QUANTUM EUROPE

From national strategies to European leadership

Quantum Europe Strategy • EU Quantum Act • Joint action with Member States

QUANTUM ACT

QUANTUM EUROPE STRATEGY

Forum Teratec | Paris | 21 October 2026

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European Commission

Europe starts from strength, but faces a conversion gap

Scientific leadership does not automatically become industrial leadership

- **#1 Global position in quantum scientific publications**
- **~1/3 of quantum companies worldwide are based in the EU**
- **>€11 bn EU + Member State public investment over five years**

But Europe still faces:

- Fragmentation
- Scale-up challenges
- Limited private investment
- Insufficient early demand
- Technology and supply-chain dependencies



The challenge: Science → Technology → Industry → Market

Outlook: Global Public Funding



UK
€4bn

CANADA
€1.9 bn

UNITED STATES
€7.67bn

EUROPE
over €11bn
on European level and through national programmes

European Union (EU):
- **Germany:** €4.9B
- **France:** €2.0B
- **Netherlands:** €965M
- **Spain:** €60M
- **Finland:** €24M
- **Austria:** €115M
- **Hungary:** HUF 3.5B (~€11M)
- **Denmark:** DKK 2.7B (~€406M)
- **Sweden:** SEK 1.6B (~€160M)
- **European Commission:** €2.0B

JAPAN
€7.91bn

ROK
€2.14bn

CHINA
€8-15bn
range estimates based on various sources

AUSTRALIA
€610M

Region/Country	Public Investment	Private Investment	Key Players
European Union	MS +6bn + €2B Quantum Flagship (HE)	Lower compared to global counterparts	Universities, startups, MS and EU-led, IQM, Pasqal, AQT, Blueforce,…
United States	National Quantum Initiative	Strong from bit tech players such as Google, IBM, Microsoft	Google, IBM, Microsoft, Rigetti, Qera, Quantinium, …
China	Large state-backed investment in quantum infrastructure	Growing, government-driven	Government-led, Alibaba, Huawei
Canada	Gov-private partnerships on quantum computing research	Strong collaboration with D-Wave, Xanadu	D-Wave, Xanadu, …
Japan	Significant gov investment (Moonshot, Quantum Strategic Program)	Growing with Toshiba, NTT, Fujitsu	Toshiba, NTT, Fujitsu, Q*Quantum
UK	Major public funding through UK National Quantum Technologies Programme	Moderate, focused on startups and collaborations	OQC, ORCA, Riverlane, Universal Quantum
Australia	State investment in quantum computing and communications	Collaboration with companies like Silicon Quantum Computing	Silicon Quantum Computing, Quantum Brilliance, Diraq

The international competition and the corresponding public funds having radically increased over the past years

Source: qt.eu, McKinsey, Qureca

National Quantum Strategies

A European Landscape

Snapshot: National Quantum Strategies / Agendas (EU Member States, October 2026)

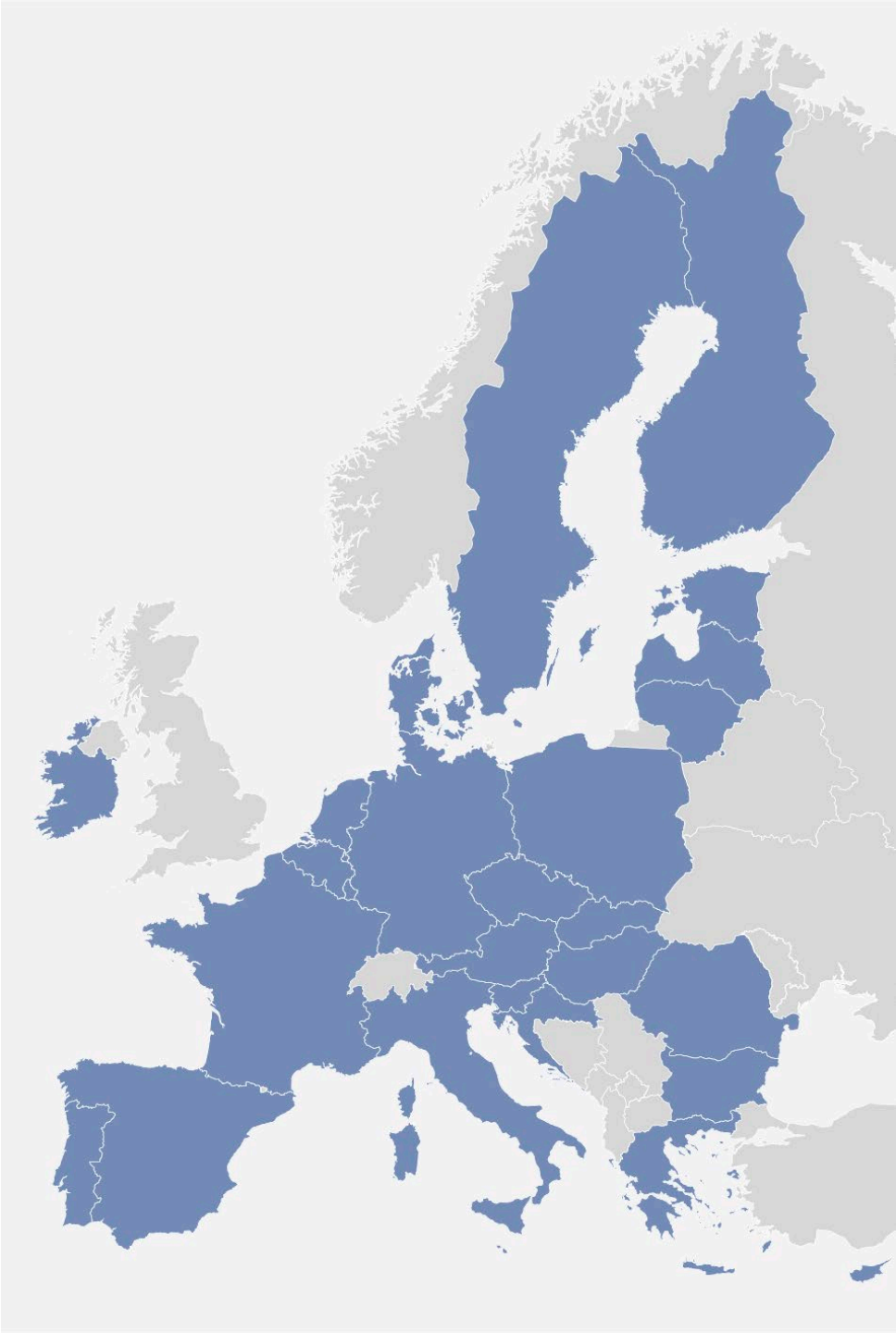
- **Czechia:** National Strategy for Quantum Technologies 2026+ (2025)
- **Denmark:** National Strategy for Quantum Technology (2023)
- **Finland:** Quantum Technology Strategy 2025–2035 (2025)
- **France:** Plan Quantique (2021)
- **Germany:** Handlungskonzept Quantentechnologien (2023)
- **Ireland:** Quantum 2030 (2023)
- **Italy:** Strategia Italiana per le Tecnologie Quantistiche (2025)
- **Luxembourg:** Luxembourg's Quantum Strategy (2025)
- **Netherlands:** Nationale Agenda Quantum Technologie (2019)
- **Romania:** National Quantum Technologies Strategy 2024–2029 (2024)
- **Slovenia:** Quantum Technologies Strategy to 2035 (2025)
- **Spain:** Estrategia Nacional de Tecnologías Cuánticas 2025–2030 (2025)
- **Sweden:** National Quantum Technology Strategy (2026)

