



## Southern Counties Farming & Machinery Show

# Roll out the robots

The first Southern Counties Farming & Machinery Show opened its gates to visitors at Newbury Showground in November and *CPM* attended the inaugural event to hear how robots have transformed one East Anglia based farm.

*By Melanie Jenkins*

**Machinery might have been the focus at the show, but the future is likely to include the increasing presence of robotics.**

Speaking during one of the seminar sessions held on the day, Andrew Williams detailed how robots had helped to transfer operations at Home Farm, Nacton in East Anglia, while he was farm director there.

Although Andrew stepped back from this role earlier this year (2023), he has stayed on as an advisor and was integral to the adoption of robots in the day-to-day operations in 2021. The tenanted farm consists of 1950ha of arable and vegetable production near the river Orwell, where the land is light and so heavily irrigated. Cropping is diverse, consisting of 30 different crops, including onions,

potatoes, brassicas, cabbages, cauliflower, winter barley, winter wheat and vining peas.

Around 10% of the land is farmed organically and this is what really drove the move into robots, says Andrew. "There's a lot of labour on the farm, with around 50 employees in total, 20 of which are field staff who hand plant, rogue and harvest crops. Since Brexit, the challenges sourcing labour have been exacerbated and so we decided to explore the opportunities presented by robotics."

### Juggling jobs

"We were also struggling to get in as many passes as we wanted with the weeding hoe and comb harrow during the early stages of crop development, as well as managing the pressures of irrigating these crops and juggling harvest alongside weeding in July, August and September," he explained.

While weighing up the financial viability of continuing to grow certain crops, such as organic onions, it came to Andrew's attention that there was a commercially available robot that could weed crops and reduce the requirement for manual labour. "We got in touch with the Agrobot team in Denmark who had created Robotti. The engineers in the team had farming backgrounds, so they understood the challenges that we faced."

The farm took ownership of its first Robotti in April 2021 and the comb harrow

*"If it weren't for introducing the robots, we wouldn't be growing organic onions anymore."*

was adapted to work with it. "To all intents and purposes the Robotti is an autonomous mini tractor with a three-point linkage, hydraulic system and a PTO. It



*Andrew Williams introduced robots to Nacton Farm to help make crops financially viable and deal with labour shortages.*

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runs off two Kubota engines — one on each side — and can operate for 26 hours on one tank of fuel. One engine drives the three-point linkage and propulsion and the other looks after the PTO and spool system.”

Work plans are compiled using maps on an iPad and the user can indicate where they want the robot to lift up and put down, as well as turn. Maps are directly emailed to the machine and once started it'll then carry out the task.

The Robotti has been fitted with a number of safety features, including a red stop bar and a LIDAR system so that it'll slow down if an object comes within 3m of it and will come to a complete halt when this reduces to 1m. “It has a fail-safe for about every situation but sometimes this has kicked in in response to dust clouds, but a software patch has now solved this issue,” explained Andrew. “We can monitor it using a mobile but it's still good to go and check on it throughout the day to ensure it's working well.”

The farm also decided to buy a small rotavator which could be fitted to the Robotti because it didn't have any work to do in the spring. “This allowed us to use the robot to destroy our organic cover



*The Robotti has been fitted with a number of safety features, including a red stop bar and a LIDAR system so it'll come to a stop if an object gets too close.*

crops by passing through them two or three times.

“We also adapted a slightly wider cultivator so that this can be used on the robot from November through to January in fields that were destined to be used for both conventional and organic potato production where we suffered with wireworm issues,” he detailed. “Wireworms

can bury themselves within one minute of being brought to the surface, so by having the Robotti disturbing the ground regularly, it allowed birds to feed on them more and we think it's helping to reduce the population of the pest.”

One of the biggest benefits of the robot is that it can run for 24 hours a day, said Andrew. “We can set it up to do repetitive ▶

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One of the biggest benefits of robots like the Robotti is that they can operate for 24 hours a day.

► tasks and it'll just do them over and over without requiring a break. It can be operated with a remote control, but if we have to move it down a road, we put it on a low-loader to transport it."

Since the farm's original investment, a newer version of the Robotti has been launched — the LR — which is double the width of the original at 2.6m. "Along with Kuhn, Agriointelli has developed an implement that will hoe in between cabbage plants which has allowed us to eliminate the requirement for manual weeding. It also has just one motor and a larger diesel tank, meaning it can run for longer."

After having success with the Robotti, Andrew decided to invest in a FarmDroid robot. "This is solar powered and operates at a walking pace and is able to plant seeds using GPS. It records where every single seed has gone which means it can go back to the field later in the season and hoe in between the plants."

At the time of introducing the FarmDroids to the operations, the farm was growing organic fodder beet and onions which were proving difficult to

make financially viable. "We brought the FarmDroid to the business in an attempt to change this," he explained. "Initially we drilled 6ha of onions using it and had to plant three seeds per slot because the robot could only go down to a certain spacing. It was a slow process with weather interruptions and ended up taking us about eight days to do."

## Second robot

Once this was complete, he then adapted it to drill fodder beet. "It's recommended that each FarmDroid can cope with 20ha of fodder beet per year, but every time we changed between crops it took us half a day to adjust the robot. Subsequently, we pushed the robot too hard and ended up with a reasonable crop of onions and a dirty crop of fodder beet. So we decided to purchase a second robot.

"We now plant 8ha of onions using the one of the FarmDroids, which it then weeds until the crop gets too tall. At this point we set the robot to drill red beet and do the weeding in that. The second robot is tasked with drilling and weeding all the fodder beet," said Andrew.



The FarmDroids rely on a base station on the farm for data transfer and everything from seed spacings to how close the weeding knives get to the plant can be controlled.

The FarmDroids rely on a base station on the farm for data transfer and everything from seed spacings to how close the weeding knives get to the plant can be controlled. "The advice is to weed in one direction and then when the robot turns around, go back again."

Being solar powered, the FarmDroids usually run out of power by 11pm when used in March, so the farm has two sets of batteries for each, so that one can be charging during the day and swapped over with the dead battery at night. "But from mid-May onwards, one battery will run all through the night on the power it's gained during the day."

One limitation with the FarmDroids is that they can only drill small seeds, admitted Andrew. "But the firm is looking at the possibility of the robot being able to plant peas, beans, lentils and maize."

Of the two types of robots the farm has, he feels that the FarmDroid has been the most successful. "We've had very little trouble with them and very few crop losses. The Robotti has been more challenging because we adopted it at such an early stage in its development, plus it's faster and more powerful. We had one occasion with the mounted hoe where it jammed in one direction and wiped out some of the crop before we could stop it. However, at this point the Robotti and hoe couldn't talk to one another, but this has since been fixed, so now if there's a fault with the hoe then the robot will stop."

Before investing in the robots, the farm was spending about £1000/ha on hand weeding organic leeks and brassicas, but now, if the weather falls right, this can be reduced to zero, he said. "And even if we wanted to, we couldn't source this labour now. Additionally, if it weren't for introducing the robots, we wouldn't be growing organic onions anymore because the cost of production just wouldn't stack up. The FarmDroids are what's made it possible for us to keep growing them."

However, he feels that the Robotti is still a work in progress and the farm hasn't quite found the right niche for it yet.

Although Andrew hasn't seen himself as a pioneer when it comes to new agricultural technology, the early adoption of robots was something the business had to do to overcome the challenges it faced. "The successful adoption of this technology is also down to the attitude of the farm manager and the staff — without them being on board, it wouldn't be possible." ■