

SPOT® THE ROBOTIC DOG

ROBBO CROOP



A PROJECT BY THE

mtc

Manufacturing
Technology Centre

EXPLORING THE
USE OF ADVANCED
ROBOTICS TO
CREATE A MORE
SUSTAINABLE
AGRICULTURAL
SECTOR WHILST
IMPROVING YIELD
AND QUALITY



THE CHALLENGE

Studies have found that over 98% of sprayed insecticides and 95% of herbicides reach a destination other than their target species, because they are sprayed or spread across entire agricultural fields.

In March 2021 the RoboCrop project, based at MTC Liverpool, won Innovate UK funding to utilise Boston Dynamics' Spot® robots to investigate and prove the benefits of using advanced robotics to reduce the use of chemicals in the agricultural sector.

The project, run in conjunction with partners at Bardsley England, one of the UK's leading fruit farm specialists that operates across 26 sites over 850 hectares, would also seek to highlight the wider commercial, environmental and health benefits that are realised when using robots in these practices.

As part of its work with Boston Dynamics to develop Spot's capabilities and prove its worth to UK manufacturing, the MTC was tasked with designing, building, and testing a new payload for Spot®.

The new payload would be used for agricultural inspection activities and to demonstrate how reducing pesticide usage can increase crop yield and improve produce quality whilst also reducing labour costs and subsequently freeing up resource for value added tasks.

In the case of Bardsley England, Spot® would be required to inspect apples in the orchard to determine the ripeness and quality, but most importantly detect any diseases and pests that might be prevalent.





“
HERE AT BARDSLEY, WE ARE
PASSIONATE ABOUT WORKING
WITH PARTNERS SUCH AS
THE MTC WHO CAN HELP US
SHAPE THE FUTURE. THE
GLOBAL INDUSTRY IS GOING
THROUGH A GREAT CHANGE,
AND WE NEED TO TRANSFORM
HOW WE GROW. GROWERS
NEED TO BE INCENTIVISED
FOR NOT WHAT THEY GROW,
BUT HOW THEY GROW IT AND
THE PARTNERSHIPS WE ARE
FORMING ARE HELPING US WITH
OUR FUTURE.”

BEN BARDSLEY
CEO, BARDSLEY ENGLAND



THE SOLUTION

Automation and robotics experts at the MTC utilised their extensive knowledge and cross-industry experience to create a payload that attaches to the back of Spot®.

Alongside an on-board computer and a robotic, 4K camera system that is capable of autonomously controlling and managing the robot's everyday activities, the MTC designed payload included a crop inspecting image processing system that would scan crops and detect any diseases or pests in the process.

This would mean that chemicals would only be applied where and when required.

To accompany this, engineers also developed a unique user interface that would allow Bardsley England to view the data collected from the orchard in real time.

The interface would also make the management and handling of the robot fleet simpler and more effective.

THE OUTCOME

Following completion of testing on the payload and on-site with Bardsley England, the MTC has been able to successfully demonstrate the positive impact that complex autonomous mobile robots, AI and vision systems can have on operations in the UK agricultural sector.

For Bardsley England, the future of its operations is to grow carbon negative food and the use of robotics will help them to achieve their aim of totally automating their orchards by 2030.

The RoboCrop system has shown that using robots that are able to work autonomously to achieve the round the clock crop management required can be extremely valuable, improving efficiency and allowing highly skilled farmers and engineers to complete value-added tasks that will in turn create a higher quality crop.

This more proactive, data-led approach to farming will allow operations like Bardsley England to save costs, increase annual profits and grow healthier products in a more sustainable, environmentally minded manner which will reduce the use of pesticides and herbicides.





BENEFITS

Introducing robotics into agriculture has previously been a huge challenge due to factors such as terrain, the environment, plot sizes and the large potential cost to the business if poorly implemented.

Working with Bardsley England and its tech partner, BX, and leveraging the capabilities of advanced robotics, MTC has been able to demonstrate a number of benefits that will transform the UK agricultural sector including:

- The ability to be better planned and quantify a yield at an earlier stage to give a competitive advantage in the market.
- Early disease detection means better targeted application of pesticides and herbicides which decreases the amount of pollutants being emitted into the environment, therefore improving soil quality and encouraging more sustainable practices.
- Reduction of costs through the use of less chemicals and manual labour.
- Decreased requirement for the excessive use of petrol or diesel fueled machinery, reducing the amount of carbon dioxide emitted into the environment.

“ THE CULMINATION OF THIS STAGE OF THE ROBOCROP PROJECT IS A REALLY PROUD MOMENT FOR THE MTC. BY PARTNERING WITH BARDSLEY ENGLAND AND BX, WE HAVE BEEN ABLE TO SUCCESSFULLY DEMONSTRATE HOW UTILISING ADVANCED ROBOTICS CAN CREATE A MORE SUSTAINABLE AND PRODUCTIVE UK AGRICULTURAL SECTOR. IMPORTANTLY, THIS INSPECTION PAYLOAD THAT HAS BEEN DEVELOPED SPECIFICALLY FOR THIS PROJECT CAN BE EASILY ADAPTED FOR OTHER INDUSTRIES AND TO ENSURE MTC CAN CONTINUE TO POSITIVELY IMPACT SOCIETY IN EVERYTHING THAT WE DO. ”

JOEL KELLAM
ADVANCED RESEARCH ENGINEER, MTC





mtc

Manufacturing
Technology Centre

CONTACT US TODAY

Experts at the MTC are working collaboratively with Boston Dynamics to develop Spot's capabilities further and prove its worth in the UK.

We are actively looking to engage with businesses and organisations to investigate how advanced robotics can increase efficiency, improve manufacturing processes and reduce human risk in dangerous working environments.

For more information on automation and robotics at the MTC, please visit the-mtc.org/automation

