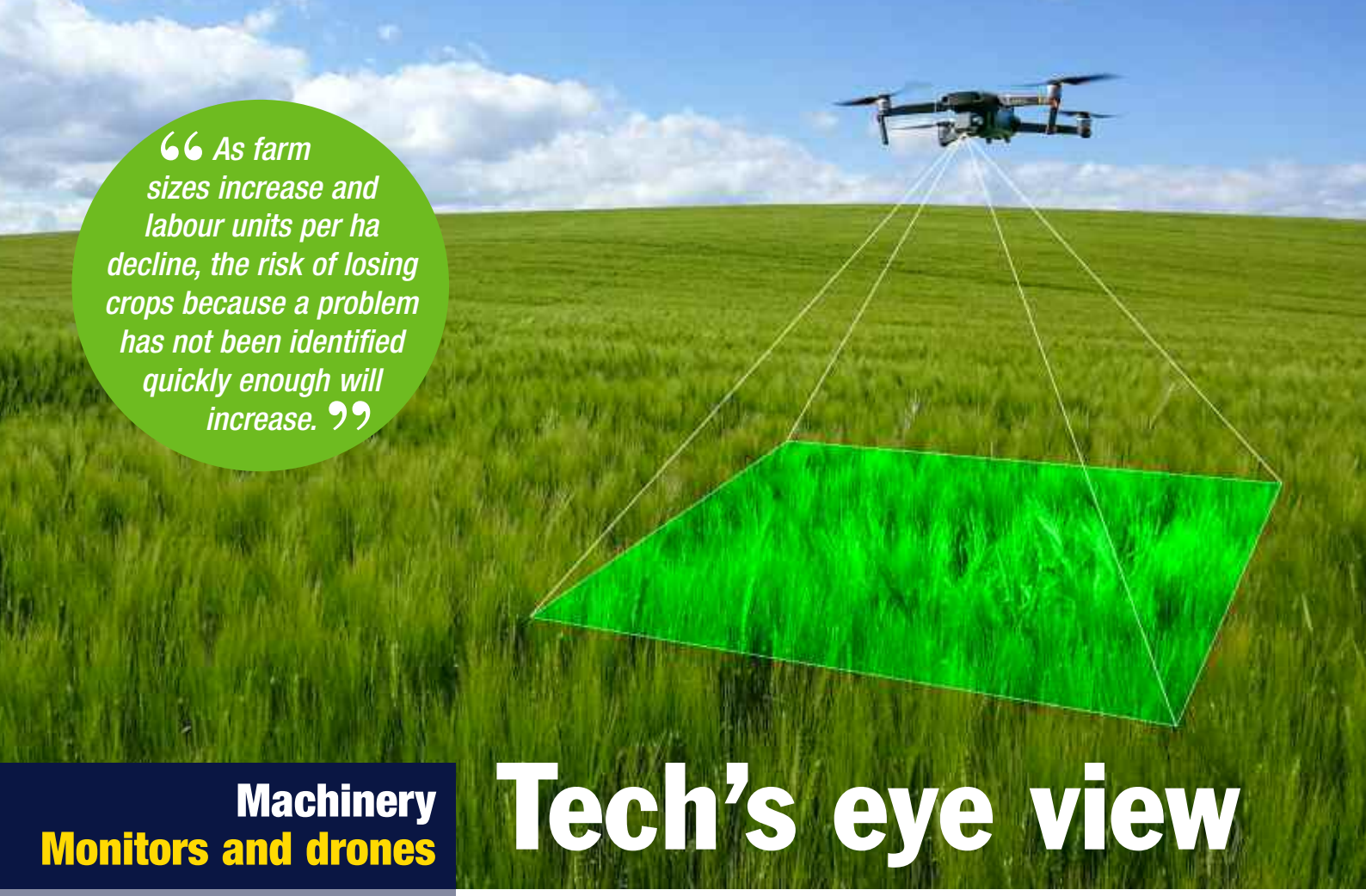

> *“As farm sizes increase and labour units per ha decline, the risk of losing crops because a problem has not been identified quickly enough will increase.”*

Machinery
Monitors and drones

Tech’s eye view

Crop monitors and drones are aiding precision farming across the globe. *CPM* takes a look at some of the latest and greatest tech on the market.

By Charlotte Cunningham

Most of us will have an old phone sitting in a drawer somewhere. No camera, certainly no mobile data connection, and if you’ve had it for a really long time, it may be of similar size to your face, with a pull-out aerial intact.

So it’s perhaps rather mind-boggling to think that these are still around at a time where we now have tiny little devices flying through the sky, telling us everything we need to know about our crops.

Precision farming is now standard practice on many farms, with growers able to measure exactly what’s happening in a field at any given moment thanks to the rapid development and accessibility of crop monitors and drones.

This, combined with expert support from agronomists, is widely accepted to be driving better decision making and more efficient and cost-effective input decisions.

But in a fast-moving sector, keeping up with the latest developments can be slightly daunting.

