
QUANTUM
FLAGSHIP
QSN
PARTNERSHIP
Quantum
Secure
Networks
Parternship
October 16 - 20 | 2023
EQTC
European Quantum
Technologies Conference 2023
Hosted by Quantum Valley Lower Saxony

QSN Partnership At a Glance

General numbers

25 M €

3.5 years
duration
(2023-2027)

170 researchers
42 partners
14 countries in Europe

The first year

2 meetings

5 publications
Early 2023

Quantum Flagship Ecosystem and other European projects

QSNP gathers the know-how and expertise from all technology development phases of the projects CIVIQ, UNIQORN and QRANGE.

All of the Quantum Flagship projects are aligned in the pursuit of the overall goal to consolidate and expand European scientific leadership and excellence in this research area and to kick-start a competitive European industry in Quantum Technologies.

QUANTUM Communication { UNIQORN, CiViQ, QRANGE } QSN PARTNERSHIP

QIA PASQuanS OpenSuperQ and more

Future outcomes

10
new spin-offs

10
prototypes per year

500
publications

70
conferences

Quantum cryptography and beyond

- Unforgeable quantum cryptograms for e-payment networks.

- Quantum comm with super-aditive quantum receiver.

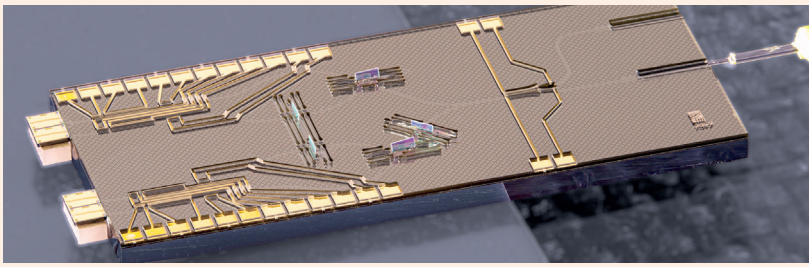
- Key establishment with performance beyond QKD in weaker security models.

- Secure multi-party computation.

- Long-term secure storage based on practive secret sharing and QKD.

- Quantum- distance bouncing.

- Secured distributed quantum metrology and sensing.



Technology development in Quantum Cryptography for future deployment in EuroQCI and private Telecom sector.

Develop

Develop advanced technology for quantum secure communication networks against the ever increasing power of computers and sophistication of algorithms (even for quantum computers).

Integrate

Integrate quantum cryptography technology at component, system and network levels, also into classical communication.

Deploy

Deploy the technology into Quantum-safe critical governmental infrastructures, private telecommunication market sector and future quantum internet.

Research pillars

P1 Next Generation Protocols

WP2
QKD advanced performance, including security proofs

WP3
Entanglement based and device independent QKD.

WP4
Protocols beyond QKD.

Significant progress in secure quantum communicaton in the past years:

High-TRL QKD systems deployed in moderate-scale testbeds all over Europe with strong security assumptions (trusted users, trusted intermediate nodes)

Milestone satellite quantum communication experiments in China

Low-TRL photonic integrated systems for QKD and proof-of-principle implementations of other quantum cryptographic functionalities.

Functionalities and applications

Prepare and measure QKD, coin flipping, oblivious transfer, digital signatures, position based crytography

Device-independent QKD, certification and verification, secret sharing, conference key agreement, anonymous communication

Quantum money, secure multiparty computing, simple leader election

Blind, delegated and distributed quantum computing, distributed quantum sensing, byzantine agreement

Research pillars

P2 Integration

WP5
Photonic integrated circuits (PIC), electronic circuits, signal and post procesing.

WP6
Quantum and classical cryptography integration.

WP7
Large-scale quantum communication networks

Paving the path towards **exploitable Quantum Advantage.**

Demonstrate that Quantum Technology can work (pilot role of QKD in the TRL Ladder)

At large scale:
Cost-effective
Small Form Factor

Over Real-World Networks
Integration & Management
Compability, upgrade

Provide Real-World Security
QC + PQC > QC
Evaluate HW Impl.

