Leeder uses the Steiger Cougar on his farm as the extra tires work well on soft, damp ground. The "Big Cat" has also been a hit on the local Show circuit.

Vandalized 'Big Cat' Gets New Lease On Life

Rick Leeder of Port Elgin, Ontario, takes pride in his collection of older model tractors and added to their number with a unique "Big Cat" in 2018.

A friend alerted him of an unused 1981 Steiger Cougar, ST-251 designation with a Cummins NT-885-C-250 inline 6-cyl. engine and 10-speed transmission. The abandoned tractor was part of a bankruptcy farm sale. Due to extensive vandalism, insurance had written it off and the new owner wanted it removed from the property.

Since it was fall and his grain harvest was underway, Leeder didn't get a chance to view the Steiger until December 2018. "The tractor was sitting on blocks without wheels or tires, the gauges and the windows were smashed, there was dirt in the engine, hydraulic oil, and fuel tank, plus someone had dumped a bunch of black paint all over it," Leeder says. "It was a mess, but I still thought it might be worthwhile."

Due to its damaged condition and 27,000 lbs. of dead weight, scrap yards weren't interested in picking it up, so Leeder got it for free if he promised to remove it. After scrounging up two used rims and tires, he traveled the 2-hr. distance to pick up the tractor.

Once the tires were installed on the front end of the Cougar, Leeder used jacks and blocks to ready it for loading onto a float trailer. A neighbor with a large payloader helped with the lift.

"It was quite an ordeal to get it up on the float with only two tires," Leeder says. "We were jacking on the front end, but once we'd get it high enough, it would pivot on the drawbar. Finally, we let the air out of the tires, lifted it, and got it on the float trailer."

Once home, he cleaned out the oil pan and filter, flushed the hydraulic tank, and rinsed the fuel lines in a clean pail of diesel. The dirt in the 267-gal. fuel tank demanded extra attention, so Leeder cut a hole in the 1/2-in. thick steel tank wall large enough to climb inside. After cleaning the dirt from the tank, he welded it back up.

"When I got it all together, I hooked up the batteries it came with, and the engine fired right up," Leeder says.

After confirming it would run, he painted the entire tractor with matching paint, replaced the gauges, and added used rims and tires for triples around the unit. Rather than purchasing Case-IH glass for $4,500, he had Standard Auto Glass make up the replacement windows for $800.

"The tractor was sitting on blocks without wheels or tires, the gauges and the windows were smashed, there was dirt in the engine, hydraulic oil and fuel tank," says Leeder.

Leeder uses the Steiger Cougar on his farm as the extra tires work well on soft, damp ground. The "Big Cat" has also been a hit on the local show circuit.

He estimates he put about $5,000 into the tractor renovation.

"The only thing I'd still like to do is upgrade the brakes as they aren't the best," Leeder says.

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Robots Add Year-Round Nitrogen Efficiency To Corn

Many companies are transitioning to more sustainable and regenerative agricultural practices, but fertilizers and their use have been a lingering stumbling block. Much of what's applied isn't being used by the targeted crops; rather, it's being washed away or vaporized.

"Fertilizers aren't bad; they're actually amazing," says Jana Tian, CEO and co-founder of Upside Robotics. "They help with growing food more efficiently, but the issue is they're getting applied inefficiently, even in split applications, because the way the crop needs fertilizer is almost the opposite of how it's usually applied."

Most fertilizer is incorporated before or during seeding, but the plant's needs are greatest during later stages when the uptake is highest.

"Robots are the missing piece in this dilemma," Tian says. "With robotics, we don't need all the labor and power requirements, plus we can align with plant growth and conditions far better by making as many split applications as we want with no additional costs."

Upside Robotics developed the Maize Runner, the first live-in-field robot. The 24-in. wide electrically-driven miniature robots are sized to fit between 30-in. corn rows, spraying liquid fertilizer directly onto the plants right in season. The Maize Runners come with multiple sensors for crop monitoring, a 10-gal. tank and solar-powered rechargeable batteries that deliver about six hours of running time before a 40-min. recharge is required. Controls are guided by RTK GPS, which sends the robots to and from the field for spraying, recharging and refilling.

