Center. You can also import field boundaries from your management software to make mission planning quick and painless.

DroneDeploy customers can easily export their drone maps as a zoned shapefile that can be integrated into precision agriculture software. We've seen growers use drone data to generate variable rate prescriptions for nitrogen and pesticides that have saved thousands of dollars in human resources and supply costs—and effectively maximized yields.

Landon Oldham owns Heartland Soil Services, a company that uses soil samples to estimate crop yields and make variable rate prescription maps. He pairs drone data with soil samples to generate highly accurate nutrient prescriptions. Instead of relying solely on data from soil samples—about one sample per two acres—Landon's new workflow combines this sampling with the many data points on a drone-generated NDVI map to gather information at a much more granular level.

> **"The ROI is tremendous because growers can further increase the site-specific application of any and all products rather than applying the entire field at the exact same rate."**
>
> **— Landon Oldham,** Heartland Soil Services

DroneDeploy has worked with thousands of businesses to bring drones to their job sites, farms, mines, and properties. We know how to assist your team in getting a successful operation off the ground.

Our solution is easy to use, and a one-stop-shop, so you can start monitoring your sites today, by flying, processing, analyzing, and acting on drone data.

Want to learn how DroneDeploy can help your business? Visit **https://www.dronedeploy.com/solutions/agriculture/** to learn more or **request a consultation** with one of our team members.

DroneDeploy is the leading drone software solution trusted by over 5,000 companies across a variety of industries, including construction, energy, agriculture, and mining. From drone fleet management to data analysis, DroneDeploy makes aerial data accessible and productive for everyone. Simple by design, DroneDeploy enables professional mapping, 3D modeling, and reporting from any drone on any device.