

# A Grain of Truth

Accurate infield weather and crop data improves spray recommendations, enabling enterprise brand enhancement, cost savings to end users, and environmental benefits to all.



## THE CUSTOMER

xarvio™ Digital Farming, a division of BASF, is a crop management solution and Arable channel partner with over 17,000 customers in more than 100 countries across the globe.



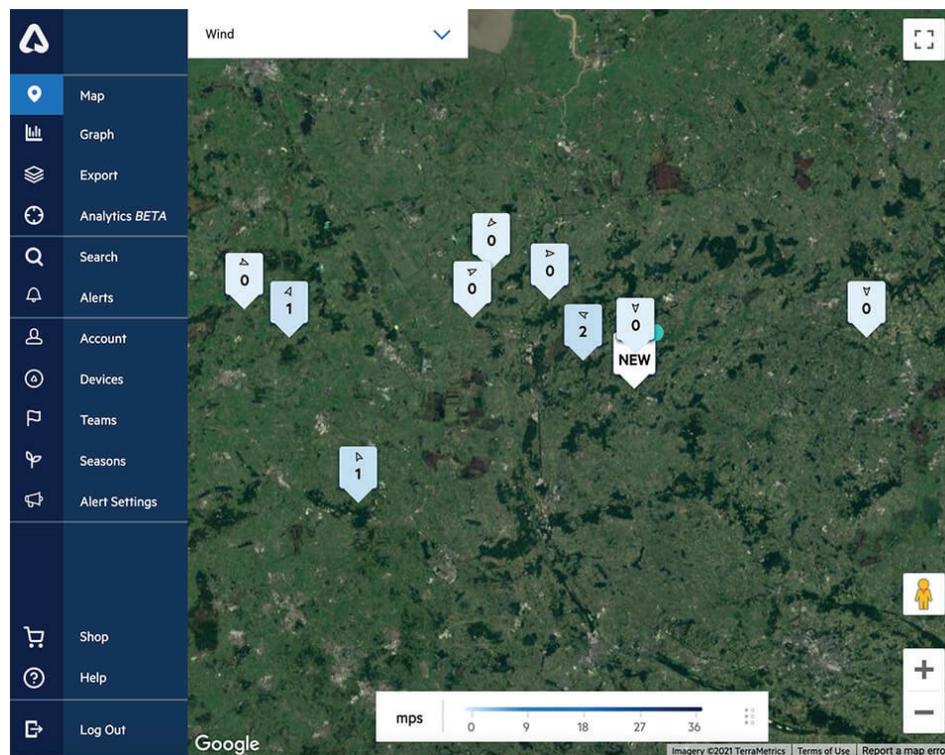
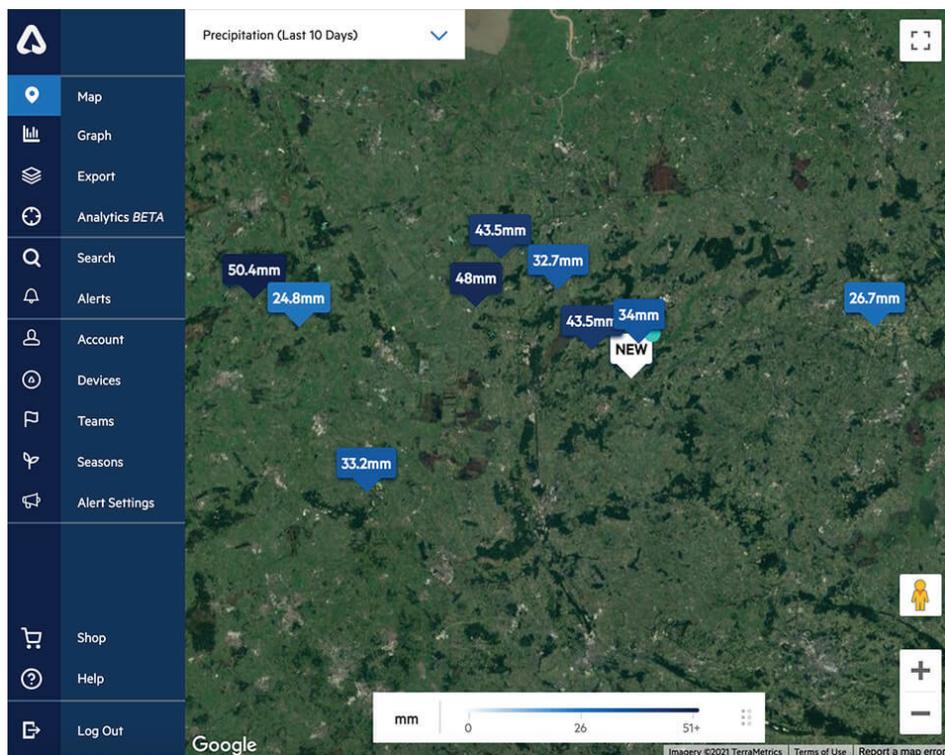
## THE DEPLOYMENT

196 devices | Europe, Canada, Brazil | 2017-2021

## KEY TAKEAWAYS

- Global agricultural enterprise field management software solution provider was looking for infield weather data to improve spray recommendations.
- Ill-timed spray applications are ineffective, cost growers extra money, pollute the environment, and erode brand loyalty.
- Simple and accurate infield weather improved crop protection, pinpointed a more precise spray window by 12 days, reduced costs and amounts used by 30%, and boosted app engagement.





