Virtually Incredible: Mercedes-Benz Prepares Its Digital Production System for Next-Gen Platform With NVIDIA Omniverse, MB.OS and Generative AI

Automaker showcases the vital role of simulation when bringing up new factories.

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Mercedes-Benz is using digital twins for production with help from NVIDIA Omniverse , a platform for developing Universal Scene Description (OpenUSD) applications to design, collaborate, plan and operate manufacturing and assembly facilities.

Mercedes-Benz's new production techniques will bring its next-generation vehicle portfolio into its manufacturing facilities operating in Rastatt, Germany; Kecskemét, Hungary; and Beijing, China — and offer a blueprint for its more than 30 factories worldwide. This "Digital First" approach enhances efficiency, avoids defects and saves time, marking a step-change in the flexibility, resilience and intelligence of the Mercedes-Benz MO360 production system.

The digital twin in production helps ensure Mercedes-Benz assembly lines can be retooled, configured and optimized in physically accurate simulations first. The new assembly lines in the Kecskemét plant will enable production of vehicles based on the newly launched Mercedes Modular Architecture that are developed virtually using digital twins in Omniverse.

By leveraging Omniverse, Mercedes-Benz can interact directly with its suppliers, reducing coordination processes by 50%. Using a digital twin in production doubles the speed for converting or constructing an assembly hall, while improving the quality of the processes, according to the automaker.

"Using NVIDIA Omniverse and AI, Mercedes-Benz is building a connected, digital-first approach to optimize its manufacturing processes, ultimately reducing construction time and production costs," said Rev Lebaredian, vice president of Omniverse and simulation technology at NVIDIA, during a digital event held earlier today.

In addition, the introduction of AI opens up new areas of energy and cost savings. The Rastatt plant is being used to pioneer digital production in the paint shop. Mercedes-Benz used AI to monitor relevant sub-processes in the pilot testing, which led to energy savings of 20%.

Next-generation Mercedes-Benz vehicles will feature its new operating system "MB.OS," which will be standard across its entire vehicle portfolio and deliver premium software capabilities and experiences across all vehicle domains.

Mercedes-Benz has partnered with NVIDIA to develop software-defined vehicles. NVIDIA will provide its DRIVE Orin system-on-a-chip and DRIVE software, with intelligent driving capabilities tested and validated in the NVIDIA DRIVE Sim platform, which is also built on Omniverse.

The automaker's MO360 production system will enable it to produce electric, hybrid and gas models on the same production lines and to scale the manufacturing of electric vehicles. The implementation of MB.OS in production will allow its cars to roll off assembly lines with the latest versions of vehicle software.

"Mercedes-Benz is initiating a new era of automotive manufacturing thanks to the integration of artificial intelligence, MB.OS and the digital twin based on NVIDIA Omniverse into the MO360 ecosystem," said Jörg Burzer, member of the board of the Mercedes-Benz Group AG, Production, Quality and Supply Chain Management. "With our new 'Digital First' approach, we unlock efficiency potential even before the launch of our MMA models in our global production network and can accelerate the ramp-up

significantly.”

Avoiding costly manufacturing production shutdowns is critical. Running simulations in NVIDIA Omniverse enables factory planners to optimize factory floor and production line layouts for supply routes, and production lines can be validated without having to disrupt production.

This virtual approach also enables efficient design of new lines and change management for existing lines while reducing downtime and helping improve product quality. For the world’s automakers, much is at stake across the entire software development stack, from chip to cloud.

The Kecskemét plant is the first with a full digital twin of the entire factory. This virtual area enables development at the heart of assembly, between its tech and trim lines. And plans are for the new Kecskemét factory hall to launch into full production.

Collaboration in Omniverse has enabled plant suppliers and planners to interact with each other interactively in the virtual environment, so that layout options and automation changes can be incorporated and validated in real time. This accelerates how quickly new production lines can reach maximum capacity and reduces the risk of re-work or stoppages.

Virtual collaboration with digital twins can accelerate planning and implementation of projects by weeks, as well as translate to significant cost savings for launching new manufacturing lines.

Learn more about NVIDIA Omniverse and DRIVE Orin .

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