Other Member States (programmes, initiatives or policy development)

- **Austria:** Quantum Austria programme (2021)
- **Belgium:** Quantum4Belgium initiative
- **Poland:** Updated quantum technology policy assumptions (2026)
- **Portugal:** National Strategy for Emerging Technologies, including quantum technologies
- **Others:** Quantum-related activities in Hungary, Latvia, Lithuania, Greece and other MS

Towards Greater European Coordination

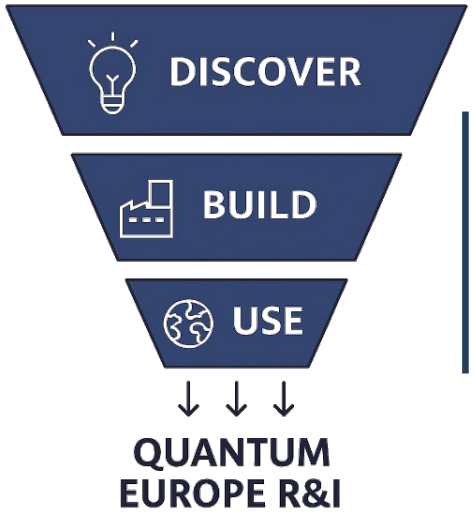
- **27 Member States** signed the European Quantum Declaration.
- **QTCG, SRIA and shared infrastructures** support coordination.
- **Align national strengths and investments** to build European critical mass.



Quantum Europe Strategy
One lifecycle, five strategic areas



FROM LAB TO MARKET



SCALING QUANTUM CAPABILITIES



Quantum computers in 10+ EU countries

EuroHPC

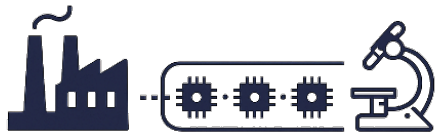
EuroQCI secure quantum communication

Quantum sensors gravimeters, MRI inertial navigation

Pilot lines for production and testing

Interoperability & hybrid systems

GROWING EUROPE'S QUANTUM ECONOMY



- 6 industrial pilot lines
- EU Design Facilitiy + cloud-based tools
- Public procurement to stimulate demand
- QU-TEST: EU-wide certification + benchmarking
- IP strategy + resilience for EU supply chain

STRATEGIC AUTONOMY IN SPACE, SECURITY & DEFENCE

Quantum sensors for GNSS-free navigation

Quantum communication in IRIS² satellites



Roadmaps: PQC, dual-use applications, ESA cooperation

CIVIL

DEFENCE

Quantum in EU defence and NATO strategy

Quantum in EU defence and NATO strategy



A QUANTUM WORKFORCE FOR THE FUTURE

110,000+ graduates/year in related fields

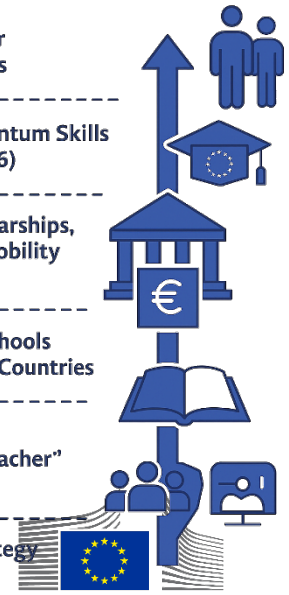
European Quantum Skills Academy (2026)