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Each unit sprays about 20 acres daily, running 45 to 150 min. between liquid tank refills. A group of miniature robots working together in swarms can cover many acres.

Before weekly spraying events, preprogrammed algorithms analyze and monitor weather patterns. The intention is to send robots into the field before rain to ensure the sprayed nitrogen is washed down properly into the roots. During the following week's spray trip, the algorithm differentiates the crop growth in different field sectors to measure its response.

Upside Robotics completed seven Ontario-based commercial trials during the 2024 growing season.

"Our research and trials demonstrated we saved our customers about 50 percent of total nitrogen with no impact on yield," Tian says. "We believe in the right conditions, we could reduce nitrogen by as much as 70 percent while still maintaining yields. This confirmation provides much more confidence with split applications as we can change strategy. We don't need to make upfront decisions about how much nitrogen we're putting down. Climate conditions and microorganisms will change. We need to constantly measure how responsive the crops are."

Tian explains their technology also improves soil health as the less nitrogen applied, the better it is for the microorganisms.

Upside Robotics will begin its first U.S.-based trial in Florida in January 2025. The company's goal for the year is to incorporate phosphorus, potassium and sulfur into the system to save nutrients and build yields. They intend to utilize a total of 30 Maize Runners. "We'd like to realize 35-bushel increases by detecting nutrient deficiencies before they happen and ensuring the corn gets exactly what it needs at the right time," Tian says.

Longer-term goals include combining pest management controls and fungicides in 2026 and detecting and spraying weeds in-row while continuing to add fertilizer variations.

"We're beginning as the ultimate corn robot, but eventually, we'll expand into other crops as well," Tian says. "In a sense, we're already commercially available as we continue our trials and prove our added value. Next year, about 15 units will be sold to farmers as a service, and around 50 the following year. We're working to prove they're 100 percent viable on a per acre basis."

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Sukkarieh explains the robot addresses key challenges in modern cattle production, including labor shortages, animal welfare, pasture and soil health, and operational efficiency.

Robotic Cattle Herder Gets Updates

In 2016, SwagBot, an AI-powered robot, was created as a rugged, all-terrain platform capable of autonomously herding cattle. Today, researchers at the University of Sydney, Australia, have updated its mission in both hardware and software to become the world's first "Smart Cow."

"Its capabilities have expanded to include precision pasture management, animal health monitoring, and broader applications in autonomous farm operations," says University of Sydney professor of robotics and intelligent systems Salah Sukkarieh. "Advances in sensing, navigation and AI have significantly enhanced its autonomy and adaptability to different farm environments for improved precision livestock and pasture management."

SwagBot's sensors have been upgraded with Lidar and stereo cameras for terrain mapping and obstacle detection, thermal and RGB cameras for detecting animal body temperature, multispectral and hyperspectral imaging for pasture analysis, and GPS and IMU systems for enhanced navigation accuracy.

AI and machine learning systems have built-in animal behavior analysis to track cattle movements, machine learning algorithms to monitor and assess pasture biomass and recommend grazing strategies, and AI-driven path planning to improve autonomous navigation over complex farm terrain.

"These technologies are designed to improve livestock management efficiency, reduce operational costs, and enhance sustainability through data-driven decision-making," Sukkarieh says.

SwagBot is powered by an electric drive system with swappable battery packs to support extended field operations. The transition to fully electric propulsion aligns with broader sustainability goals in agriculture, reducing emissions compared to fossil-fuel-powered alternatives.

Sukkarieh explains the robot addresses key challenges in modern cattle production, including labor shortages, animal welfare, pasture and soil health, and operational efficiency.

The robot remains under continuous development, with future upgrades expected to focus on more advanced animal health diagnosis, using AI, integration with farm management software, enhanced computing to process data directly on the robot, and better energy efficiency with potential hybrid charging.

The commercial availability of SwagBot is anticipated within the next few years.

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