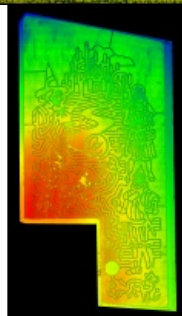


# How RedTail LiDAR Systems Produces Detailed Corn Maze Images



Light detection and ranging (Lidar) technology has increasingly been used for commercial, government, and scientific applications. The 3D images produced by a Lidar system have changed the way individuals, businesses, researchers, and government regulators assess the world in which we live. The RedTail LiDAR Systems' RTL-400, designed specifically for use on small drones, is a cost-effective

tool that provides high-resolution, accurately geolocated images needed to make informed business decisions.

As the [RedTail LiDAR Systems](#) team prepared to launch the [RTL-400](#), they looked for new opportunities to demonstrate the product's capabilities across a broad range of industries. Agriculture was identified as an important application. The worldwide need for food requires ever-increasing levels of production, while simultaneously meeting that demand in an environmentally friendly and sustainable manner.

## Drone-based Lidar for precision agriculture

Precision agriculture is a farming management concept based on observing, measuring and responding to inter and intra-field variability. In recent years, the agriculture industry has increasingly adopted UAV-based Lidar technology to support precision agriculture methods, allowing them to make more informed crop and livestock management decisions; one example is the selective application of fertilizers to achieve even yield throughout a field.



Toto close-up point cloud created by RTL-400.

To demonstrate the RTL-400's capability in the area of precision agriculture, RedTail staff researched various agricultural flight options and hit on an idea – what better way to demonstrate the high-resolution, high-accuracy system than in one of the toughest challenges that could be found – a corn maze. Why fly a corn maze? It represents precision agriculture at its finest with a perfectly planted, monitored, and managed corn field.

The corn maze selected to map was located in New Springfield, Ohio. The Maze Craze corn maze was ranked one of the 10 Best by USA Today. Carved out of 8.5 hectares of corn and including 14.5 kilometres of winding trails, the 2019 life-size maze is celebrating the 80<sup>th</sup> anniversary of the classic film *The Wizard of Oz*. Complete with Dorothy, Toto, the Tin Man, Scarecrow, Lion and the Wicked Witch, the maze was designed to provide hours of fun for young and old.

## Mirror-based laser scanner

Developed with technology licensed from the Army Research Laboratory (ARL), the RTL-400 was designed specifically for use on small drones flying at altitudes of up to 400 ft. The RTL-400 incorporates an innovative microelectromechanical system (MEMS) mirror-based laser scanner that rapidly and evenly distributes laser pulses to the ground, moving side-to-side 400 times each second. This rapid line scan rate, coupled with a laser pulse rate of up to 400,000 pulses per second, yields point clouds that are unprecedented in resolution and density.

The total project scanned and mapped an area of 10.5 hectares. The RTL-400 completed the flight in 15 minutes, flying at an altitude of 120 feet and a speed of 42 kilometres per hour. The resulting point cloud included over 98 million data points, and the point cloud images had such high resolution that a farmer could easily and accurately estimate crop yield.

"We couldn't be more pleased with the RTL-400's performance today. These high-resolution, high-density point clouds can enable farmers to efficiently gather the quality and quantity of data required for precision crop management," said Brad DeRoos, President and CEO of

RedTail LiDAR Systems. "We are excited to work with individual members of the agricultural community to design custom solutions to meet their specific needs."



Maze Craze point cloud image generated by RTL-400.

The RedTail LiDAR Systems' RTL-400 combines the flexibility of a UAV with the accuracy of a high-performance Lidar system. The data collected with the RTL-400 can be used for multiple agricultural management, planning and monitoring purposes, including:

- the creation of slope and sunlight exposure area maps
- monitoring irrigation and fertilizer needs
- detecting crop damage, analyzing stand counts, and estimating harvest yield
- identifying and minimizing the impact of pests and disease
- observing plant growth, calculating grove maturity, and detecting areas of irregularities
- mapping water flow and catchments
- monitoring erosion, soil loss, and assessing storm damage
- assessing livestock foraging needs and determining optimal foraging areas

The RedTail LiDAR Systems team is excited to develop custom solutions for farmers, and other industry sector professionals, looking to integrate Lidar scanning and 3D mapping into their operational workflow.

[Learn more about RedTail LiDAR Systems here.](#)

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