Training, scholarships, internships, mobility schemes

Qutreach to schools and Widening Countries

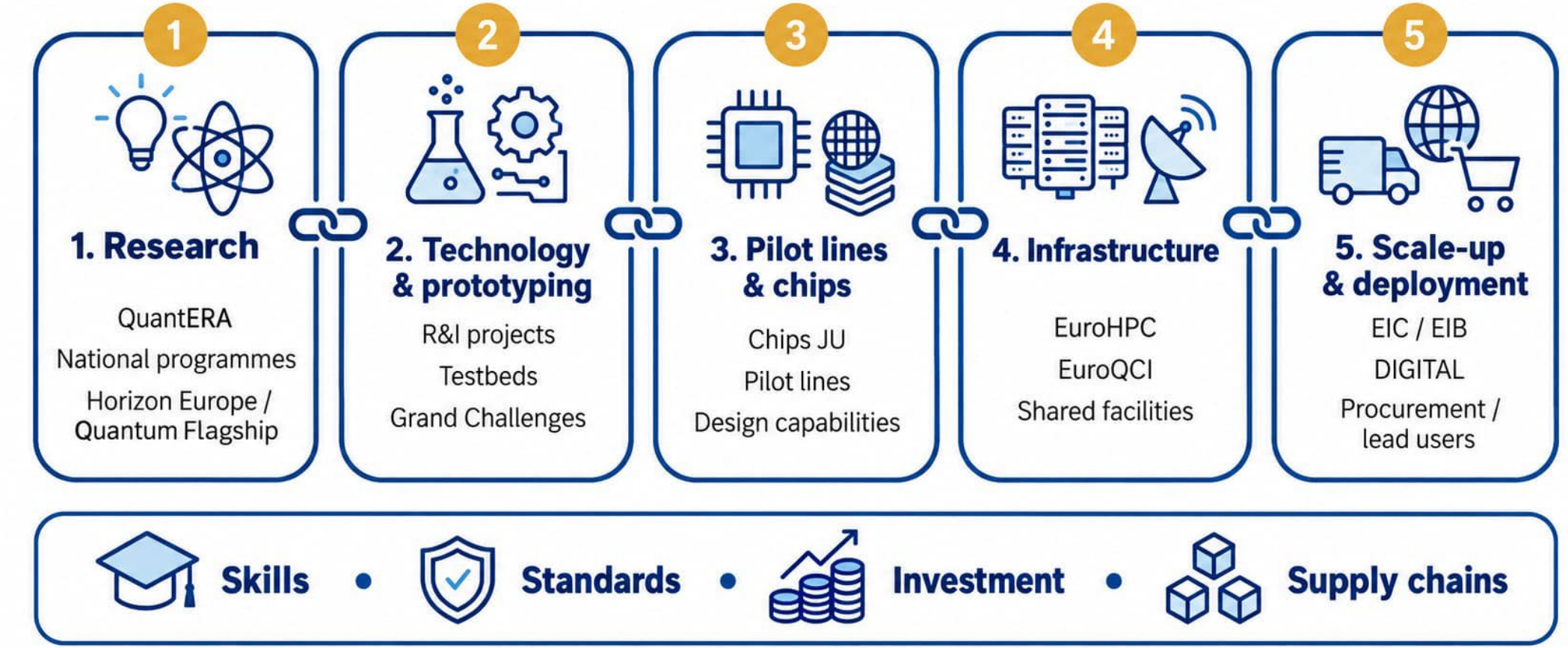
Talent portal + 'Teach the Teacher" modules

Robust IP strategy



Europe’s funding and innovation chain

Connecting national and European efforts from research to industrial deployment



European added value: connecting national strengths, shared infrastructures and industrial scale-up

QUANTUM Technologies

DG CNECT C.2 • Quantum Technologies



Quantum Computing & Simulation

- Hybrid HPC+Quantum Integration (e.g., EuroHPC)
- Complex Simulation (Pharma, Energy Materials)
- NISQ to Fault-Tolerant Systems

Quantum Communication

- Quantum Communication Research and innovation
- Quantum Internet Development
- Deployment of quantum communication and internet infrastructure (testbed and pilots)
- Quantum Repeaters & Memories Research

Quantum Sensing & Metrology

- GPS-free Navigation & Timing (PNT)
- Next-gen Medical Imaging (Brain, Heart)
- Environmental Monitoring (Gravity, Fields)

Quantum computing (hardware: QPUs, cryogenics, control, error correction): TRL 4-5
Strong R&D and advanced prototypes, but limited fault-tolerance and industrial-scale manufacturability.

Quantum computing (software, algorithms, compilers, hybrid workflows, early use cases): often **TRL 5–7**
Pilots and demonstrations exist, especially in hybrid classical–quantum settings, but many use cases still depend on hardware progress.

Quantum communication (especially QKD and network components): frequently **TRL 6–8**, with some elements **TRL 8–9**
Field trials and early deployments are more mature here than in QC hardware.

Quantum sensing & metrology (timekeeping, gravimetry, magnetometry, imaging in niche settings): typically **TRL 6–9**
Several sensing applications are already close to market or commercial in specific niches, while others remain in pilot phase.

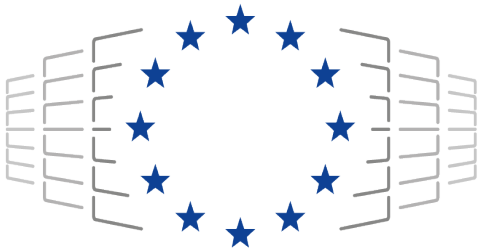
EuroHPC Joint Undertaking

Deployment QC

QUANTUM FLAGSHIP

From strategy to implementation:

EuroHPC JU and Chips JU



EuroHPC
Joint Undertaking

Chips JU

A **dedicated Quantum Technologies Pillar** covering computing, simulation, communication, sensing and metrology. Connecting R&I, infrastructures and industrial deployment.
Strengthening **European coordination** on investments, standards, skills and industrial uptake.

- Supporting **quantum chip design, prototyping, fabrication** and testing through pilot lines.
- Leveraging **semiconductor synergies** through design platforms, pilot lines and competence centres.
- Developing **quantum-specific PDKs, scalable manufacturing** and resilient supply chains.

Complementary instruments connecting research, chip design, fabrication, quantum infrastructures and industrial deployment.

Why a Quantum Act now?

