

CASE STUDY:

Precision Agriculture

Utilizing technology to optimize food production and resources

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As the global population increases and resources become even more scarce, the need for efficient, cost-effective, and precise agricultural management is vital to meet growing food demand.

According to the World Economic Forum, the global food situation is critical, with over 2 billion people suffering from malnutrition and the projection that 60% more food is needed to feed the global population by 2050. In addition, current agricultural growing and harvesting methods are inefficient. In fact, agriculture accounts for 70% of the world's water consumption and 30% of global greenhouse gas emissions.

Precision Agriculture can help address these inefficiencies, reduce waste, and streamline production.

Utilizing technology like advanced sensors, GPS, high-bandwidth telecommunication, data management, and autonomous systems (e.g., robots and drones), Precision Agriculture enables higher food production and more efficient management of precious resources like water, soil, and labor.

Companies like GUSS Automation are developing intelligent, autonomous solutions that drive Precision Agriculture and help farmers reduce waste and boost sustainable farming techniques.

SOLUTION

Working closely with Scanreco's longtime System Integrator, Hawe Hydraulik (Clackamas, OR), on hydraulics and electronic controls, GUSS developed a system of controls and software that autonomously guide the vehicles row-by-row and apply water or herbicide with waste-reducing precision and accuracy.

However, while GUSS vehicles are autonomous, a human operator must perform certain tasks in a typical deployment. For instance, an operator must remove the vehicle from over-the-road transportation trailers and position it in the correct starting position to work a field. Additionally, an operator may have to move alongside and control the vehicle in certain circumstances because the sprayers lack a cab or steering wheel for an operator.



This is where Scanreco Radio Remote-Control Technology comes into play. Working in collaboration with engineers from GUSS and Hawe, Scanreco developed a custom system that integrates via the vehicle's master control panel and allows for wireless human control, monitoring, and deployment.

The system includes a Scanreco Mini Joystick Transmitter and a G3 CAN Receiver. Although the Mini Joystick transmitter can accommodate up to three separate joysticks, the GUSS system is configured with a single joystick and an array of easy-to-access toggle switches.

Anywhere a master controller is already present, the G3 CAN receiver can be added to the existing machine controls. In addition to its ability to receive and transmit CAN messages via 2.4 GHz radio frequency, the rugged and reliable receiver also withstands the vibrations and harsh environments of a typical orchard deployment.



RESULTS

With the integration of technology from Hawe and Scanreco, GUSS Automation delivers a Precision Agriculture solution that improves farming efficiency, reduces waste, and uses less herbicide and pesticide for crop management.

Indeed, this technology enables farmers to do more with less and helps create a sustainable food future for the world.

- 15% to 20% **Efficiency Gain** in Acres Covered
- Spray company **increased coverage** by 50 acres per day
- System **turns on nozzles only** when a tree is present
- **Saves hundreds of gallons** of chemical per orchard.

REQUIREMENT	SOLUTION
Custom Software/Firmware	The custom software/firmware needed to integrate with such a complex system was developed in conjunction with GUSS and Hawe to not only accurately control the vehicle, but to graphically display system feedback on the remote-control screen.
System Feedback	Remote control battery and RF signal can be monitored. In addition, CAN messaging is able to display MPH, Pressure in PSI, Fuel in GPM, and Level Product in percentage. Vehicle Low Fuel and Low Oil alarms can also be generated. LCD screen allows operators to easily monitor the system.
Operator Maneuverability	Utilizing a Scanreco Mini Joystick Transmitter and a G3 CAN Receiver, human operators can precisely maneuver the vehicle using a joystick and toggling between 2 and 4-wheel steering options. In addition, spray pressure and direction can be set using the belly-pack transmitter.
Customized Label and Operator Interface	With its ample, yet ergonomic design, the Mini Joystick belly-pack transmitter can be customized by combining symbols, text, and branding logos.
Rugged and Reliable Hardware	GUSS demanded functionality with maximum performance in wet, humid, and hot operational environments. With an operational temperature range of -25°C to +55°C / ~ -15°F to + 130°F and an ingress protection rating of IP65, the Mini Joy with e-stop and G3 CAN receiver are purpose-built to perform in harsh conditions.

Customized and functional systems – the way you want them to be

Scanreco works closely with customers to create fully customized and functional systems. In this case, GUSS Automation, Hawe and Scanreco had a close collaboration in developing sustainable solutions for tomorrow.

Based in the San Joaquin Valley of central California, USA, **GUSS Automation** develops and manufactures autonomous orchard and herbicide sprayers that leverage highly advanced sensors, satellite mapping, communications, and electronic controls.

These vehicles also use LiDAR combined with GPS for accurate maneuvering in fields and orchards. Vehicle sensors and software enable the vehicles to control speed and water/herbicide application under orchard and vineyard canopies. A single operator can monitor multiple GUSS machines from a vehicle, office, or home while the nurse truck supplies the spray product when the vehicle signals for a refill.

This automated farming ecosystem results in significant labor savings and efficiencies. Indeed, GUSS Automation represents a great leap forward in Precision Agriculture, allowing many more crops to be sprayed autonomously. Its design makes it perfect for vineyards, high-density orchards, berries, hops, and other high-value crops.



This is Scanreco

- *Leading developer and supplier in radio remote control systems of machines and equipment.*
- *Supplier to leading OEMs and players in a number of different industries.*
- *Development and production take place in close collaboration with the customer to create individual systems with maximum benefit.*
- *Scanreco was founded in 1984 in Södertälje, is privately owned and is still run by the founders.*
- *Scanreco has a large global network and subsidiaries across the world.*
- *Over half a million systems sold worldwide.*

We are here to help you achieve!

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Questions about this case?

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