Research pillars

P3 Applications and use cases

WP8
EuroQCI

WP9
Use cases for commercial services.

Specific objectives:

- Prototypes up to TRL6: QRNG, QKD, in a module or integrated format, with proper interfaces.
- Companies will increase the TRL further (to 8 or 9) for production and deployment in EuroQCI.
- Commercial use cases for the private market sector: business-to-consumer (B2C), business-to-business (B2B) and business-to-business-to-consumer (B2B2C).
- Technology and business requirements, the definition of a business model, and the identification of stakeholders, associated with the necessary operational procedures for service lifecycle management: fulfilment, assurance and accounting.

Challenges and way forward

Practical approach:
Trust and key management
Reuse, redefine

Futureproofness
Set the ground for technology evolution

Quantum/classical integration
PQC convergence
Migration paths from PKI-based trust fabrics

Convergence über alles
Partition is the worst enemy of a network
Public demand as technology tractor

COMPANIES

ACADEMIC PARTNERS

AIT
Austrian Institute of Technology, Austria
Leading innovator with a key role in the European RTO landscape.

CNRS
Centre National de la Recherche Scientifique, France
Identifying and conducting reasearch that is in the interest of science as well as the technological, social, and cultural advancement of France.

DTU
Technical University of Denmark Denmark
Inspiring innovation through interdisciplinary collaboration, fostering sustainable technologies for a globalized world.

FAU
Friedrich-Alexander University Erlangen-Nuremberg, Germany
Research university with top-tier infrastructure dedicated to the unity of research and teaching.

NKUA
National and Kapodistrian University of Athens, Greece
Institution of educational and scientific excellence and a source of intellectual wealth for the country.

ICCS NTUA
The Institute of Communication and Computer Systems – National Technical University of Athens, Greece
Elevating Greek ECE research, fostering global recognition, inspiring innovation and nurturing young scholars.

ICFO
The Institute of Photonic Sciences, Spain
Excellence in fundamental and applied research in the fields of photonics and quantum technologies.

INRIA
Institut national de recherche en sciences et technologies du numérique, France
World-class research and technological innovation on digital science and technology.

ACADEMIC PARTNERS

IPP
Institut Polytechnique de Paris, France
Delivering world-class training programs and cutting-edge research in the engineering field.

IST
Instituto Superior Tecnico, Portugal
A beacon of excellence in Architecture, Engineering, Science, and Technology through education, research, and innovation.

IT
Instituto de Telecomunicaçoes – Universidade de Aveiro, Portugal
Pioneers in secure quantum tech solutions through interdisciplinary expertise.

KU Leuven
Katholieke Universiteit Leuven, Belgium
A fusion of math, computer science, and engineering to pioneer cryptology breakthroughs, shaping global security standards.

POLIBA
Politecnico di Bari, Italy
Delivering world-class training programs and cutting-edge research in the engineering field.

QuTech
Delft University of Technology – QuTech, Netherlands
Scalable prototypes of quantum computers and safe quantum internet, based on the fundamental laws of quantum mechanics.

U. Vigo
Universidade de Vigo, Spain
Vibrant hub with 3 campuses, driving impactful R&D and fostering prolific scientific achievements.

ULB
Université Libre Bruxelles, Belgium
Research in theory of quantum technology, experimental quantum optics and machine learning.

ACADEMIC PARTNERS

UM
University of Malta, Malta
Highest teaching institution in Malta, leaders in European funded projects and global partnerships.

U. Vienna
Universität Wien, Austria
Europe's historic and expansive hub for research and education, fostering innovation through collaboration and critical thinking.

U. Warsaw
University of Warsaw, Poland
Public, research-driven university, offering education and exploration in humanities, social and natural sciences, and interdisciplinary projects.

