SIEMENS ERLANGEN –

BUILDING THE FACTORY OF THE FUTURE

Erlangen, October 2026

Siemens Electronics Factory Erlangen – Facts & Figures

- **Founded:** 1971
- **Location:** Siemens Technology Campus, Erlangen, Germany
- **Factory Size:** ~45,000 m²
- **Employees:** 1,000 working in production
- **Specialization:** industrial control systems, drives and frequency converters for machine tools and production environments
- **Advanced Technologies:** Integrates digital twins, artificial intelligence, IT/OT convergence, Augmented and Virtual Reality and the industrial metaverse
- **Recognition:** World Economic Forum Digital Lighthouse Factory for advanced digital manufacturing
- **Strategic Investment:** Siemens is investing €500 million in the Technology Campus – a lighthouse project under the Made for Germany initiative.
- **Future of Manufacturing:** Establishes Erlangen as a global R&D hub and the nucleus of Siemens' industrial metaverse activities, while showcasing AI-powered, digital and sustainable manufacturing as a blueprint for the world's first fully AI-powered, autonomous and adaptive manufacturing site.
- **AI in Action:** Over 100 active AI algorithms deployed in production, logistics, quality inspection and maintenance
- **Manufacturing Performance of the Factory:**
    - 40% faster time-to-market
    - ~7% annual productivity gains through intelligent automation and digitalization
    - 99.99% quality level
    - 42% lower energy consumption (related to fossil fuels)

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Siemens Electronics Factory Erlangen from above

Fully automated production line

Automated guided vehicles optimize material flow and logistics across the factory floor

Industrial robot supporting automated handling processes

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Collaboration between Siemens and NVIDIA

The strategic partnership between Siemens and NVIDIA brings together two complementary strengths: NVIDIA provides the AI technology and computing power that make advanced Industrial AI possible. Siemens contributes its deep manufacturing expertise and integrates these technologies into real-world factory environments, turning them into practical solutions that help manufacturers automate processes and improve productivity.

The Siemens Electronics Factory Erlangen serves as the showcase and application environment for the collaboration, where AI technologies are being integrated into live production processes.

By combining AI computing infrastructure with industrial software, automation systems, digital twins and factory operations, the partners aim to accelerate the adoption of Industrial AI at scale. Their shared vision is to develop the world's first fully AI-powered, adaptive manufacturing site that can autonomously optimize workflows and respond more flexibly to changing production requirements.

The collaboration provides a practical example of how Industrial AI can be applied in a production environment to enable more productive, flexible and resilient industrial operations.

Use Cases

1) **Digital Twin of the Factory – Digital Twin Composer**

   A regularly updated virtual copy of the entire factory that stays in sync with what is happening on the shop floor. Factories are constantly changing: machines are moved, production lines are reconfigured, equipment is updated. But traditionally, keeping the digital model accurate meant someone had to manually update it every time something changed in the real world. Digital Twin Composer, accelerated by NVIDIA Omniverse libraries, automatically connects the virtual factory with live data from sensors, machines and production systems, creating a "living" model that updates itself as the real factory changes. Factory operators and engineers can test different solutions in the virtual environment, and validate their decisions before implementing them on the actual production floor, reducing the effort needed to maintain an accurate digital twin by up to 50 percent.

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2) **AI-Powered Printed Circuit Board Assembly Inspection with Process Preparation X**

A circuit board is the essential foundation inside electronic devices, using printed pathways to connect and power components so they can work together. In electronics manufacturing, setting up vision quality inspection systems for new circuit boards traditionally requires waiting for the first physical prototype – a process that can take several weeks – and then spending hours manually programming inspection equipment based on that sample. Siemens and NVIDIA have eliminated this bottleneck by creating photorealistic virtual prototypes of circuit boards before they physically exist, using digital twin technology and NVIDIA Cosmos world models to generate thousands of synthetic images showing both perfect boards and potential defects. These virtual images are used to train the inspection equipment weeks in advance, so when the very first real board comes off the production line, the system is already programmed and ready to instantly check its quality. Scaled up, this approach reduces engineering effort by up to 85 percent and cuts time-to-market by 40 percent, allowing manufacturers to launch new products faster.

3) **Autonomous production planning and change response – Intelligence Center X for Operations**

Production planning is a constant puzzle of balancing capacity, demand, material availability and production line configurations. Traditionally, this requires planners to manually analyze thousands of possibilities and trade-offs. At the Siemens Electronics Factory Erlangen, Siemens Intelligence Center X Agents that are built with the NVIDIA Factory Operations Blueprint, support them with this. When a new order comes in, the AI agents automatically generate and assess multiple production scenarios, considering costs, order volumes, material availability, and line configurations. Production planners can compare the impact of each option through key performance indicators and select the most suitable plan. Before it is put into operation, the proposed plan is validated against a physics-based digital twin that simulates the behavior of the real factory, combining automated intelligence with human expertise and oversight. End-to-end agentic production planning promises up to 20 percent in cost savings, including capital and rush costs, while making production more agile and responsive to changing demands.

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4) Physical AI & End-of-Line Packaging – Startup Challenge

Many factory tasks, such as end-of-line packaging involving flexible materials and high variability, have traditionally been too expensive to automate. These tasks are often performed manually by human workers and can be repetitive and physically demanding. While AI and robotics have expanded machine capabilities, the current challenge involves developing robots capable of perceiving their environment, making autonomous decisions, and handling objects with high variability that are difficult to grasp and require high dexterity. This capability is termed "Physical AI".

The Electronics Factory Erlangen has already successfully automated their outbound logistic processes with Physical AI. The next step in automating packaging processes is tackled in an ecosystem approach: Siemens launched the Startup Challenge, inviting 45 startups globally to propose solutions for a specific packaging problem at the Erlangen factory. The objective is to automate a manual packaging workflow that requires robots to perform tasks such as grasping deformable accessory bags containing manuals and cables from a box, inserting these bags into designated compartments within product packages, closing the product package lid and applying a label at a designated area on the package. The system must adapt to multiple product variants and configurations without requiring reprogramming.

This approach combines startup innovation with validation in an operational factory setting. The challenge format is intended to facilitate the transition of further Physical AI use cases from research and development into production, thereby expanding Siemens' network of Physical AI collaborators.

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