Press release

June 2023

EU project DESIRE6G lays foundation for 6G system architecture

Horizon Europe/JU SNS project DESIRE6G is a three-year project that started in January 2023 on the system architecture for future mobile networks. The envisioned 6G network will support new applications with extreme performance requirements. From zero power to extreme low latency or ultra-high reliability: the next generation of mobile communications should enable future advanced use cases, yet it should be simpler and more autonomous than 5G.

While 5G networks are currently being rolled out commercially, the world is already thinking about how to improve the capabilities of networks even further: a sixth-generation or 6G-network to be rolled out in early 2030s. With momentum building up for developing 6G, the European Union takes the lead in defining the architecture of the 6G-network. Specifically, the European Smart Networks and Services Joint Undertaking (SNS JU) public-private partnership has awarded a budget of 5.9 million euros for a three-year research project (2023-2025) that will develop ideas for the system architecture of a 6G network: *Deep Programmability and Secure Distributed Intelligence for Real-Time End-to-End 6G Networks* (DESIRE6G). Promoting the 6G vision, the DESIRE6G project is set to design and develop a novel zero-touch control, management, and orchestration platform, with native integration of AI, to support verticals with extreme performance requirements over a performant, measurable and programable data plane.

The University of Amsterdam (UvA) is leading DESIRE6G that involves a total of fifteen European partners. These include one the largest telecommunications service providers in the world (Telefonica), a leading mobile/ICT network provider (Ericsson), NEC Laboratories Europe-the European technology R&D center for the NEC Group, and a manufacturer of high-performance network HW (NVIDIA). The consortium is complemented by leading research institutes (UvA, Universitat Politècnica de Catalunya, Universidad Carlos III de Madrid, Eötvös Loránd University, Scuola Superiore Sant'Anna, University of Oulu and Consorzio Nazionale Interuniversitario per le Telecomunicazioni) and three highly innovative SMEs (Nubis PC, Tages Solidshield and Accelleran).

“In the three years that the project will run, we aspire to lay the foundations for 6G”, says Chrysa Papagianni, assistant professor at UVA and project coordinator. “There are concepts that are fundamental to our design. First of all, we want to make the network fully automated and optimize its performance with artificial intelligence at every level in the 6G system architecture. We facilitate deep programmability of the 6G network both vertically (control and data plane) and horizontally (end-to-end from the radio to edge and core network) to meet extreme performance requirements and increase flexibility and reusability of the infrastructure. Furthermore, we integrate security by design and follow a pure cloud-native approach for mobile network deployment. The Technology Readiness Level or TRL of the project gets to 3 or 4, which means that by the end of the project we want to show proofs of concept of what a 6G-network is capable of.”

“For the mobile industry it is crucial to always look ahead and find new use cases, new domains where better connectivity can help in increasing the quality of our life or the efficiency of production”, says Gergely Pongracz, network expert at Ericsson and the technical coordinator of the project. “5G and its evolution to 5G-Advanced enables a wide range of new use cases. Besides even higher performance it also comes with simplicity and easy manageability. However, envisaged future challenges beyond 2030 requires a more adaptable and dynamic architecture. 6G will naturally push the performance limits even further, but it must do it without creating a more complex system. Fortunately, we have every tool at hand to make it right this time: programmable data planes can make the network not just more flexible and resilient, but also more performant, as it will be possible to do more service-oriented optimizations. Cloud-native algorithms can introduce simpler scalability and resiliency methods. And distributed, fast control loops can increase reaction speed to anomalies. Yes, this is quite far from the centralized, complex system we used to have for generations.”

By the end of 2025 selected proofs of concept will be shown in the context of two representative 6G use cases: mixed reality and digital twin industrial applications. One demonstrator will involve the digital twins of industrial robotics applications while the second demonstrator will employ a factory maintenance application, where multiple video streams rendered by unmanned aerial vehicles will be merged/processed and delivered to an AR/VR headset.
The developed solutions will be demonstrated and tested through experiments in laboratory environments, and larger field evaluations utilizing diverse experimentation facilities; namely the 5TONIC laboratory (https://www.5tonic.org) in Spain and the ARNO testbed (http://arnotestbed.santannapisa.it) in Italy. All news, publications, and other outputs of the project will be available on the official project webpage at desire6g.eu.

Website: http://desire6g.eu

Twitter: @DESIRE6G_EU

LinkedIn: @DESIRE6G

Horizon Europe Grant Agreement No. 101096466

Project Coordinator:
Dr. Chrysa Papagianni
Institute for Informatics
University of Amsterdam

Technical Coordinator:
Gergely Pongracz
Research Area Networks
Ericsson Hungary

Co-funded by
the European Union