To guide growers thinking about investing in crop monitors or drones, *CPM* has delved deeper into the detail of some of the key products on the market.

Omnia Plant Vision

With new updates expected later this spring, Omnia’s Plant Vision claims to be a cost-effective and reliable way to gather crop biomass data, explains Oliver Wood, Hutchinson precision service manager. “Measuring the green area index of a field allows growers to take real time measurements of the canopy during the crop’s life.

“Known as remote sensing, this measurement relies on the reflection of light from the leaf surface and specialist machinery has been developed around this concept that measures crop reflectance at different levels.

“However, to date this capability for real-time remote sensing has often been compromised due to unreliable satellite imaging, and the high cost of the specialist sensor equipment.

“Real time measurements of crop biomass are notoriously unreliable as there are so many factors that can affect the readings — crop layers, growth stage, the angle of the sun for example all have an effect — so you could be paying an awful lot of money for technology that is not really working.”

As a solution to this, Omnia’s Plant Vision sensor system is based on NDVI reflectance sensors, explains Oliver. “Data collected through Plant Vision correlates strongly to the Leaf Area Index and Green Area Index and is the same as NDVI data collected from other sensor systems or satellites.

“This data can then be run to create shapes that represent differences in green area index across a field, from which biomass maps can be developed and used in the Omnia Precision Agronomy system.

“If data has already been collected through another system, that can also be

Omnia’s Plant Vision is claimed to be a cost-effective and reliable way to gather crop biomass data

Available for farmers from March this year, Skippy Scout is a new crop monitoring app from Drone Ag that's scooped a number of awards even before its commercial launch.

brought in and used within Omnia."

However, the true value of Plant Vision is the ability to use the biomass information in conjunction with other field characteristics to explain or verify yield potential through Omnia, he adds.

Using the data in this way can help to answer the question of whether or not to increase inputs on a poor or high-performing area of a field. "It's not about aiming for an even crop, it's about managing the agronomy of particular areas of the field that require a more prescriptive approach to push for optimum yield potential.

"For example, at the beginning of the season, regular biomass measurements will allow the user to look at how the crop has tillered and where this is poor it may need additional early nitrogen. Later in the season the better performing areas of the crop may need pushing and this justifies more nitrogen."

The system can be mounted to any machine, but commonly it's used on a sprayer, he adds. "A typical installation would be four or six sensors mounted to the sprayer boom and a simple controller in the cab. "Plant Vision is incredibly accurate as it can collect measurements each time the sprayer passes through the field during the season — there's no need for expensive machinery or extra passes through the field and it allows the farmer to decide when they want to collect the data."

Drone Ag Skippy Scout

Available for farmers from March this year, Skippy Scout is a new crop monitoring app from Drone Ag that has scooped a number of awards even before its commercial launch — including the Gold Innovation award at LAMMA in January.

For those who are yet to come across it, Skippy Scout uses artificial intelligence to offer guidance on crop health, pests and weed control, significantly reducing the time it takes to monitor and evaluate crop problems, says founder, Jack Wrangham. "Skippy Scout is an autonomous software package that flies drones to points plotted by the farmer using a normal mobile phone. Farmers don't need to have prior understanding of drones or the ability to fly a drone because the software will do it all for them.

"Skippy users will use maps on their phone to simply touch the points in a field they want to see images of. The drone flies to these points and sends the images to the phone. Once delivered, the artificial intelligence in the app analyses the images and provides data on green area index (GAI), pests and weeds."

Jack and his team have spent the past 18 months developing the software and during 2019 worked with 200 triallists. These ranged from farmers and agronomists to universities such as Harper Adams.

It's Jack's belief that drones are an essential tool for farmers ▸

Data collected through Omnia's Plant Vision correlates strongly to the Leaf Area Index and Green Area Index and is the same as NDVI data collected from other sensor systems or satellites.

▸ today and that in the next five years, drones will help to provide much of the information needed to aid precision farming decisions.

"Farmers have always walked their crops. However, the time available to do this in the traditional way is diminishing. As farm sizes increase and labour units per ha decline, the risk of losing crops because a problem has not been identified quickly enough will increase. Skippy Scout offers every farmer the chance to see and evaluate crops easily and efficiently using just a phone and a drone."

With the software newly launched onto the market, those wanting to invest are looking at an estimated cost of £30/month for a single user software licence, adds Jack. "This is less than the average mobile phone contract and there's also relatively little investment needed to buy a suitable drone.

"A Mavic Mini is a perfectly suitable drone for crop scouting and can be bought for just £450. This would make the annual use of Skippy £810."

A key benefit of the Mavic Mini is its weight, says Jack. "At just 249g it falls one gram below the threshold for registration."

Drones under 250g do not need to be registered with the Civil Aviation Authority which will save farmers time and hassle with paperwork, he explains. "All you need is your smartphone and a drone. When you register for Skippy you can be in the air monitoring your crops on the same day."

