Small, simple machines that do simple tasks, very well.

What is Swarm Farming?

Swarm Farming operates on the concept of swarms of small machines completing simple tasks, completely autonomously. Affectionately known as 'SwarmBots', they allow operation day or night in ideal conditions. Take spraying for example; no more getting up at 2am to spray because if you don't you will miss the ideal weather window. SwarmBots do the hard work for you.

Why Swarm Farming?

The increasing drive for efficiency in recent years has led to bigger machines. While this has improved time use efficiency and saved some labour costs, it has also increased our cost of capital, production risk due to single machine failure, and increased compaction. Swarm Farming turns all this around.

Swarm Farming creates a platform for the use of high tech equipment to monitor, assess, and treat crops. Andrew Bate has fitted WeedIt technology to his prototype SwarmBots, allowing them to autonomously spray weeds around the clock.

Additionally, in the near future, high definition cameras with weed and insect identifying software will be added to the SwarmBot booms to monitor and assess crops as they are being sprayed. Research is currently being undertaken in this area at Gatton University in Queensland. Robotics researchers have fitted cameras to centre pivots to assess crop growth stage, health, and insect presence as they irrigate the crops. Early results are promising. This data will then be fed back to the grower and agronomist to make recommendations.

What are Swarm Farming's benefits?

There are many benefits of Swarm Farming including scaling, redundancy, precision, improvements in operating costs, and reduced compaction.

Today, if we want to expand our farm we generally look to bigger machines, or multiples thereof. The problem is, if one 36m self-propelled sprayer is too small, two sprayers can be overkill. So we either have to scale our operation to two sprayers, via buying more land or leasing, or look at contracting to achieve optimal use efficiency of those machines. This adds cost and risk to our operation. With SwarmBots, we could have 10 SwarmBots with 6m booms running around the farm. If we wanted to buy or lease the block next door, we could buy one or two more SwarmBots to take up the extra capacity requirement.

Having multiple units also adds the benefit of redundancy, or backup. If we have one big 36m self-propelled spray rig, and it breaks down, everything stops. If one of the 10 SwarmBots breaks, nine are still going, not missing the critical spraying windows while we wait for repairs or parts.

SwarmBots clearly lifts the bar on technical expertise needed to operate and maintain them. Andrew has already taken this into consideration. In terms of use, the SwarmBots will have simple easy-to-use software, much like we are used to on our Ipads. On the technical side, parts of the SwarmBot would be component units. If one component unit broke, you would just replace it with a spare and send the defective one for servicing-much in the same way as you can replace a monitor or keyboard for your desktop computer.

Small, simple machines that do simple tasks, very well. (Continued)

For the past few years the Patricks Port Facility in Brisbane has been running fully automated container cranes called Autostrads. Aside from the obvious employment cost saving, another surprising cost saving was reduced maintenance costs. Think about how many times you have heard of a worker running a machine into trees, fences and rock piles. Intelligent software and sensors prevent this occurring with SwarmBots.

Reductions in compaction are another benefit. Andrew estimates that each SwarmBot will weigh around 500kg, so, when compared with a 20-ton self-propelled sprayer, it's a significant reduction in the compaction footprint in the paddock. It would create no more compaction than a cow and arguably less erosion because SwarmBots have wheels, not hooves.

So how do they work?

The SwarmBots are programmed to operate in a defined area (e.g. a paddock) as well as to follow tracks around the farm to and from fill points. Within those set areas, the SwarmBot software will calculate the most efficient way to complete the assigned task.

To help with completing these tasks SwarmBots have cameras, GPS and other technical equipment. The software that drives the SwarmBot uses cameras to identify obstacles, navigate its way around them and to get back on track.

So why not automate bigger machines?

The technology to drive and operate bigger machines autonomously has been around for about 10 years. The main reluctance to fully automate a 600hp tractor and seeder is largely the risk of the machine going AWOL. If the tractor decided to drive into town to pick up the kids from school, seeding all the way and taking out the petrol station, who would be at fault?

While there are significant fail-safes built into these machines, a 500kg SwarmBot would do significantly less damage if things went awry.

Automated vehicles are significantly safer than their human driven counter parts. Google have been operating seven fully automated cars in San Francisco for the past 5 years or so with zero incidents. These cars were taking pictures for Street View and had a human as backup.

How soon will we see SwarmBots in paddocks?

Andrew plans to have a first generation of SwarmBots running on farm in early 2015, with demonstrations to follow around the country.

At this stage, Andrew thinks SwarmBots will be similar in price to a Hilux ute. Like any new technology, price tends to come down with time.

For further information check out the swarm Farm website at www.swarmfarm.com

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