

## The future is quantum: EU countries plan ultra-secure communication network

At the Digital Assembly, 7 Member States agreed to work together to explore how to make available a quantum communication infrastructure in Europe, to boost European capabilities in quantum technologies, cybersecurity and industrial competitiveness.



At the Digital Assembly today in Bucharest, Romania, representatives of seven EU countries (Belgium, Germany, Italy, Luxembourg, Malta, the Netherlands, and Spain) signed a declaration agreeing to explore together, over the next 12 months, how to develop and deploy a quantum communication infrastructure (QCI) across the EU within the next ten years. This infrastructure would enable information and data to be transmitted and stored ultra-securely, and link communication assets all over the EU. It would integrate quantum technologies and systems into conventional communication infrastructures, and consist of two elements: an earth-based component making use of existing fibre communication networks linking strategic sites at national and cross-border level, and a space-based component to cover long distances across the EU and other continents.

The QCI will help Europe to secure its critical infrastructure and encryption systems against cyber threats, protecting smart energy grids, air traffic control, banks, healthcare facilities and more from hacking. It will also enable data centres to store and exchange information safely, and will preserve the long-term privacy of government data. The long-term plan is for the QCI infrastructure to become the backbone for Europe's Quantum Internet, connecting quantum computers, simulators and sensors via quantum networks to distribute information and resources securely all over Europe.

The first service to make use of this new infrastructure will be Quantum Key Distribution (QKD). QKD is an extremely secure form of encryption: it uses the principles of quantum mechanics to provide the sender and recipient of an encrypted message with an intrinsically secure random key in such a way that an attacker cannot eavesdrop or control the system. QKD can secure confidential data, power grids, government communications and digital transactions, even against crypto code-breaking by the quantum computers of the future.

Andrus Ansip, European Commission Vice-President for the Digital Single Market, said:

All sectors of our economy and society have the potential to benefit from deploying a quantum secure communication infrastructure all over the EU. This infrastructure will be able to secure financial transactions, keep the transmission, protection and long-term storage of sensitive data safe, and ensure the sovereignty of sensitive governmental information. In a world where securing our information online is of the utmost importance, Europe cannot afford to lag behind.

Commissioner for Digital Economy and Society, Mariya Gabriel, added:

In the years to come, the way we encrypt and secure our digital systems risks becoming vulnerable to ever more powerful computers, including quantum computers. To pre-empt this, and to protect our economy and society against cyber-threats, we need to work together at European level to keep our systems secure even as computers get faster. Therefore I am happy to see that today 7 EU countries have signed a declaration regarding the creation of a future quantum communications infrastructure. I am confident that other Member States will join this initiative, which has the potential to become the EU's next major success story.

## **Additional signatories**

In July 2019, Hungary, Portugal and Poland signed the declaration. At the end of 2019, it was also signed by Croatia, Cyprus, Greece, France, Lithuania, Slovakia, Slovenia, Sweden and Finland, in early 2020 by the Czech Republic, Austria, Bulgaria, Denmark and Romania, in October 2020 by Estonia, and in February 2021 by Latvia, and it was signed by Ireland in July 2021.

## **Next steps**

The countries signing the QCI declaration have agreed to work both together and with the Commission to prepare an action plan to explore the benefits and feasibility of building the QCI infrastructure. This will cover preliminary studies, the technological options available for developing and deploying QCI all over the EU, the funding required, and the security certification schemes that would be needed for the QCI to deploy technologies that support sensitive applications. It will also focus on the further development of high-quality, competitive European cybersecurity and quantum technologies, and their integration in the QCI, infrastructure, contributing to increasing Europe's digital autonomy.

## Background

In October 2018, the European Commission launched the first phase of the Quantum Technologies Flagship, a €1 billion, ten-year initiative pooling resources around a commonly agreed science and technology roadmap. Five fields are covered: quantum communication, quantum computing, quantum simulation, quantum metrology and sensing, and the basic science behind quantum technologies.

In the period 2021-2027, quantum technologies will be supported by the Digital Europe programme, which will develop and reinforce Europe's strategic digital capacities, as well as the Commission's Horizon Europe programme, contributing to research and space applications.

Frequently asked questions about the Quantum Communication Infrastructure

Quantum Flagship factsheet

Signed Declaration of Cooperation on Quantum-secure Communication Infrastructure

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