Quantum technologies are moving from **science to strategic deployment.**

Europe must act now to turn its research leadership **into industrial capacity, trusted deployment and economic security.**

Global race is accelerating

The US, China and other major economies are scaling public and private investment faster than in Europe.

+

Quantum SMEs struggle to scale-up and access late-stage finance

Europe remains fragmented and slower in translating breakthroughs into deployable technologies.

+

Quantum is now a security and competitiveness file

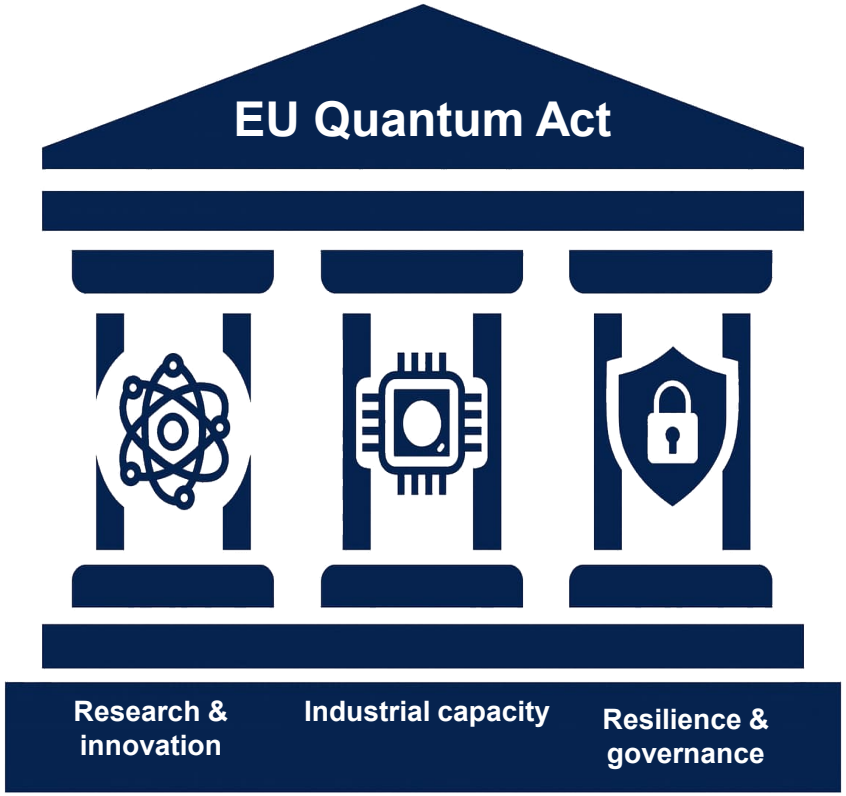
Quantum will affect computing, secure communications, sensing, defense, critical infrastructures and future industrial leadership.

=

The Quantum Act will provide a comprehensive legal framework to bring quantum to the next level

It will align EU and MS action, support **industrialization, create demand, and secure critical quantum value chains.**

EU Quantum Act: objectives and direction



1. Boost research and innovation
Strengthen Europe's science and technology base and improve coordination across the Union.

2. Scale up industrial capacity
Support the transition from research to industrial capability, including quantum chip pilot lines and design capabilities.

3. Reinforce **supply-chain resilience and governance**
Address critical dependencies, strengthen European value chains and improve strategic coordination.

Connecting national strengths to build a competitive and resilient European quantum ecosystem.

Three priorities for European quantum leadership

Building European critical mass while preserving national strengths



1. Protect scientific excellence

Sustain **frontier research, talent and innovation** as the foundation of Europe's quantum leadership.



2. Connect research to industrial scale-up

Strengthen links between **research, shared infrastructures, industry and market uptake**.



3. Coordinate national and European efforts

Align investments, combine complementary strengths and build European critical mass.

National strengths. European scale. Global competitiveness.

EUROPEAN QUANTUM TECHNOLOGIES CONFERENCE
Advancing Quantum
Dublin 2026



Brand-new Quantum Vertical Exchanges (QVX) for technology providers, use-case developers, buyers & validators, and investors. To help demand creation

[HOME | EQTC](#)

