EPIC meeting 27th June 2022

GRUPPO TIM

Second Quantum Revolution: technologies and applications

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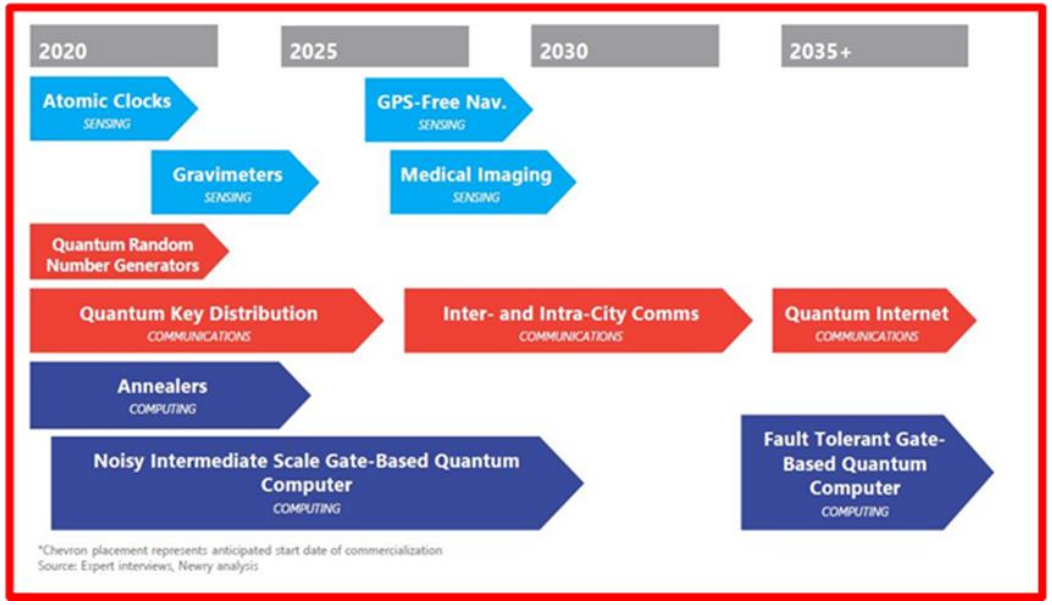
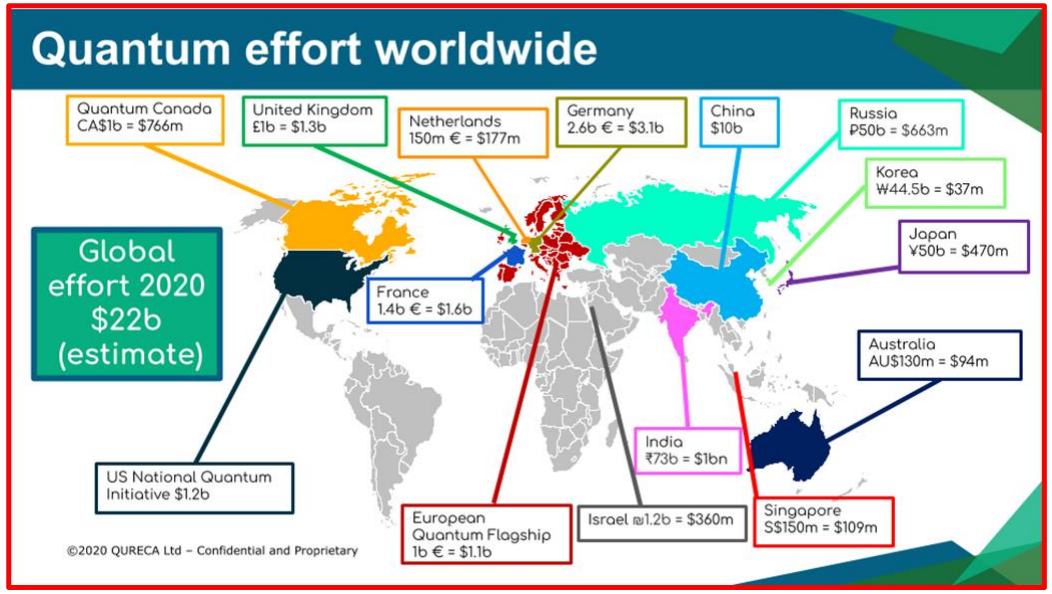
The Second Quantum Revolution is underway

- **Examples of evidences that there is a growing international interest on Quantum Technologies and Services:**
  - **Several experiments and field-trials**
  - **Private and public investments**
  - **Increasing number of patents on Quantum**
  - **Growing number of start-ups**
  - **Efforts in all Standardization Bodies**
- **Main Applications**
  - **Quantum communication : quantum effects are employed to transmit digital data in a quantum-secure way (e.g., QKD).**
  - **Quantum computation: new kind of computers that use quantum effects to speed up data processing.**
  - **Quantum simulations**
  - **Quantum sensing and metrology**

