



Precise Positioning Provides “Superpower” Efficiency and Accuracy in Agricultural Research



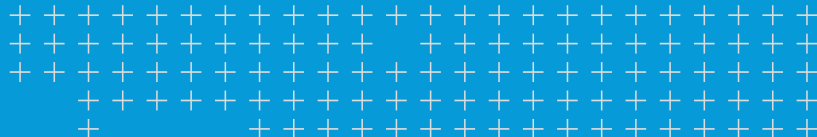
A technician uses Trimble GNSS to establish ground control prior to a UAV flight. Precise control for aerial imagery is essential for high-resolution crop assessment.

Modern field research trials use GNSS positioning for accurate assessment of plant health and performance.

A Trimble solution provides dependable precision and simple workflows to support aerial imaging and analysis.

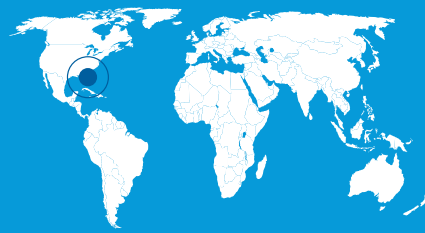
Solution

- ▶ Trimble® CenterPoint® RTX Correction Service
- ▶ Trimble R2 GNSS Receiver
- ▶ Trimble TSC3 Controller
- ▶ Trimble Access™ Software



overview

As part of the effort to maintain and increase the world's food supply, agrochemical companies conduct ongoing research to develop and improve their products. An essential task is measuring the performance of crops treated with new additives. Once performed by technicians in the field examining individual plants, crop assessment can now be achieved via uncrewed aerial vehicles (UAV). By using precise GNSS, researchers ensure high accuracy and productivity in collecting and processing the aerial data.



Location
NORTH
AMERICA



Precision Silver is a Florida-based start-up company providing specialized services for the agriculture industry. Focused on automated ratings for agricultural research, the company provides plot- and plant-level assessments on test sites scattered across North America. Their clients include some of the world's largest agrochemical companies.

According to Precision Silver President Taylor Glenn, typical test sites (or "blocks") comprise multiple trial plots that are treated with differing levels of additives. Each plot is rated multiple times during a test period to quantify the additives' effects. Glenn said this work is often done manually using measuring sticks and clipboards. The tedious work requires skilled scientists to spend hours in the field collecting data; time that could be better spent on analysis and interpretation.

Glenn's company is replacing the in-field evaluations with aerial imagery and specialized software. Using customized UAVs, Precision Silver can obtain high-resolution imagery over the entire site in minutes. "With our system, we automate the process to magnify their productivity. It gives them sort of a 'superpower,' where they can be out there for a half hour, instead of all day," he said. Precision Silver then processes the images to obtain more than 20 industry-standard ratings on crop performance on crop types ranging from broadacre crops such as wheat and barley to orchard products including fruit and nut trees.

PRECISE GNSS IN REMOTE LOCATIONS

In order to produce the desired results, the aerial imaging system needs precise ground control points. Glenn uses a Trimble R2 GNSS receiver in conjunction with Trimble CenterPoint® RTX positioning service to establish survey-grade accuracy on the control marks. Often working in areas where RTK or VRS is not practical due to coverage or terrain issues, Glenn appreciates the speed and flexibility provided by Trimble RTX®.

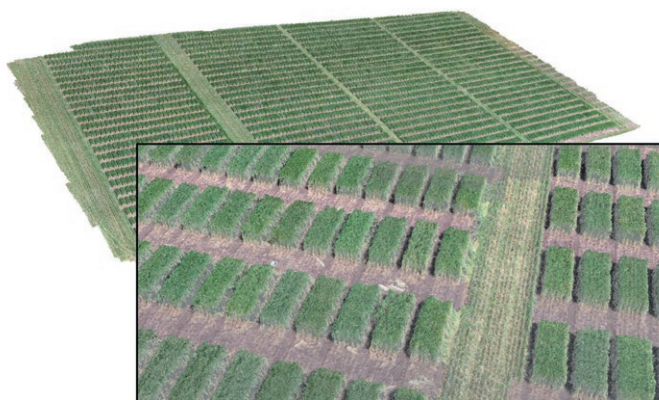
CenterPoint RTX provides accuracy better than 2 cm horizontal and 5 cm vertical. Using Trimble Access software running on a Trimble TSC3 controller, field operators can see the real-time accuracy of their GNSS positions. "We like to get horizontal accuracy of 5 cm or better," he said. "Having that kind of accuracy with a system we can ship across the country to different operators is great. They just need the system once when they start up their block; we use those same coordinates throughout the rest of the project."

Once a flight route is established, blocks may be reflown 10 to 20 times over a season. "We can do extraordinarily high-resolution images, up to 1 mm per pixel," Glenn said. "We can really see everything that's going on in the plots." The precise ground control ensures that the high-resolution imagery is accurately georeferenced and helps ensure reliable ratings over the season.

“We use the Trimble R2 with CenterPoint RTX. It does a great job for us for being able to quickly measure the coordinates of our ground control points.”