QUANTUM EUROPE STRATEGY

QUANTUM ACT

Many thanks

More info at http://qt.eu

QUANTUM FLAGSHIP

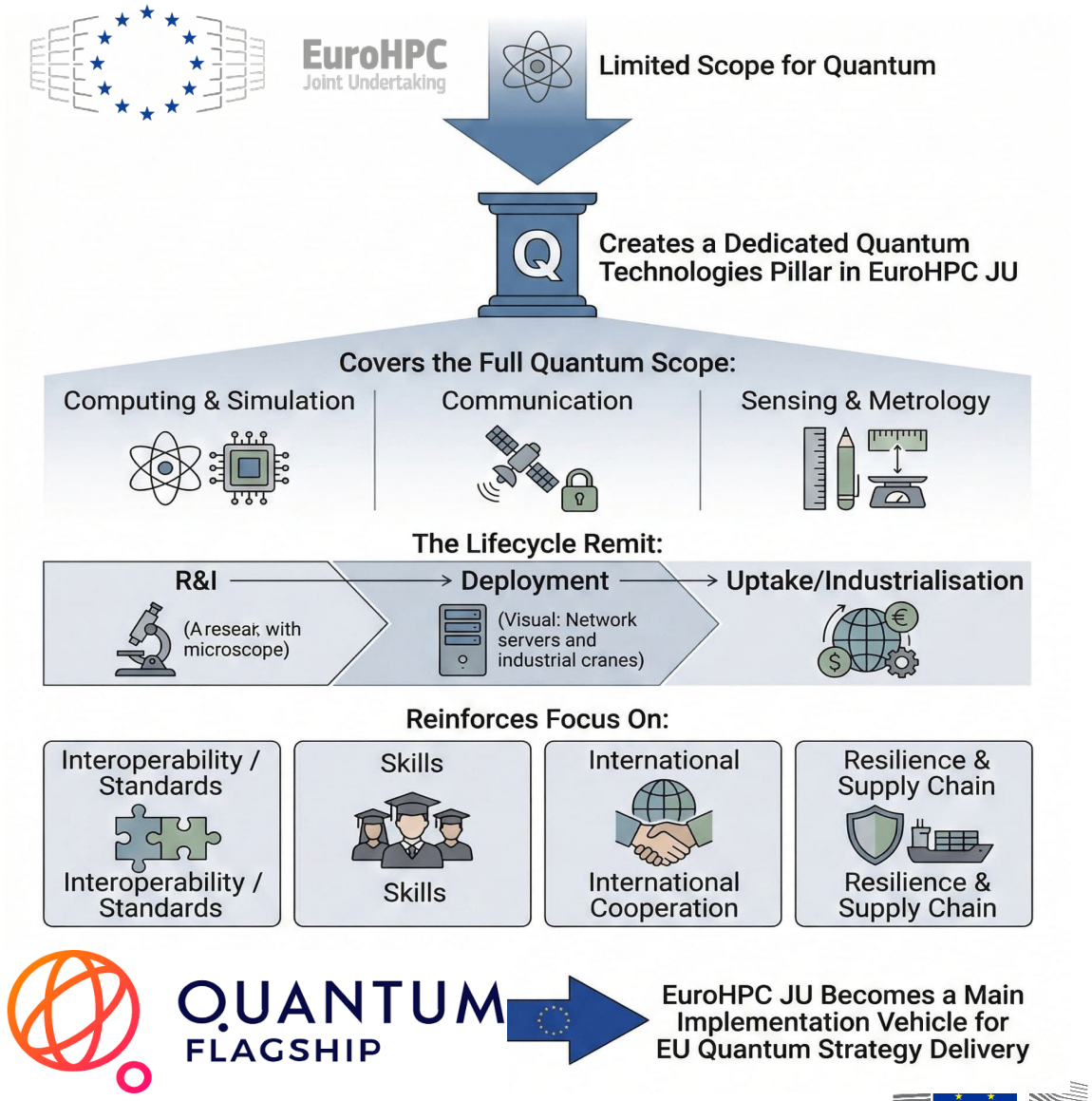
REFERENCE

ADDITIONAL SLIDES

For questions and discussion | Not part of the 15-minute talk

EuroHPC JU: A European framework for implementing the Quantum Europe Strategy

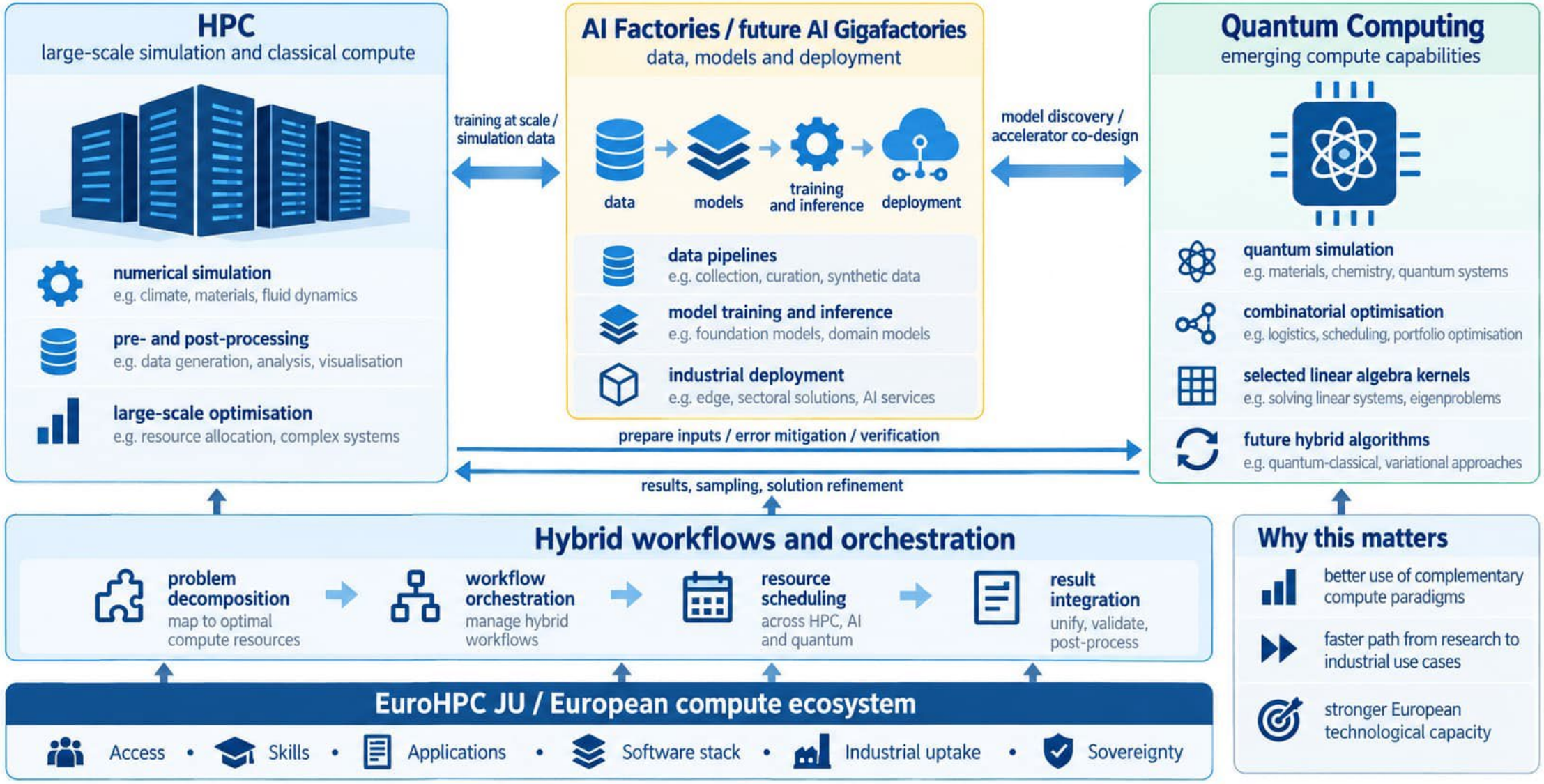
- A dedicated Quantum Technologies Pillar covering **computing and simulation, communication, sensing and metrology**.
- An **integrated approach** connecting research and innovation, deployment and industrial uptake.
- **Stronger European coordination** through shared capabilities, Member State participation, standards and resilient supply chains.