Roadmap of Quantum technologies





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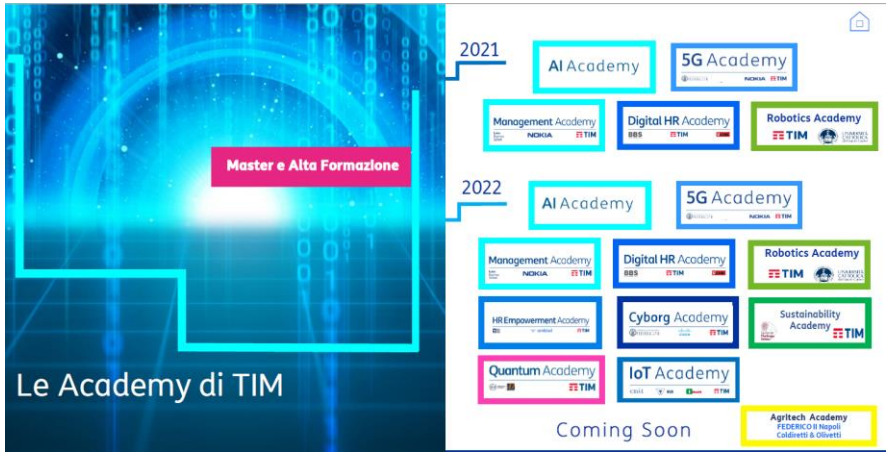
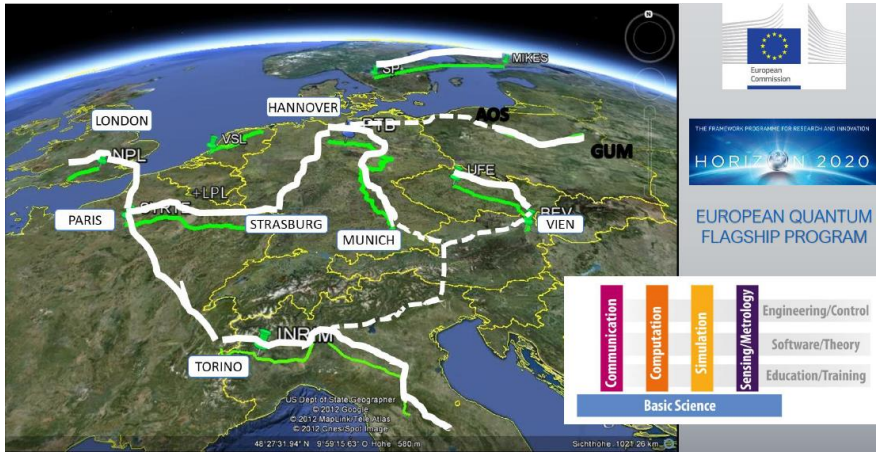
Main activities in TIM

- **Investment of Telsy (TIM Group) in QTI (spin-off CNR)**
- **Experimental activities on QKD: Telsy e QTI**
- **Collaboration with Universities: Quantum Security and Computing**
- **Participation in EU projects of Quantum Flagship and Euro-QCI**
- **Participation in Standardization activities**
- **Trends reports and technical communication su Quantum**
  - https://www.gruppotim.it/tit/it/notiziariotecnico/edizioni-2020/n-2-2020.html
- **TIM Quantum Academy**

Quantum Telecommunications Italy

Telsy





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Example of participation in European Projects

QSAFE - Detailed system study for a Quantum Communication Infrastructure

Background

Euro-QCI (Quantum Communication Infrastructure) Call “Tender Study on the System Architecture of a Quantum Communication Infrastructure” (link).

Only two projects in Europe: QSAFE and OQTAVO
Project Start: May 2021 – Duration: 18 months

Main objectives

- To define the functional/system architecture of Euro-QCI, the implementation roadmap, including costs and timeline (focus on QKD optical networks)
- To support EC in reaching the objective to run a **EuroQCI demo by 2024 and initial operational services by 2027**
- considering also integration with space QKD and PQC (Post Quantum Cryptography)
- looking at upgradability towards Quantum Ready Networks and Quantum Internet

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Example of participation in Standardization

- TIM Chair in GSMA IG Work-item on Quantum Networking and Services
  - https://www.gsma.com/newsroom/resources/ig-11-quantum-computing-networking-and-security/attachment/ig-11-quantum-computing-networking-and-security-2/
  - https://www.gsma.com/newsroom/resources/quantum-networking-and-service/
- CEN CENELEC
  - https://www.cencenelec.eu/areas-of-work/cen-cenelec-topics/quantum-technologies/
- IETF - Quantum Internet Research Group (qirg)
  - https://datatracker.ietf.org/group/qirg/about/
- ETSI - Quantum Safe Cryptography
  - https://www.etsi.org/technologies/quantum-key-distribution
- ITU-T Focus Group on Quantum Information Technology for Networks (FG-QIT4N)
  - https://www.itu.int/en/ITU-T/focusgroups/qit4n/Pages/default.aspx

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