A sample size of Arable deployments that participated in a xarvio™ European field trial, which began in 2017 to measure infield weather for spray timing.

## The Customer

xarvio™ Digital Farming, a division of global chemical company BASF, is an Arable channel partner with over 17,000 customers in more than 100 countries. The xarvio™ crop management solution includes FIELD MANAGER, an app that helps growers plan spray applications and maximize crop health in corn, soybeans, winter wheat, spring wheat and canola.

## The Deployment

In order to run a trial for a future integration of Arable with xarvio™ FIELD MANAGER, BASF reached out to a selected group of wheat grower customers in France, Germany, and the UK to beta test the technology for spray timing recommendations. To achieve a robust sample size, they deployed Arable Mark devices across more than 100 fields at the start of the 2017 season.

## The Challenge

Crop protection applications are a large part of a broadacre grower's budget, yet shifting climate scenarios and pathogens' adaptive resistance can make the optimal spray window a moving target. Mistimed spray comes at great expense to the farmer, in the form of sunk costs and decreased effectiveness; and also to the ecosystem, with runoff contamination possible if a spray is applied right before a heavy rain. xarvio™ is a global operation with tens of thousands of growers across time zones, geographies, and cultures, each with their own needs, methods, and microclimates. Maintaining customer trust and delivering a high quality product into so many people's hands demands a paradoxically scalable yet deeply personal touch.

## The Goal

BASF's mission with xarvio™ is to provide customers with trustworthy weather and crop data to enable their recommendations for disease risk, spray timing, and variable rate application. They used remote-sensed weather to power their models, but wanted to dial in accuracy with an infield solution that was easy to deploy and maintain, provided broad data about the crop and environment, integrated seamlessly with their offering, and enhanced their brand. If Arable's infield weather data could improve the xarvio™ spray recommendations, they could achieve the kind of hyper-customized accuracy on a wide scale that is essential to today's global enterprise.



# The Strategy

At the start of the 2017 season, BASF deployed Arable Mark devices in wheat across a variety of microclimates to collect critical field-level metrics like leaf wetness, precipitation, temperature, and vegetative growth. Leaf wetness is a proxy for disease risk, since wheat is prone to pathogens in hot, wet, and humid conditions. Beyond knowing disease risk, growers must also know when is an optimal time to address the risk. If it is a windy day, the spray will blow away, dispersing before reaching the crop it is meant to protect. If it is a rainy day, it will wash off before having any effect, possibly into local waterways, with unknown downstream consequences. And finally, growers will want to assess plants' response to the applications, which can be interpreted through growth indicators like NDVI and chlorophyll index.

Each field had two devices in the trial, in order to compare data for anomalies. The trial ran for two years to capture Arable's performance through the full spectrum of weather fluctuations and management operations. BASF selected a subset of some of their most innovative customers who could be trusted with scrutinizing how the new infield weather data compared with the current remote-sensed data, and provide unvarnished feedback on their experience with the new technology. They would be asked not only about data accuracy, but about user experience; if BASF were to partner with Arable, they needed to know that the technology would be simple and scalable in order to put their weight behind for their own customers. Similar, smaller trials also ran in Argentina and Brazil.

Arable's data and crop analytics were provided in real time, and integrated with recommendations to customers. Customers accessed the data in the familiar FIELD MANAGER interface, connected on the xarvio™ backend through the Arable API.



# The Results

Even before the conclusion of the trial, results showing how valuable the infield data was to the growers were promising, but anecdotal. To codify the results, BASF put out a survey to all xarvio™ trial participants to gauge effectiveness, the overall user experience, and the potential for using Arable company-wide.