Drone Ag has also considered the likelihood that the drones may be damaged and to ensure smooth, easy usage, a partnership with drone specialists Heliguy means that Skippy Scout users will be offered replacement drones, and repairs to damaged drones, adds Jack. "It's important that farmers don't experience significant downtime with any piece of farm machinery and drones should be no exception." ▸

Collaborations push weather-data performance

Sencrop — pioneers of on-farm weather data — has announced a number of changes over recent months that are set to push the performance of the systems even further.

For those who haven't come across the firm, Sencrop's solutions are used to help farms in their day-to-day decision-making, using ultra-local data collected automatically from individual 'smart' agro-weather stations.

By analysing this data, harvested from what Sencrop claims is the largest agro-weather and sensor stations network in Europe, growers can optimise management of their agricultural operations by minimising health risks to crops through weather, and environmental factors.

In practical terms, a farmer within the Sencrop network can select a data station and retrieve all relevant weather data on an ultra-localised basis. They can also make available their data and, in return, have access to other farmers' ag-weather data.

In February, Sencrop announced the acquisition of sensor specialist Visio-Green which they hope will create a more accessible tool for growers. In a statement, Sencrop's co-founders, Michael Bruniaux and Martin Ducroquet, said: "This partnership will enable us to help Visio-Green customers adopt a more collaborative and universally accessible tool. They'll have access to the Sencrop app, which is specially designed for use by communities and to promote agronomic services to farmers. Sencrop will be rolling out its Visio-Green station migration process over the coming months."

As well as this, Affinity Water, the UK's largest supply-only water company started using the network in sensitive catchment areas. "The stations — in a shared, private network — help farmers address stewardship issues on active substances such as carbetamide and propyzamide, optimising the timing of their spray applications," says Sencrop.

Propyzamide and carbetamide have very few viable alternatives, but if water companies have to cease groundwater abstraction temporarily because of a spike in detected contaminants, there will be no alternative but to import water from neighbouring areas, at significant expense, says Danny Coffey, catchment office for Affinity Water.

"Much of this catchment area comprises the heavy clay soils favoured by blackgrass, and we want to support farmers by providing additional technology and information to support the development of robust IPM plans that can incorporate more sustainable and effective use of these actives.

"We're hoping that the weather insights provided by the Sencrop network will be a tool that will truly benefit our farmers and help them make more accurate, more timely spray applications."

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Sencrop has announced a number of changes and mergers over recent months that are set to push the performance of the systems even further.

Xarvio Scouting

Also making waves in the crop monitor department is the xarvio Scouting app.

It's claimed this free-to-download software can detect in-field stress by simply analysing a photo taken using the app. The technology determines weeds, classifies and counts insects in a yellow trap, recognises diseases, analyses leaf damage, estimates crop emergence and shows the nitrogen uptake.

New features for 2020 include the Multi-Weed Identification function which was showcased at LAMMA earlier this year. This function helps farmers to identify various weeds with one picture, by providing an automatic assessment of the weed spectrum. Farmers also get an automatic evaluation of number of weed species per m^2 and weed coverage, says xarvio.

According to the firm, the algorithm has a 48-100% rate of accuracy in identifying more than 115 types of recorded weeds.

"Almost all (96%) of the 115 broadleaf weeds are identified with an accuracy rate of over 80%," explains Luke Pollard, implementation lead at xarvio. "The app relies on machine learning to improve its ability accurately detect what it sees. Therefore, the more images it receives, the better it will get."

Also new this year is the Crop Emergence Analysis function which provides users with an automatic analysis of number of plants emerged per m^2.

"By comparing the number of emerged plants with the target rate, you get an estimation on initial growing performance. You can then decide if adjusting the nutrition strategy or planting a new crop is necessary," says Luke. ■

Top tips for agri-tech investment

Farmers' developing interest in agri-tech was clearly demonstrated in a survey conducted by NFU Mutual in December last year, which revealed that 32% of respondents said they were most intrigued by robotic and data agri-tech developments; closely followed by drones (30%) and autonomous tractors (24%).

"Our research shows that many farmers are open to investing in agri-tech — but are holding back because of concerns about the risks involved, whether they will choose the right systems, and that new tech will prove durable in farm conditions," explains Fang Wang, NFU Mutual business analyst.

To help growers overcome these barriers, NFU Mutual have offered some top tips for farmers planning agri-tech investments:

- Take a long-term approach — start by reviewing the farm's strategy and then identify how technology and using detailed data could help you achieve your goals
- Explore technology systems that integrate not only the farm's activities but also its supply chain, creating opportunities for farmers, food processors and retailers to work together
- Keep up to date with developments and ensure you have the management skills to adopt technology and successfully master the opportunities available from data-based farming
- Consider working with other farms, as co-operation can help achieve economies of scale both in the use of new technology and the adoption of a farmer-friendly supply chain
- Farm data is an asset — recognise its value and be very careful who you share it with.

Xarvio's free-to-download software is claimed to detect in-field stress by simply taking a photo.

A LONG WAY TOGETHER

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