
Hard GROUND

The perfect place for precise, reliable, NREC-enabled Autonomy

ENGINEERING THE FUTURE OF ROBOTICS

NATIONAL ROBOTICS
ENGINEERING CENTER
NREC’s powerful automation technologies transform agriculture

Autonomous Systems

Autonomous Orchard Tractors

Autonomous orchard tractors can navigate between tree rows, avoid people and vehicles, mow, and spray — all without human aid. A team of two autonomous tractors operates in an orange grove at Southern Gardens Citrus. John Deere is evaluating this exciting new technology and gathering customer feedback.

Benefits:
- Keep farm workers out of harm’s way.
- One worker can supervise multiple autonomous tractors.

Computer Vision

Strawberry Plant Sorter

A consortium of California’s largest strawberry plant growers asked NREC to develop an automated plant sorter. It uses computer vision to inspect and sort harvested strawberry plants. In field trials, it sorted plants 30 times faster than individual workers while maintaining a similar level of accuracy. It enabled a team of eight workers to inspect and sort the same number of plants as 30 workers who did traditional manual sorting.

The strawberry plant sorter is currently being tested in production nurseries and is on the fast track for commercialization.

Benefits:
- Classifies and sorts plants faster than human workers while maintaining plant quality.
- Automatically adjusts for different plant sizes, varieties, and other factors.
- Integrated with harvesting and shipping processes.

Decision Support

Tree Mapping

With USDA support, NREC developed a vehicle-mounted sensor suite for mapping trees. It generates 3D tree maps and inventories trees while being driven through a grove. The system can be attached to a pickup truck, tractor, or other farm vehicle.

Southern Gardens Citrus uses the tree mapping system to map groves, track the impact of diseases, predict yields, and gather planning data.

Benefits:
- Better tracking of tree diseases.
- More accurate yield estimation.
- Data collection for improved planning.

Precision Spraying

A precision sprayer uses 3D data collected by autonomous tractors to accurately target and spray trees. It will be deployed in a production grove after testing is finished. NREC, Cornell University, and the University of Florida joined forces on this USDA-funded project.

Benefits:
- Reduce human and environmental exposure to agricultural chemicals.
- Apply chemicals only where needed, reducing waste.

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