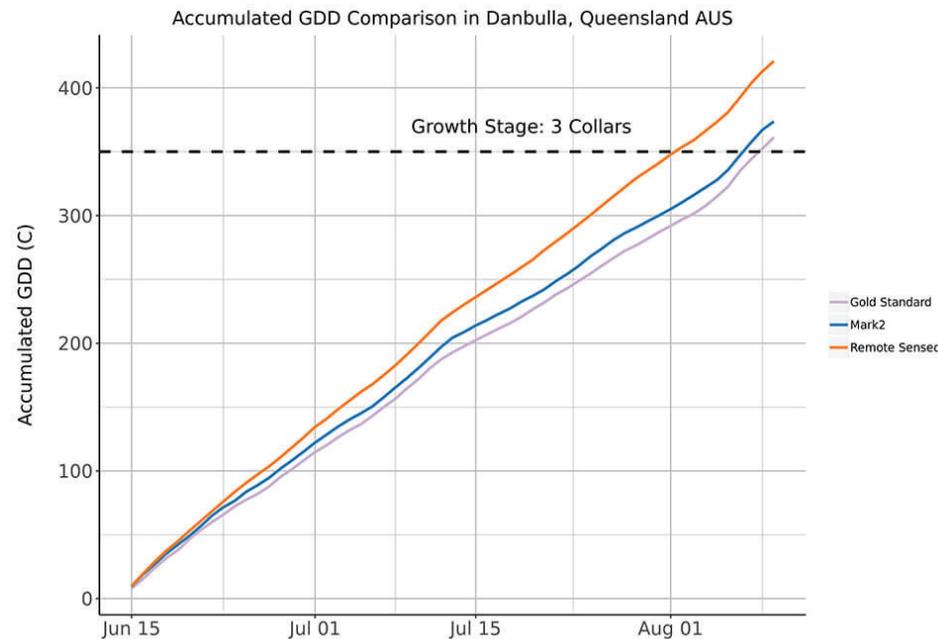
The survey found that previous, satellite-based spray recommendations were an average of 12 days earlier than Arable's

infield data showed. Farmers know when a crop is at a growth stage ready for protection through calculation of growing degree days, based on local temperatures. However, if the nearest weather station is 20 km (12-1/2 miles) away, or if the weather is measured via satellite, small daily differences in microclimate will add up over the course of a season. By the time a crop is ready for

spraying, the estimated growth stage could be days off. Having infield weather eliminates this uncertainty.

The survey also found that correcting this discrepancy by spraying in the Arable-recommended window led to more than a 30% reduction in spray, and an average savings of \$75 per hectare (\$30 per acre) without crop performance impact.

80% of users surveyed found the system useful or very useful to their daily practice, and 81% of farmers rated Arable's simple installation process easy on a scale of easy-medium-difficult. 84% of farmers considered the integration into xarvio™ FIELD MANAGER useful or very useful, and 82% of respondents opted to continue to use Arable system, finding it as convenient as the hands-off remote weather data, and more accurate.



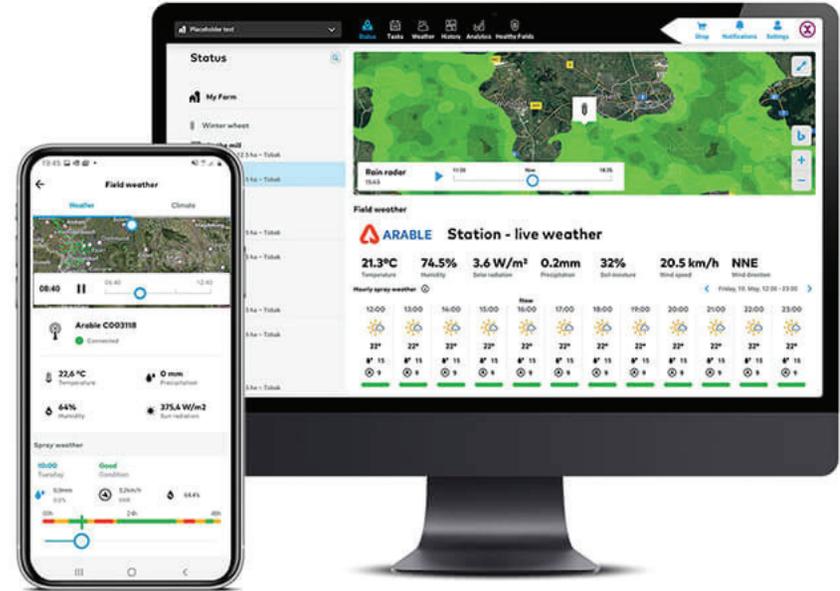
A 2020 comparison at an Arable Cal/Val site in corn in Australia co-located an Arable Mark 2 with a gold-standard weather instrument to compare infield growing degree days (GDD) against satellite-derived measurements. The study found that Arable's data resulted in GDD of about one day earlier than the gold-standard, and remote-sensed GDD were about seven days early.



# The Outcome

With such high satisfaction among survey respondents, xarvio™ released Arable into its FIELD MANAGER offering. As a result of the ease of installation and instant access to accurate and relevant data, xarvio™ saw a 200% jump in engagement for FIELD MANAGER customers over previous seasons.

“We have extensively tested Arable’s Mark over the last two years and are convinced that with this integrated solution we will support our customers to be more profitable and sustainable,” says Jeff Spencer, BASF Digital Farming Head of Technology. Arable’s hardware and software are now offered to all xarvio™ customers, including an upgraded model that includes soil moisture and wind speed & direction, for use with the platform or the Arable Web & Mobile apps.



“We are convinced that with this integrated solution we will support our customers to be more profitable and sustainable.”

**JEFF SPENCER**  
**BASF DIGITAL FARMING HEAD OF TECHNOLOGY**



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