EuroHPC
Joint Undertaking

How Quantum Computing complements HPC and AI (Giga)Factories

A hybrid European compute ecosystem for advanced research, industrial innovation and deployment



Shaping the next European quantum roadmap

From technology roadmaps → SRIA → policy and investment priorities



6 TECHNOLOGY ROADMAPS

1. Quantum Chips Industrialisation
2. Quantum Computing & Simulation
3. Quantum Communication
4. Supply Chain & Enabling Technologies
5. Quantum Standardisation
6. Quantum Sensing & Metrology

- Define technology gaps, capabilities, milestones and industrial priorities
- Become the core technology chapters of the updated SRIA
- Provide technical and strategic input for future European policy and funding

Updated SRIA

Europe's shared technology & Industrial roadmap

Quantum Act | Next MFF 2028-2034 | EU & National programmes



QCS Quantum Infrastructures

Quantum Computing and Simulation - EuroHPC

Quantum Simulators & Hosting Entities Overview

2 Quantum Simulators (100+ Qubits)

- **Jülich: JUWELS – PASQAL QS** *(Germany)*
- **GENCI: Joliot-Curie – PASQAL QS** *(France)*

➤ Both fully operational in **2025**

6 Selected Hosting "Entities" (1st CFEI)

Consortia of 30 participating countries

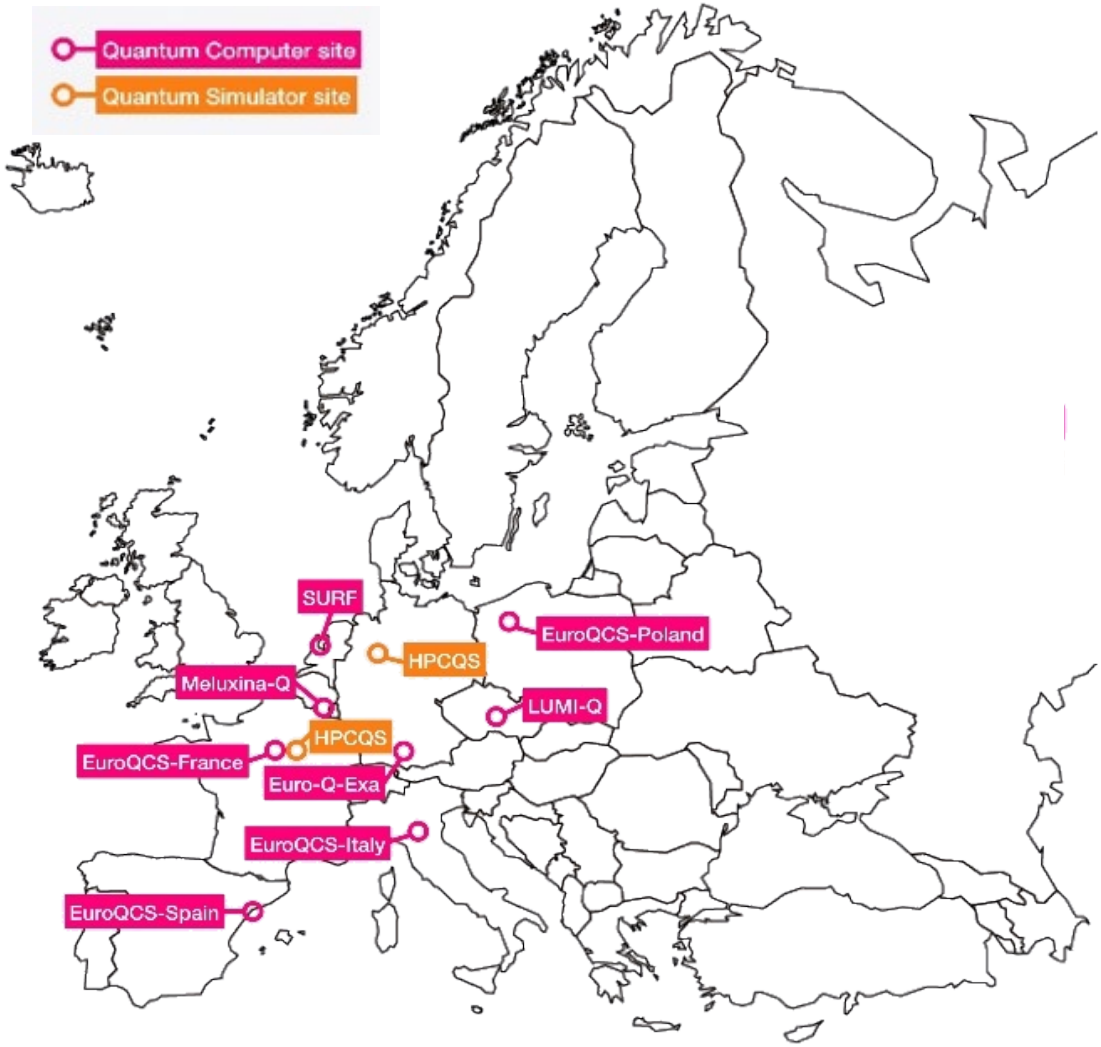
- **Euro-Q-Exa** – *Superconducting Qubits (DE)*
- **LUMI-Q** – *Superconducting Qubits (CZ)*
- **EuroQCS-Spain** – *Superconducting Qubits (ES)*
- **EuroQCS-Italy** – *Neutral Atom Qubits (IT)*
- **EuroQCS-Poland** – *Trapped Ion Qubits (PL)*
- **EuroQCS-France** – *Photonic Qubits (FR)*

