Photonics21 Press Release

EU invests €6 million in new networks to power factories of the future

A new project is developing an ultra-fast, energy-efficient industrial internet using light-speed lasers and next-generation flexible and adaptable wireless to power future smart factories.

A new European project supported by the Photonics Partnership that aims to power the digital backbone of modern industry is laying the foundations for ultra-connected smart factories.

With a €6 million investment from the European Commission, the SPRINTER project is developing cutting-edge optical and wireless technology that could replace today's sluggish, power-hungry industrial networks with super-fast, laser-driven communications systems — all built for the chaos of the factory floor.

Using light instead of electricity, this new industrial internet offers instant, wired and wireless connections between machines, rooms or even buildings — making it ideal for the fast, flexible demands of future smart factories.

At present, factories and industrial sites rely on a mixture of copper cables, unreliable Wi-Fi, and switching systems.

For the real-time, AI-driven future factories and warehouses that deploy automated robots, sensors, machine learning, and 5G-controlled systems, existing setups are too slow and power-hungry.

But, relying on its expertise in high-speed networks, the SPRINTER team is redesigning the 'nervous system' of modern industry.

At the heart of the initiative are high-speed optical transceivers, or tiny devices that use laser light to fire data through fibre cables at up to 200 gigabits per second – enough to download a full HD movie in under a second.

These transceivers are designed to be cheap, reliable and ultra-efficient, offering industries a considerable improvement in performance.

"Industry 5.0 demands faster, smarter, and more robust networks," said Efstathios Andrianopoulos, a researcher on the ICCS team that leads SPRINTER. "Our goal is to make Europe the world leader in industrial photonics — providing the tools to support the next generation of automation, robotics and intelligent systems."

Dependability in Harsh Environments

The project is creating a dependable wireless communication network that continues to operate seamlessly in harsh, dynamic and extremely complicated environments.

The new SPRINTER hybrid (photonic/wireless) transceivers are being developed to switch from light to mmWave radio signals in order to offer more flexibility and backup, ensuring

immunity against any interference such as dust, smoke, or a passing bird blocks the beams of light.

"Factories are full of moving parts, dust, and interference — a nightmare for traditional Wi-Fi. That's why we are developing hybrid "free-space optical and mmWave" transceivers that combine laser and radio technologies to maintain wireless connections, even in the noisiest settings.

 "We are building a unified network platform that supports time-sensitive networking systems where delays of even milliseconds can mean the difference between smooth automation and a factory shutdown," said Andrianopoulos.

Four Prototypes

As part of its mission to transform industrial connectivity, SPRINTER is developing four advanced prototypes tailored to the demands of next-generation smart factories. As well as the **ultra-fast 200 Gb/s optical transceivers** for high-capacity core networks and **hybrid free-space optical** and **mmWave transceivers**, SPRINTER is developing wavelength-tuneable **10 Gb/s transceivers** that can dynamically adapt to changing conditions in real-time.

To boost flexibility and efficiency, the project is also building a **Reconfigurable Optical Add-Drop Multiplexer** (ROADM) optimised for space-division multiplexing, enabling intelligent data routing across complex networks – almost like smart traffic lights for data – to vastly increase the reliability and robustness of existing infrastructure.

Funded through the EU's Horizon Europe programme, SPRINTER brings together leading research centres and industry experts from across the continent, including specialists in photonics, telecommunications, and industrial automation.

Led by the Institute of Communication and Computer Systems (ICCS) in Athens, the SPRINTER project brings together 11 partners from across Europe and one from Israel, combining top research institutes with major industry players. Key contributors include Fraunhofer (Germany), IMEC (Belgium), LioniX International (Netherlands), and Universidad Carlos III de Madrid (Spain), alongside global tech firms like Ericsson (Italy) and Mellanox Technologies (Israel). Agile SMEs such as PHIX, CUMUCORE, and FILL GmbH add specialised expertise in photonic packaging, 5G networking, and smart manufacturing. Swiss partner CSEM also supports the project, contributing expertise in microtechnology and system integration.