UPB
Paderbörn University, Germany
Modern research and educational institution with an innovative mindset.

UPM
Universidad Politécnica de Madrid, Spain
Applied advanced computer techniques to the simulation of complex phenomena in science and engineering

UPOL
Palacký University Olomouc, Czech Republic
Exploring quantum information processing to unveil quantum encryption and computing and a deeper insight into physics.

UniPD
Università di Padova, Italy
Pioneers in space quantum communications, from single photon exchange in 2008 to breakthroughs in QKD and its applications.

FOUNDRIES & RTOs

CEA
French Alternative Energies and Atomic Energy Commission, France
Interdisciplinary research in energy, defense, security, and tech, fostering synergy between fundamental and technological advancements

HHI
Fraunhofer Heinrich Hertz Institute, Germany
World leader in research and development of components for mobile and optical communications networks.

IMEC
Interuniversity Microelectronics Centre, Belgium
World-leading R&D and innovation hub in nanoelectronics and digital technologies.

TU/e
Eindhoven University of Technology, Netherlands
Scientific curiosity with a hands-on mentality combined to design solutions to highly complex problems.

Tyndall
Tyndall National Institute – University College Cork, Ireland
Leading European deep-tech research centre in integrated ICT hardware and systems, specialising in both electronics and photonics.

SPIN OFFs & SMEs

ALEA
Alea Quantum Technologies ApS, Denmark
Building high-speed quantum random number generators to secure the future interconnected world.

LuxQuanta
LuxQuanta, Spain
Enabling a new age of securikty in telecommunications with Quantum Key Distribution (QKD) systems.

MPD
Microphoton Devices, Italy
Cutting edge photon counting technology catering to diverse applications worldwide.

Nextworks
Networks, Italy
R&D, consulting, training, and cutting-edge solutions for 5G/6G networks and IoT systems.

Q*bird
Q*bird, Netherlands
Shaping a future of versatile quantum connectivity by advancing quantum data communication tools.

Quside
Quside, Spain
The most advanced randomness solutions for cybersecurity and high-performance computing markets.

ThinkQuantum
ThinkQuantum, Italy
Quantum-based technology solutions for cyber security and communication systems.

VPI
VPI Photonics, Germany
Industry leading solutions for integrated photonic devices, components, optical transmission system and network applications.

NETWORK AND CRYPTO INTEGRATORS

CNS
Cryptonext Security, France
Providers of quantum-safe software solutions to migrate IT/OT infrastructures to quantum safe.

NBLF
Nokia Bell Labs, France
Solving human needs through the power of human intellect.

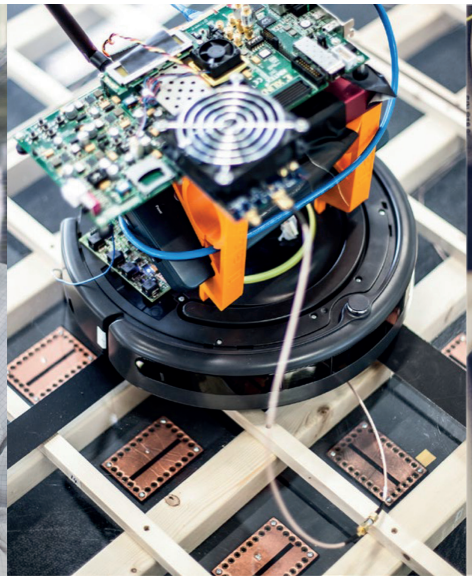
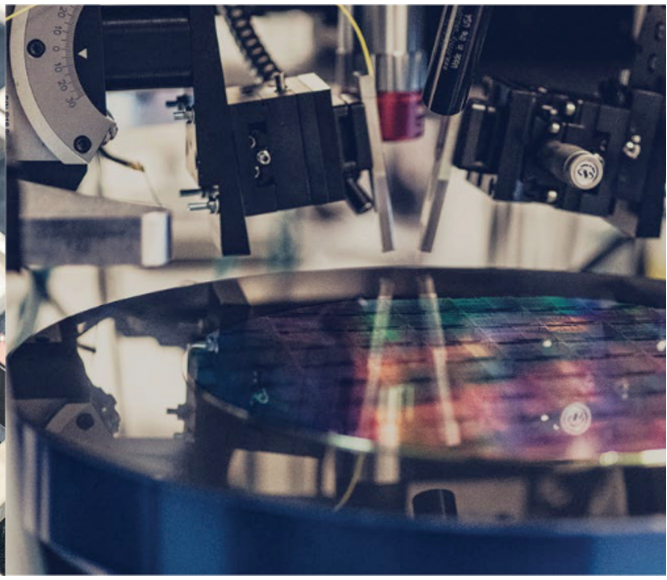
TELECOM OPERATORS