➤ All systems expected to be operational in **Q2/Q3 2025**

2 Additional Hosting "Entities" (2nd CFEI)

- **EuroSSQ-HPC** – *Semiconductor Spin-Qubits (NL)*
- **MeluXina-Q** – *Semiconductor Spin-Qubits (LU)*

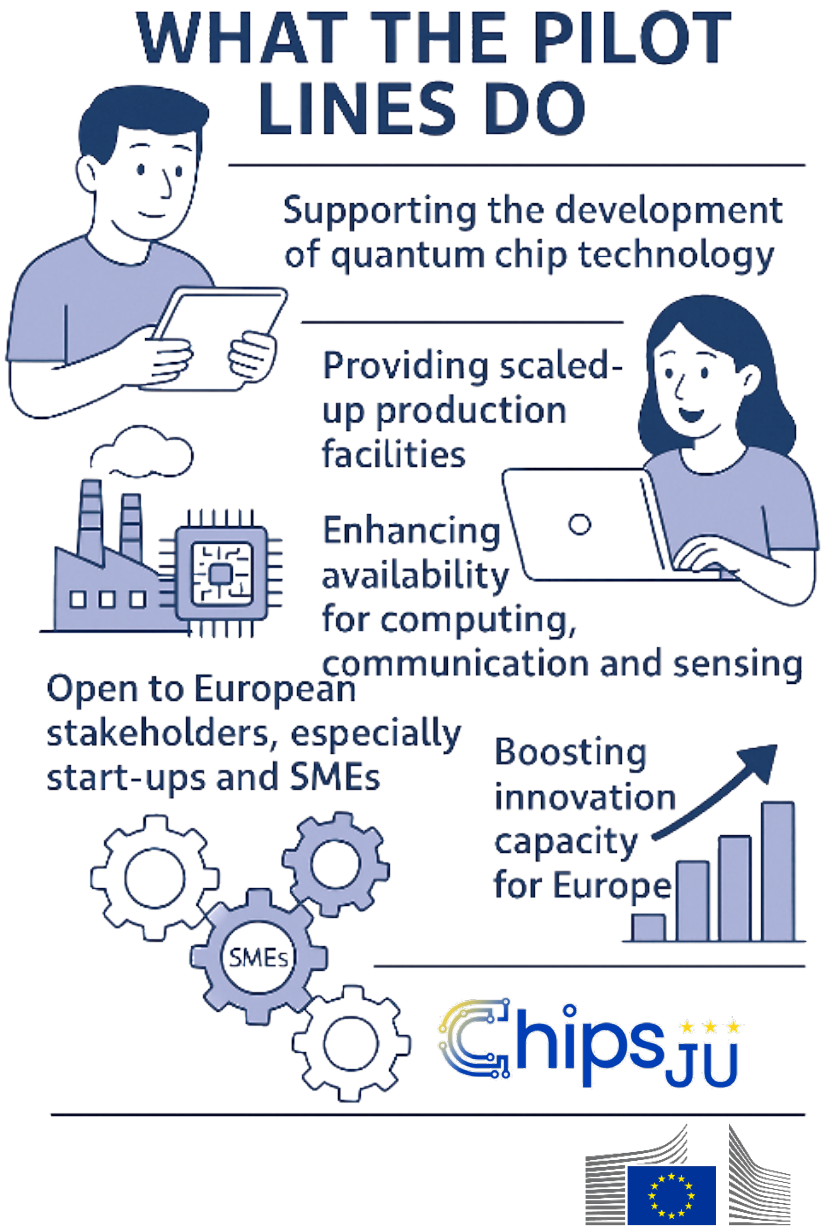
➤ First system expected to be operational in **Q2 2026**



