Dave and Bill Farb developed their own autosteer technology using this driverless Cat Track Loader, which can "communicate" with any pull-type or 3-pt. implement.

Self-driving tractor handles everything from disking to cultivating, harrowing, seeding, and spraying. Software pairs machine's control system with GPS guidance.

Self-Driving Tractor Handles Many Fieldwork Jobs

Idaho brothers Dave and Bill Farb weren't satisfied with how autosteer technology worked on their farm, so instead of trying and buying a different system, they built their own. Using their background as CAD software engineers they designed and built the "Farb-E", a custom-made power unit that uses a diesel motor running a hydraulic system powering two small tracks.

Dave Farb says the prototype operated like a skid steer without a cab and it worked well, pulling equipment across a field in a designated pattern, controlled by GPS. The project gave them additional ideas, which they used for integrating the autonomous software into a CAT 259D skidsteer. That platform has now logged more than 1,000 hrs. on 5 different machines, handling heavy disking, cultivating, harrowing, seeding, spraying and soil sampling. Machines have worked on fields ranging in size from 5 to several hundred acres. Development on their machines has involved equipment, expertise and products from nearly 10 different ag technology companies.

In the summer of 2018 Dave Farb demonstrated the autonomous system on a 100 hp. Caterpillar 299D2 Track Loader at a Wisconsin farm show. The machine pulls and communicates with any hitch-type or 3-point implement. Farb says his company's driverless technology uses sophisticated software that pairs the skid steer's control system with GPS guidance. Using the hydrostatic drive they regulate the speed, direction and steering from a single control point, which can be a computer, tablet or smartphone. Implement controls are also handled with the system.

Farb engineer Jordan Schwers says that running the units in repetitious field operations has allowed them to identify issues that affect operation, then create solutions that can be handled with sensors. "We've taken the approach of automating through seeking out mistakes, knowing that experiencing the problems is the best way to create a good solution," Schwers says.

Farb says they used a hydrostatic power unit rather than a conventional tractor because the hydrostatic machine was easier to make driverless. A tractor would've required controls for the transmission, engine, steering, braking and clutching.

Farb envisions selling vehicles equipped with the technology and also offering them as a contract service, where a farmer would pay a per-acre fee comparable to custom rates in his area.

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Big A Converted To High Boy Crop Sprayer

Howard Ewen turned a worn out Big A fertilizer spreader into an adjustable row-width, high boy sprayer. By adjusting the wheelbasse a few inches, he can switch from 24 38-in. rows to 30 30-in. rows and back or stay narrow for road transit, all on the go.

"I was planning to build a sprayer when my son heard about a Big A that needed a new engine and front wheel," recalls Ewen. "I made a low-ball offer, and they took it. We narrowed the front fork, replaced the engine with a 238 Detroit diesel and adapted it to take a 6-speed Allison transmission."

That, of course, was just the start. Ewen completely replaced the back end of the spreader from the transmission back, including legs for the drive wheels. He used the rear end from a Chevy truck with air brakes and turning brakes. He also used a mechanical final drive system from a Deere 7700 combine. He mounted them in legs he fabricated to give the sprayer extra clearance.

A telescoping toolbar connects the rear drive wheel legs to the Big A frame. Ewen used 8-in. angle iron to fabricate 8 by 8-in. channel iron.

"When you have salvaged angle iron that costs half a cent per lb. versus 25¢ per lb. for channel iron, you make do," says Ewen.

Hydraulic cylinders can adjust the toolbar by 16 in. on a side to match row or road width. Adjusting the driveshafts was more complicated as they needed to telescope with the toolbar. Ewen had splines cut into the leg ends of the shafts and used splined drive sprockets at the top of the legs.

In order to provide for future wear on the drives, the shafts connect to the Chevy rear end hubs via universal joints. Ewen fabricated half the universal joint directly on the short stubs extending out of the Chevy hubs, mounting the other half to the splined shafts.

The shafts power the triple #80 chain drive to the wheels. At the hub end of the leg, Ewen made an adapter plate for the hub so he could mount IH tractor wheels for a narrower tread.

Another change Ewen made was to install a combine cab in place of the Big A cab. It provided better visibility and had air conditioning.

"I used a boom system from an old Hagie sprayer and parts of the Big A boom," says Ewen. "Each section has a Redball spray monitor on it with a separate hose to each nozzle and cylinder on each section so I can lower or raise it or the boom ends."

The sprayer pump, hydraulic pump and engine shaft all run off of a counter shaft. Ewen says he went with a mechanical drive rather than hydrostatic so it is easier to keep pressure up while slowing down or speeding up at row ends. A combination of gear ratios, sprocket sizes and transmissions gives him a spraying speed of about 8 mph and a road speed of 14 mph.

"I had several pages of calculations on gear ratios and wheel circumferences in order to figure out field speeds," says Ewen. "I worked on it for about 3 years. You put that much time and energy into something without knowing if it will work. The first time I took it to the field, it handled like a dream. Sitting up high on it is like riding in a cloud."

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Howard Ewen built this adjustable row-width, High Boy crop sprayer by converting a worn out Big A fertilizer spreader. "Sitting up high on it is like riding in a cloud," he says.

Back end of spreader was replaced with the rear end from a Chevy truck and the mechanical final drive system from a Deere combine.

Telescoping toolbar connects sprayer's rear drive wheel legs to Big A frame. Hydraulic cylinders adjust toolbar by 16 in. on each side to match row or road width.