DJI Smarter Farming Package Lowers Nitrogen Costs For Corn Farmers

"With the Smarter Farming Package, we have seen corn growers across the Midwest save as much as $9.80 per acre by targeting Nitrogen application rates across portions of their land." – Nathaniel Hyde, Enterprise Channels at PrecisionHawk

PARTNER: PRECISIONHAWK

FOCUS: Precision Agriculture

SOLUTION: Smarter Farming Package

Nitrogen (N) is one of the primary factors that determines realistic yield expectations for corn. Traditionally speaking, farmers tend to counter N deficiency through a process known as 'side-dressing' and treat their fields uniformly with equal amounts of nitrogen. This method wastes nitrogen on crops that don't need extra nitrogen and increases operation costs for crop growers.

By using the Smarter Farming Package developed by DJI and PrecisionHawk, drone data can now reveal where farmers need to sidedress their crops. Leveraging drone technology allows growers to make precise management decisions that can greatly impact their bottom line at the end of the season.

CHALLENGE:

Nitrogen side-dressing is very often a basic binary decision: yes, no, and how much? The conventional process (see image below) involves consulting last season's prescription with adjustments for losses, in addition to, various sampling methods such as visual, soil, or plant tissue.

However, the problem is that none of these methods can quickly or reliably determine precisely where to sidedress. This, in turn, prompts farmers to treat fields uniformly with the same amount of nitrogen.

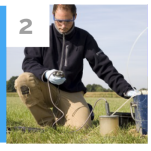
Moreover, corn prices are constantly in flux and range from as high as $8.00/bu in July 2012 to $3.05/bu in August 2016, for example. Meanwhile, N input costs vary from $40/acre to $60/acre, depending on target yield.

With volatile commodity prices and unpredictable weather conditions, farmers need to be able to gather information so that they can better optimize their yield within a set budget.

Conventional Process:

1. Consult last year's perscription, account for loss

2. Use N soil samples to further validate N deficency hypothesis.



3. Visually detect leaf firing. Sample verify across field.

SOLUTION:

In 2016, corn farmers across the US Midwest began using the Smarter Farming Package to better estimate how much N their fields really needed. The package is essentially DJI's Matrice 100 — equipped with one visual and one multispectral sensor — and PrecisionHawk's DataMapper InFlight App — a software platform for rapid drone image mapping and analysis.

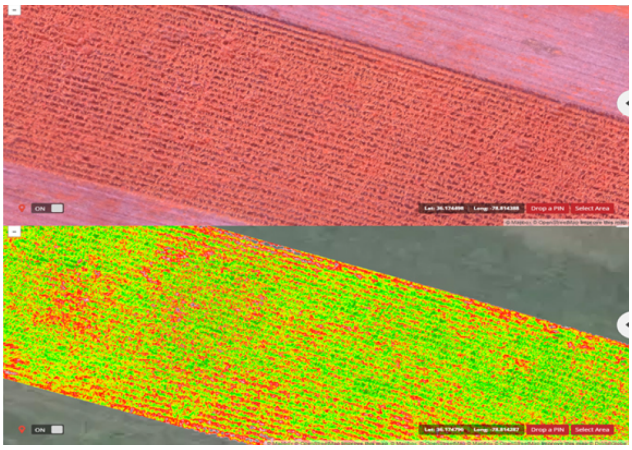
Remarkably, it took those corn farmers only 45 minutes to complete the flight for a 320-acre field at 400 feet. The images were then uploaded to DataMapper, where they were automatically stitched into an orthomosaic 2D map of the field.

Once the farmers had their maps, they used the Green Difference Vegetation Index (GDVI) algorithm in DataMapper. The output, shown below, indicated a high probability for N deficiency areas in red.

The farmers were then able to visualize the output of their surveys through shape files directly sent to their farm management platforms through the DataMapper API, which streamlined the process from decision making to precision application.

To find out their actual N deficiency rates and locations, corn farmers and their teams flew DJI's Matrice 100 drone at the start of V4 in mid-June, equipped with DJI's Zenmuse X3 multispectral sensor, which is able to record blue, green, and near-infrared bands.

The Smarter Farming Package (above) is a complete agriculture imaging solution for farmers and agronomists.



PrecisionHawk's DataMapper Standard uses a GDVI algorithm to indicate areas with a high probability of N definciency (above in red).

RESULT:

After ground-truthing a sample area and consulting their agronomist, those corn farmers had a complete picture of where N needed to be applied.

