Project Summary

EMILI Verge

Updated: October 20, 2026

Verge Ag Launch Pad Path Planner

About the technology

Verge Ag creates maps that turn existing seeding and spraying equipment into route-following machines using the autosteer and GPS hardware that producers already own. It can integrate with John Deere, Case IH, and Trimble, creating optimal routes that can save time and fuel during tillage, seeding, spraying, and harvest.



Spring tillage equipment following the pre-planned route made with Path Planner. (Photo credit: EMILI).

EMILI objectives

In 2026 EMILI used Verge Ag's supervised autonomy solution during spring tillage to:

- Validate using Path Planner to make tillage plans.
- Test the plans in the field and compare to typical field operations to determine if there were improvements in the tillage routes.

What we learned

Quick map creation

Verge Ag is able to quickly create supervised autonomy maps to a producer's specifications for direction, types of turns, number of headland passes, skip passes, etc. These Path Plans can be exported in multiple formats compatible with all major equipment brands and guidance systems.

Reduced decision making in-field

Using Path Planner allows a route to be created and followed with reduced cognitive load on the operator. Producers can plan how they want the operation to be done and have confidence that it was done well, even if the operator is less experienced or unfamiliar with the field.

Growth opportunity subheading

The operator noted that it can be difficult to tell what direction they should be going on each pass. If you had to resume an operation it was not obvious what direction to go in when lining up with the path. Visible arrows on the lines or some direction indication could help.



What this technology could unlock

This technology could unlock improved field operations with less soil movement, reduced compaction from overlapping passes, and improved efficiency with optimized refill points. AI learns from all these decisions to suggest smarter routes, eventually powering full autonomy.

Summary of analyses

Materials and methods

Verge Ag created plans for 2 fields at Innovation Farms with input from the producer about their preferences for the tillage operations. The operator then selected the Path Plan in the field to complete the work. We compared the planned paths to what was actually done in the field to determine the outcomes of using Path Planner.

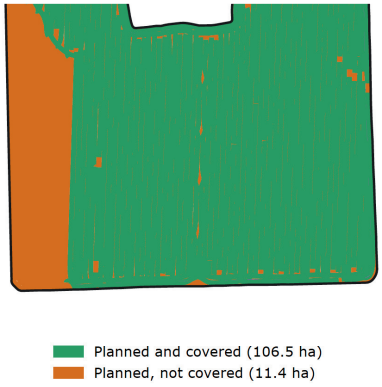


Figure 1. Palmer field showing wet area in orange that was avoided. Image Credit: Verge Ag.

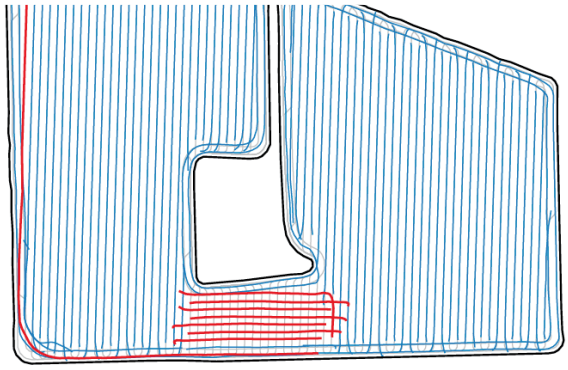


Figure 2. Shae's Quarter field area where operator deviated from plan (red lines). Image Credit: Verge Ag.



Figure 3. Comparison of area covered, missed, and overlapped during tillage operations in 2025 (left) and 2026 (right) on Shae's Quarter. Image Credit: Verge Ag.

Results

The two fields where the Path Planner was used were "Palmer" (117.8 ha / 291.1 ac) and "Shae's Quarter" (42.7 ha / 105.5 ac). Verge Ag analyzed the actual routes taken by the equipment compared to the plan they created in 2026, and also analyzed a fall tillage operation in 2025. The route in 2025 used GPS guidance, while the route in 2026 used Verge Ag's supervised autonomy, so the differences in accuracy between years were not as large as they would be when comparing to manual or freehand operation.

The logged activity in 2026 was 93% and 97% matched to the Path Plans for Palmer and Shae's Quarter, respectively. Due to wet conditions, some areas had to be avoided, which resulted in the actual paths deviating from the Path Plans in some parts of the field (Figure 1). One area was completed differently than the Path Plan due to the operators preference to do fewer short lines (Figure 2). Many of the ends of passes either went past the planned end point or lifted early. This is likely because the operator was going faster than the planned speed in Path Planner and it is more difficult for the machine to stay on the Path Plan at higher speed and going into turns.

In 2026 there was less overlap of passes compared to 2025. This changed from 10.3% overlap in 2025 to 7.6% overlap in 2026 on Palmer, and from 17.4% overlap in 2025 to 10.6% in 2026 on Shae's Quarter.

On Shae's Quarter there was less missed area with the Path Planner route, going from 6.1% missed in 2025 to 2.4% missed in 2026 (Figure 3). In 2026 there was more area missed on Palmer than in 2025. This was due to wet conditions; an 11.4 ha (28.2 ac) portion of the field had to be avoided. If this area is excluded from the data, the reduction of missed area was similar to Shae's Quarter.

Next steps

EMILI looks forward to continued testing of Verge Ag's Path Planner with other types of equipment on Innovation Farms powered by AgExpert.