Quantum Stability Pilot lines

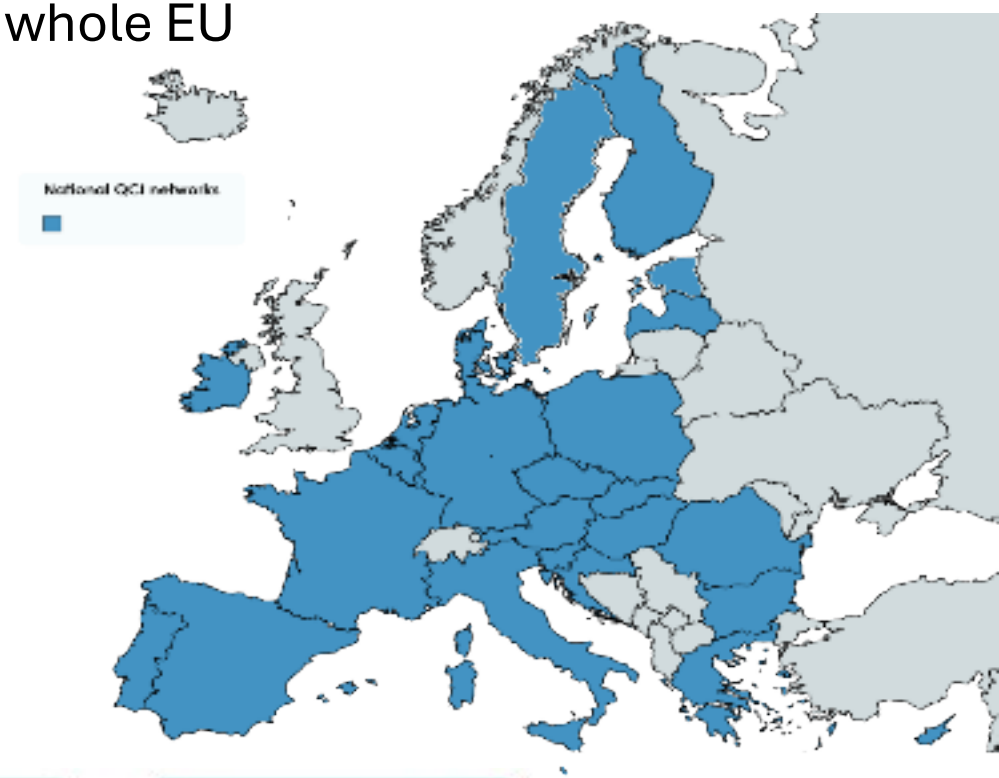
Growing Europe's Quantum Economy

Quantum Tech	Technical Focus	Strategic Objective
Superconducting	Integrated microwave control, scalable fabrication, coherence preservation	Industrial-scale yield of superconducting QPUs
Photonic	Quantum Photonic Integrated Circuits (QPICs), monolithic integration, photon sources	Enable photonic QPUs & QComm chips with CMOS-compatible fabrication
Semiconducting	Silicon spin qubits, CMOS-compatible fabrication, 2D/3D stacking	Transfer spin-based QPUs from labs to fabs, scalable readout & packaging
Diamond-based	NV and SiV centers in diamond, sensing and computing integration	Advance EU self-sufficiency in quantum sensors and QPUs based on diamond
Neutral Atoms	Atom arrays, optical tweezers, laser beam integration	Create pilot-level capability for neutral-atom-based digital/analog QPUs
Trapped Ions	Micro-fabricated ion traps, vacuum packaging, integrated laser systems	Establish EU trapped-ion foundry with sustainable chip-level production



EuroQCI quantum communications

- Integrated **satellite and terrestrial** system spanning the whole EU for ultra-secure exchange of cryptographic keys
- Part of the EU Secure Connectivity Programme (**IRIS²**)



→ **<u>Deployments</u>**

*Terrestrial segment

→ DIGITAL: **6 industrial & 26 national projects, CSA**

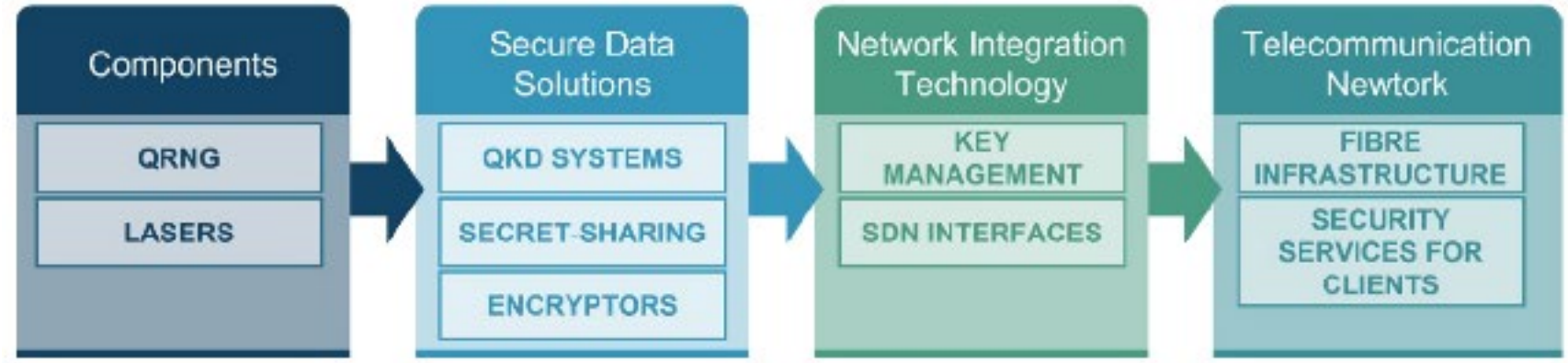
→ Ongoing: **procurement for QKD testing & evaluation**

→ 2024+: CEF **call for cross-border connections** / OGS

*Space segment

→ Eagle-1

→ SAGA





Quantum Skills Digital Academy

Launched on 1 May 2026 for 4 years (until 30 April 2030)
Coordinated by Aarhus University | 74 partners | Lump-sum budget: EUR 20 million

Establish a central EU-level academy to deliver specialised training in quantum technologies, targeting different education levels and professional profiles.

Scope of activities:

- Master's and doctoral programmes (ISCED 7 & 8)
- Stand-alone training modules for professionals
- Hands-on quantum lab experiences, internships and summer schools
- Teacher training ("teach the teacher"), including visits to quantum labs
- Outreach to underrepresented groups, including women and less-developed regions

Ecosystem building:

- Strong partnerships with academia, industry and research centres
- Promotion of industry-linked education and quantum career pathways
- Integration with EU initiatives such as the Quantum Flagship and the Deep Tech Talent Initiative

Measuring impact:

- KPIs on trained individuals, industry uptake, satisfaction and inclusiveness
- Progress monitoring aligned with the Digital Decade and the EU Skills Framework

From scientific excellence to industrial leadership

Europe’s quantum future will be built across the full value chain

1. Europe has the science

- Maintain scientific leadership.

2. Europe must build the industrial pathway

- Connect materials, devices, fabrication, integration and scale-up.

3. Europe must create markets

- Bring together technology providers, industry, investors and public users.

The question is no longer only: “Can we build it?”

It is also: “Can we scale it in Europe?”. And beneath that, for the roundtable:

- **What shared European capability would most accelerate SiC from research devices to scalable products?**
- **Where should Europe build critical mass together rather than duplicate capabilities nationally?**