Furthermore, the entire process of drone flight, data upload, and analysis to N application was completed in just two days, as opposed to using the traditional approach, which took one week.

Those corn growers now only need to precisely target 30% of the land and save as much as $9.80 per acre, if the target yield remains 140 bu./acre.

DETECTING N DEFICIENCY

TRADITIONAL METHOD

1 WEEK

1. Consult Last Year Data, Followed By One Or All Of The Below:
2. Optional 3-5 Soil Samples
3. Optional 3-5 Visual Samples

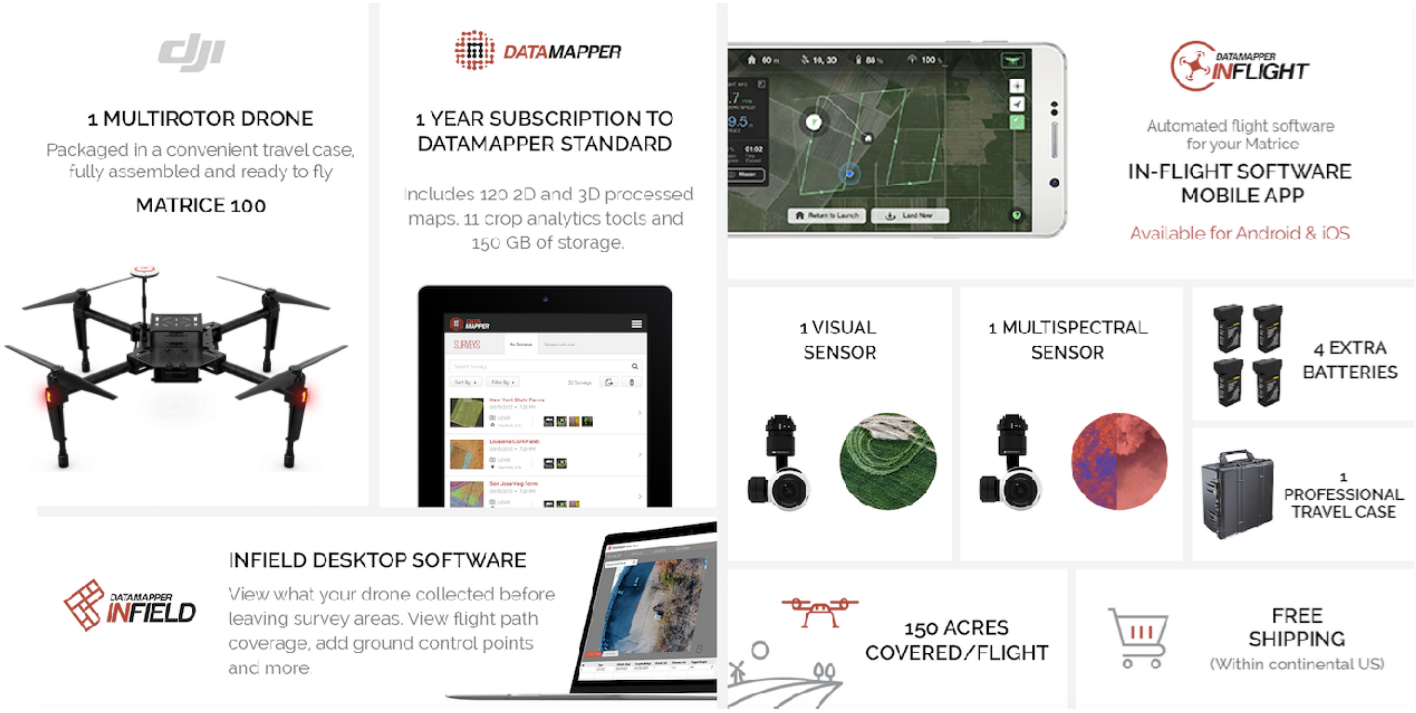
SMARTER FARMING METHOD

2 DAY

1. Fly DJI Matrice 100
2. Upload Images, Use GDVI Analyze In DataMapper
3. Ground Truth Sampling

DECISION TO APPLY N

Smarter Farming Package Includes:



Reach out to DJI or PrecisionHawk to start using drones for precision agriculture:

DJI Enterprise: enterprise.dji.com/contact-us

PrecisionHawk: http://www.precisionhawk.com/contact

Learn more about commercial applications of drones at: enterprise.dji.com