Ontario Tree Fruit Innovation and Technology Roadmap

Autonomous Tractors

Evaluating New Technologies

	Feasibility and cost	Implement	Labour Reduced	Changes in production	Training for staff	Impact on risk of COVID-19 Transmission
Identified Technology	low, medium, high	easy, medium, challenging	% estimate	easy, medium, hard	none, medium, high	none, low, medium, high
Autonomous tractors	high	medium	50	medium	medium	high

Current Status - Autonomous tractors have been in development since the idea of precision agriculture came about in the 1980s. Autonomous tractor detects obstacles with a perception system using LADAR and cameras. The perception system detects hazards in the cluttered orchard environment and guides the tractor down the centre of the tree rows. Depending on how big the orchard is, autonomous tractors can be operated alone or organized into multi-tractor systems used to for mowing and for crop protection application sprays.

Feasibility of Implementation - Capital purchase costs for autonomous tractors are high making it challenging for smaller growing operations to afford. Autonomous tractors fit into the existing orchard operations and current practices used for manual spraying can improve the overall safeguarding of the autonomous tractor system by restricting access to areas of operation.

Impact on Labour - These systems improve labour productivity, reduce labour requirements, and create cost efficiency in tree fruit orchards by automating multiple tasks such as mowing and spraying. Additionally, this equipment can be used for prolonged periods of time during a 24-hour day compared to an operator.

COVID-19 Mitigation Risk - This technology helps to reduce overall labour requirements for orchard operations therefore implementation has a high impact on lowering the overall risk of COVID-19 exposure and transmission for orchard operations.

Need for Change, Research and Training - This equipment would require a significant initial time allocation for setup, mission planning and programming, and would require some changes to orchard operations and processes. Training would also be needed.