

6G-IA's Endorsement of Photonics 21 "Lightspeed AI: Powering Europe's Next Generation AI Infrastructure with Light" Grand Challenge

The LightSpeed AI vision of a global photonic-powered AI fabric with massive computing capacities and its possible declension into a distributed European AI infrastructure (medium-sized and edge data centres interconnected through Europe's existing terrestrial, mobile and satellite networks) is fully consistent with the **Connected Digital Fabric (CDF)** framework put forward by 6G-IA and endorsed by ten partner associations, including Photonics21. In the Connected Digital Fabric, advanced connectivity is the integrating layer that binds AI and data, compute, microelectronics and photonics, trustworthiness, devices and software into a coherent Connected Digital Fabric. The photonic technologies identified by Photonics21 (ultra-high-capacity and energy-efficient optical interconnects, petabit-class fibre networking including multi-band, multi-core and hollow-core systems, optical switching, and enhanced optical resilience and security for AI workloads) are important enablers of this fabric. Equally, the proposal's recognition that a distributed compute-connectivity infrastructure requires secure, reliable protocol stacks and self-evolving, AI-driven network management supporting AI-native infrastructures aligns directly with the research agenda pursued by the European connectivity community under the SNS Programme. 6G-IA therefore considers these strategic research topics important and well suited for potential inclusion within the CDF framing in the next Multiannual Financial Framework.

Beyond research, 6G-IA sees concrete opportunities for cooperation on innovation and exploitation. The pan-European experimental infrastructures, trials and pilots developed under the SNS programme, in the context of the CDF, could offer a natural validation environment for photonic networking technologies at pre-commercial Technology Readiness Levels (TRLs), enabling early demonstrators of distributed AI infrastructures under realistic network conditions and accelerating the path from laboratory results to deployment. This encompasses photonic computing architecture design, algorithms, system-level integration for high-throughput AI workload, extreme trustworthiness, capability for self-monitoring and reconfiguration (performance optimisation and security), new fibres, amplifiers and PICs, co-packaging technology, and early demonstrators. 6G-IA likewise supports the skills and training dimension of the proposal: developing engineers and system designers with combined expertise in photonics, networking and AI is a shared priority, and joint training and coordination actions between the photonics and connectivity communities would strengthen Europe's talent base across the digital stack.

This statement expresses 6G-IA's support for the above-mentioned connectivity-related research, innovation and skills elements of the LightSpeed AI Grand Challenge initiative, and its readiness to explore joint activities with Photonics21 in these areas, as part of the overall concept of the Connected Digital Fabric that focuses on key connectivity technologies (e.g., radio, optical networks, cloud solutions, satellites, security, quantum networking etc.). For topics mentioned in the LightSpeed AI, the Connected Digital Fabric also identifies the need to find intersection points and collaboration opportunities with related enabling technologies, such as Microelectronics & Photonics that will require dedicated industrial pilot lines and manufacturing scale-up.

Contacts

6G Smart Networks and Services Industry Association (6G-IA)

E-mail : Office@6g-ia.eu

Website: <https://6g-ia.eu>

LinkedIn: <https://www.linkedin.com/company/6g-smart-networks-and-services-industry-association>