

Cheers to AI: Monarch Tractor Launches First Commercially Available Electric, 'Driver Optional' Smart Tractor

Startup will deliver the first six of its NVIDIA Jetson-driven Founder Series MK-V tractors to leading wine, spirits, and beer producer Constellation Brands

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Livermore, Calif., renowned for research and vineyards, is plowing in a new distinction: the birthplace of the first commercially available smart tractor.

Local startup Monarch Tractor has announced the first of six Founder Series MK-V tractors are rolling off the production line at its headquarters. Constellation Brands, a leading wine and spirits producer and beer importer, will be the first customer given keys at a launch event today.

The debut caps a two-year development sprint since Monarch, founded in 2018, hatched plans to deliver its smart tractor, complete with the energy-efficient NVIDIA Jetson edge AI platform. The tractor combines electrification, automation, and data analysis to help farmers reduce their carbon footprint, improve field safety, streamline farming operations, and increase their bottom lines.

The MK-V tractor cuts energy costs and diesel emissions, while also helping reduce harmful herbicides, which are expensive and deplete the soil.

"With precision ag, autonomy and AI, data will decrease the volume of chemicals used, which is good for the soil, good for the farmer from a profitability standpoint, and good for the consumer," said Praveen Penmetsa, CEO of Monarch Tractor.

The delivery of MK-V tractors to Constellation Brands will be followed with additional tractor shipments to family farms and large corporate customers, according to the company.

Monarch is a member of the NVIDIA Inception program, which provides startups with technology support and AI platforms guidance.

Monarch Tractor founders include veterans of Silicon Valley's EV scene who worked together at startup Zoox, now Amazon owned. Carlo Mondavi, from the Napa Valley Mondavi winery family, is a sustainability-focused vintner and chief farming officer. Mark Schwager, former Tesla Gigafactory chief, is president; Zachary Omohundro, a robotics Ph.D. from Carnegie Mellon, is CTO; Penmetsa is an autonomy and mobility engineer. "The marriage of NVIDIA accelerated computing with Jetson edge AI on our Monarch MK-V has helped our customers reduce the use of unneeded herbicides with our cutting-edge, zero-emission tractor – this revolutionary technology is helping our planet's soil, waterways and biodiversity," said Carlo Mondavi.

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Penmetsa likens the revolutionary new tractor to paradigm shifts in PCs and smartphones, enablers of world-changing applications. Monarch's role, he said, is as the hub to enable smart implements — precision sprayers, harvesters and more — for computer vision applications to help automate farming.

In 2021, Monarch launched pilot test models for commercial use at Wente Vineyards, also based in Livermore. The trial at Wente compared its energy usage to that of a diesel tractor, noting Monarch saved more than \$2,600 in annual expenses.

Monarch has raised more than \$110 million in funding. Strategic investors include Japanese auto parts maker Musashi Seimitsu Industry Co; CNH Industrial, an agricultural equipment maker; and VST Tillers Tractors, an India-based equipment maker and dealer of tractors and implements.

It recently signed a contract manufacturing agreement with Hon Hai Technology Group Foxconn to build the MK-V and its battery packs at the Mahoning Valley, Ohio, plant.

As a wave of AI sweeps farming , developers are working to support more sustainable farming practices.

The NVIDIA Jetson platform provides energy-efficient computing to the MK-V, which offers advances in battery performance.

Tapping into six NVIDIA Jetson Xavier NX SOMs (system on modules), Monarch's Founder Series MK-V tractors are essentially roving robots packing supercomputing.

Monarch has harnessed Jetson to deliver tractors that can safely traverse rows within agriculture fields using only cameras. "This is important in certain agriculture environments because there may be no GPS signal," said Penmetsa. "It's also crucial for safety as the Monarch is intended for totally driverless operation."

The Founder Series MK-V runs two 3D cameras and six standard cameras. With the six Jetson edge AI modules on board, it can run models for multiple farming tasks when paired with different implements.

Supporting more sustainable farming practices, computer vision applications are available to fine-tune with transfer learning for the Monarch platform to develop precision spraying and other options.

Monarch offers a core of main applications to assist farms with AI, available in a software-as-a-service model on its platform.

The Founder Series MK-V has some basic functions on its platform as well, such as sending alerts when on a low charge or there's an unidentified object obstructing a path. It will also shut down from spraying if its camera-based vision platform identifies a human.

The tractor collects and analyzes crop data daily and can process data from current and next-generation implements equipped with sensors and imaging. This data can be used for real-time implement adjustments, long-term yield estimates, current growth stages and other plant and crop health metrics.

Wider availability of the tractor begins a new chapter in improved farming practices.

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