DT
Deutsche Telekom, Germany
Achieving a superior customer experience and exploring disruptive technologies for future telecommunications infrastructures.

Orange
Orange, France
Leading provider of global IT and telecommunication services to multinational companies.

Telefónica
Telefónica, Spain
In the forefront of scientific research pushing the boundaries of fundamental science and technology.

TIM
Telecom Italia, Italy
Cloud, IoT and Cybersecurity end-to-end solutions to develop the digital transformation of the country.

SPEAKERS AT EQTC2023

Who will you see at EQTC 2023?

Not final

Antonio Acín

Professor, *ICFO*

Plenary Session: Quantum Flagship Success Stories: Quantum Communication

17 October 2023 14:00h

Paolo Villoresi

Professor, *University of Padua*

Expert Panel: The European Strategy on Quantum Communication

17 October 2023 14:50h

Eleni Diamanti

Research Director, *CNRS*

Expert Panel: The European Strategy on Quantum Communication

17 October 22023 14:50h

Next-Generaton Quantum Technology Highlights from Science, Industry and Start-Ups

17 October 2023 17:00h

Vicente Martín

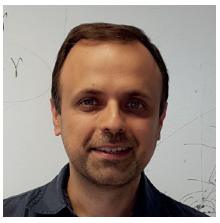
Professor, *Universidad Politécnica de Madrid*

Expert Panel: The European Strategy on Quantum Communication (moderator tbc.)

17 October 22023 14:50h

Parallel Sessions – Scientific Advances Across the Quantum Domains
Track II: Quantum Communication

19 October 2023 11:30h



Yasser Omar

Professor, *Instituto Superior Técnico*

Interactive Session on the EU Quantum Strategy and the Role of National Initiatives (moderator)

17 October 2023 16:00h

Parallel Sessions – European Showcases of Technology Maturity
Track I: Quantum Computing & Simulation

18 October 2023 14:30h

Who will you see at EQTC 2023?

Not final

Felix Wissel

Researcher, ***Deutsche Telekom***

Presentation and Discussion of the Quantum Flagship's Strategic Research and Industry Agenda (SRIA)

18 October 2023 10:00h

Sebastián Etcheberry

CTO, ***LuxQuanta***

Parallel Sessions – European Showcases of Technology Maturity

Track II: Quantum Communication

18 October 2023 14:30h

Marie-Christine Slater

Resarcher, ***Austrian Institute of Technology***

Parallel Sessions – Scientific Advances Across the Quantum Domains

Track II: Quantum Communication

19 October 2023 11:30h

Mathieu Bozzio

Postdoctoral Researcher, ***Universität Wein***

Parallel Sessions – Scientific Advances Across the Quantum Domains

Track II: Quantum Communication

20 October 2023 11:30h

Vanesa Díaz

CEO, ***LuxQuanta***

qsnp.eu

QSN PARTNERSHIP

For more information on QSNP:

projectmanagement@icfo.eu

Follow QSNP