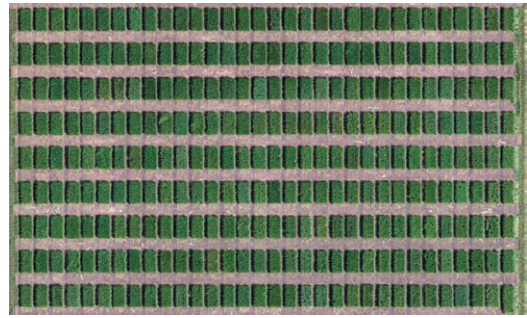
— Taylor Glenn, Ph.D., President, Precision Silver

Glenn added that the local operators are often skilled agricultural scientists but have no background in GNSS positioning. The simplicity of the Trimble solution enables them to quickly establish accurate control and then focus on the work of crop assessment. “Our dealer “Seiler Instrument” helped us overcome our lack of deep background in surveying or GNSS,” he said. “They helped us set up a very nice streamlined workflow that works reliably and gets the job done.”



Accurate 3D models enable assessment of plant heights, elevation and slopes in test plots.

Example: Wheat Breeding Plots



Overview map created from over 2,300 images stitched together

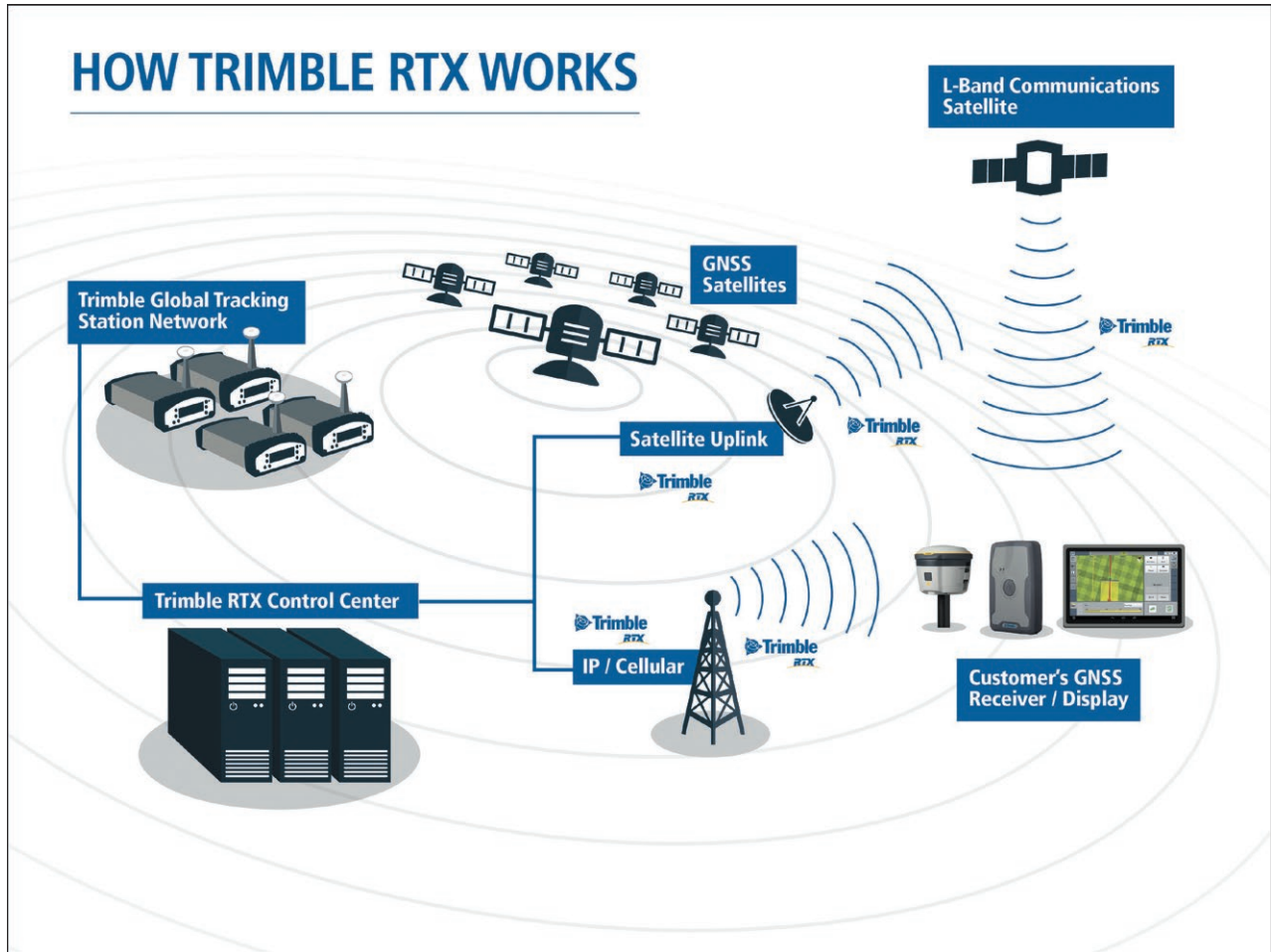


Supported by precise GNSS, high-resolution imagery enables assessment from field level (top) down to individual wheat plants (bottom).





HOW TRIMBLE RTX WORKS



By delivering corrections via satellite, CenterPoint RTX enables easy and precise positioning without need for GNSS base stations or networks.



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TRANSFORMING THE WAY THE WORLD WORKS

