Case study: Automated lasers for bird control – Summerhill Road Vineyard

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Product: Agrilaser Autonomic

Reason: Grape damage due to birds

In use since: March 2016

Summerhill Road Vineyard is located within the Canberra district. We grow Riesling, Sauvignon Blanc, Merlot and Pinot Noir grapes. The vineyard was planted in 1996 and we took over the vineyard three years ago.

This was part of a dream to transition from my current role as an IT architect to realise my passion for wine and country living. As with all transitions I have tried to apply my existing knowledge in developing technology solutions and connecting this with what I am learning through viticulture studies at CSU and the day-to-day running of our vineyard, this is what resulted in my trialling lasers as an alternative to netting.

Our vineyard is planted over a relatively small area – 8 acres – making protecting grapes from birds a critical requirement to ensure the quality of grapes and achieve a high yield. Birds, such as starlings, cockatoos, currawong, crows, rosellas and wattlebirds, damage the grapes. Without any bird control, this can lead to a significant reduction of crops (1–2 tonne per week) and increased risk of disease (reducing the quality of the fruit).

Historically, birds have been controlled with netting. The vineyard was 100% netted as lower cost options such as using gas guns are not practical given the vineyard is situated close to neighbours, including a number of horse farms, resulting in approximately $4,000 in annual labour costs. The nets that we inherited are 15–20 years old, full of holes and degraded from sun damage. The result is that I am faced with needing to replace the nets at an estimated cost of $20 k, depending on the density of the nets, or finding an alternative.

It was at this point I decided I would start with replacing a portion of the nets to maintain the vineyard, and look for a better long-term solution. My first attempt was using drones and bird humming wire, which were somewhat successful. However, the drone is required to be under the control of a person (even when running via GPS waypoints) and so requires a commitment to fly regularly to deter the birds. This was fun in the initial stages, but when the drone happened to decide it was time to descend rapidly (aka crash), I realised a replacement for nets needed to be robust and reliable. This ruled drones out as a viable option in the short term.

Partway through the 2016 vintage, a colleague of mine with whom I had been talking about the issues with bird control and my trials with drones, sent me a link to new laser technology (Figure 1) that was developed out of the Netherlands for controlling birds in airports. It had been adapted to agriculture and used successful in blueberry farms and getting some significant traction in Europe and America. It had undergone trials in similar environments, but as it hadn't been deployed in a commercial sense in a vineyard it was a world first and exciting to work with a cutting-edge technology.

Figure 1. Mounted Agrilaser ready for positioning in any outdoor situation.

How does the technology work?

The principal behind the technology is based on using a high-powered laser that the birds perceive as a large stick. The birds perceive the laser in the canopy as a physical threat and treat the area as unsafe. The laser is combined with a heavy-duty pivot and tilt security camera and software for programing the unit so that it has continuous movement throughout the controlled area.

The unit is programmed by setting waypoints and times when the program should be active. This way, the laser can be directed to the areas where it is required and avoid shining outside the area to be controlled. As it is automated, it is able to repel birds whenever required which, in a vineyard environment, is from just before the sun rises until soon after sunset (Figure 2).

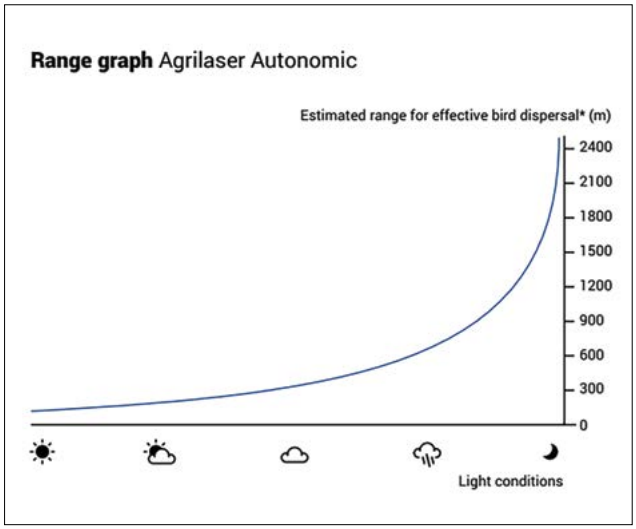

Figure 2. The graph highlights the effective range of the Agrilaser under different light conditions.

The laser is able to repel birds from a range of approximately 300 m to 2.5 km, depending on the time of day and the terrain. Based on the area of a circle, this is able to protect and area upwards of 28 ha.

Trial details

The trial was conducted in the last five weeks of our vintage – from early March until the start of April 2016.

The reason why it was such a late trial is that the Agrilaser Autonomic hadn't been previously used in Australia and I wasn't aware of the technology until February. So after a few emails to the manufacturer and the local reseller that had been doing lots of work with airports, I was able to have a unit delivered from the Netherlands to run a trial before completing our harvest.

We completed the initial setup (Figure 3.) in a few hours, including programming, to protect our Sauvignon Blanc and Merlot blocks. After setting up the Agrilaser Autonomic, the bird reduction was obvious, even after only a few days. The reduction continued over the following weeks.

Figure 3. Setting up the Agrilaser in a mounted position for greater coverage.

After 2–3 weeks, the birds simply wouldn't nest in any of the surrounding trees and spent very little time in the vineyard. Based on my observation, one of the key reasons that the laser is effective not only in the immediate area of the vineyard, is because it can be directed to the surrounding trees, ensuring the birds no longer sit in the trees to plan an attack, or build up a large flock capable of causing significant damage to the vineyard (Figure 4.). It was interesting to watch how the laser affected the flocks of starlings that would spend time in and around the vineyard. Initially they shifted from using the trees as a launching point to using a grassed area next to the vineyard. I adjusted the waypoints in the laser to include the grassed area and within a few days the flock never returned.

Figure 4. Agrilaser at work in the vineyard.

In relation to a reduction in bird activity, it wasn't a 100% control of all birds. Based on my observation and review using some time-lapse cameras and general observation, it appeared to be around an 80–90% reduction in birds. It also seemed that the birds that still visited the vineyard were in small numbers of 5–10 and appeared to be scout birds rather than a large flock capable of doing significant damage.

The one species that appeared more resistant than others was the wattlebirds. Being the first time this technology has been used it isn't clear if this is because the laser wasn't deployed until after the grapes had already started ripening or perhaps the way the birds move through the vineyard underneath the canopy, which could mean that they are less affected by the laser as it is directed to the top of the canopy. However, it did still reduce them, which was evidenced while I was preparing for harvesting. I adjusted the laser and noted a much larger flock arrived unexpectedly, at which point I returned the laser to the normal program, which deterred the large wattlebird flock.

When it came to the end of the end of the trial, the laser had some residual impact, but after turning it off for a week the water birds and other wildlife returned to the dams. This appeared to show there is some safety in the event of a short-term failure – after a few days without the laser I would expect very little residual impact. The good thing, however, is that this also means the beneficial birds over winter are not deterred and continue to keep the bugs down while the vineyard is dormant.

Expectations for 2017

Our focus this year will be getting the laser deployed well in advance of when the birds start becoming a problem and having it running over all three of our blocks by deploying it on an extended able pole raised to approximately 5 m. Based on this, we will do the setup in mid-December so we can monitor the bird activity with a plan to delay and, if practical, avoid netting entirely.

Results

- 80–90% less birds
- immediate effect after installation that seemed to continue to improve during the five-week trial
- capacity for significant savings in labour and capital replacement costs over netting
- works fully autonomically and autonomously
- allows a more flexible grape harvest and maintenance – able to access vineyard with tractors and equipment right up to picking.