Report on the Quantum Flagship kickoff

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Videos available online

Quantum Flagship kickoff in numbers

- Participants (based on the number of registration):
  - Day 1: 439
  - Day 2: 320
- Types:
  - Participant of funded project: 175
  - Member of day 2 working groups: 91
  - European commission and institutions: 13
  - National government: 43
  - Press: 9
  - Other academia: 150
  - Other: 63

36 countries; 70 Industry participants
Quantum Fleet?

- Framework Programme
- Member States
- Education
  - Early Career Investigators
- Technology supply R&D
- Science
  - Comp
  - Simul
  - Sens
  - Comm
- Digital Europe
- Space
- International cooperation?
  - Japan
- High-performance computing
- Advanced digital skills
- Cybersecurity
- Build the first quantum computer in Europe
- Pan-European secure quantum network
- Intelligent drug design
- Ultrasensitive diagnostics for healthcare
- Navigation for autonomous driving

Quantum Flagship Kickoff, 2018
Open floor discussion, October 29th

- What is the role of Basic Science in the flagship? Is it going to disappear?
  - Basic Science is vital for the initiative but is not its main focus.
  - Basic Science is an integral part of every proposal that has been funded: key resource within each project in any of the application pillar, so it is definitely not going to disappear in the Flagship.
  - Evaluation of the ramp-up phase projects: usual EU peer-review process (assessing excellence, impact and implementation) with no strategic criteria factored in; this can be changed.

- Is there a European official policy on international cooperation on QTs, especially given the current international situation?
  - No official EU policy on International cooperation in QT; very complex problem starting to be addressed.
  - Differences in investments:
    - US: federal investments (DARPA, IARPA, DOE and the likes) and National Labs, plus private companies (Intel, IBM, Google, etc.) which can pour resources in the field without fearing failure.
    - China: money is not even an issue; expertise might be, but they are closing the gap.
    - EC aware of this and not willing to depend on non-EU providers for critical components, being hardware and/or software, of the future Digital Single Market.
    - EC is willing to listen to the ideas from the QT community to setup asap a strategy.
Open floor discussion, October 29th

- Around 100 ideas were not funded in this call; what can be done for not wasting the relevant ones? And, connected to this, how can new partners be included in the existing efforts?
  - Details of the submitted proposals not disclosed
  - QT Community should come up with a list of topics (per pillar) that for strategic reasons are considered to be a must for the success of the QT Flagship
    - Example: scalability/miniaturation of quantum systems compatible with the fabrication techniques of the semiconductor industry being considered for an additional call under the QT Flagship
  - QT Community should discuss and propose additional instruments/approaches/measures that could be implemented in future calls (post ramp-up phase)

- Are there new measures foreseen for Small and Medium Enterprises?
  - EU double role of SMEs and start-ups: create new jobs; convert QTs into commercially viable products, ultimately bringing the flagship results to the EU citizens
  - QT industry community should propose new measures to help and stimulate SMEs, and push for them to be implemented.
Strategic Research Agenda Working Group, October 30th

- Presentation and discussion on
  - Where we are at and what is missing after the announcement of first FS projects
  - Relevance of 3, 6, 10 year challenges
  - The role and added value of Basic Science and cross cutting activities

- Outcomes relevant for the BoF
  - Key areas are missing underlining the need for strategic decision making in the process (SAB in the future)
  - 2-stage proposal submission proposed as mechanism to help ensure SRA is addressed. Could also allow grouping of proposals/partners.
  - Need to facilitate inclusion of non-funded community. e.g. EU/National programmes but also QuantEra can not do everything.
  - Engineering, materials, fabrication and packaging facilities are fragmented - needs federation to scale up QT across all areas.
  - Startup accelerator programmes needed for fast and flexible funding to bring in new capabilities and grow the supply chain
  - Certification & standards across all areas is required. This is a long term process and needs dedicated effort and funding.
  - Education and training seen as key tasks to ensure the needed quantum aware workforce
  - Need for more societal engagement, not just outreach, to understand how QT services will be accepted - improve technology uptake.
  - Academic and Industry communities agree that basic science is necessary for sustainable QT industries and markets.
  - Synergies need to be found and instruments developed for the FS to work with other programmes and initiatives
Innovation Working Group, October 30th

- **Connect with existing trade or professional associations**
  - Connection with new platforms and organizations were suggested:
    - professional associations in communication, computing, medicine
    - Scientific societies (IOP, EPS)
    - EU programs on process industry (EPOS), Embedded Intelligent Systems (Artemis)
    - Organizations from the end-user side
  - Classify the platforms depending on whether they are transverse or focused to a specific field

- **Promote workshops with sessions devoted to applications**
  - dedicated to a specific sector
  - to support start-ups/spin-offs,
  - at non-quantum industry events,
  - showcase day for venture capitalists with start-ups from the Quantum Flagship

- **Connect potential start-up creators with business incubators / accelerators / innovation boot camps / venture capital**
  - Provide training/education for young professionals: entrepreneurship, write a business plan
  - Help VCs invest in start-ups. Run showcase events for start-ups with VCs
  - Make access to facilities easier for start-ups
  - Address the shortage of skills that start-ups face (Issue with young talents setting up their businesses abroad)
Innovation Working Group, October 30th

- Connect European technology/ nanofabrication and nano-manipulation platforms amongst each other and with Start-ups and SMEs
  - Consider platforms able to develop new processes specific to quantum technologies
  - Identify specialists who can act as broker between the quantum community and facilities/ platforms
  - Use organisations that are working with different platforms to gain access to them
  - Look at the foundries roadmap, which already include ideas/strategies to include quantum technologies
- Develop criteria / methodology for identifying use-cases
  - Use case that are early adopters but low volume: e.g. Gravitational Waves Project
  - Clarify what the user community need and what the quantum community can provide (e.g. in QSim)
  - Publish use cases for the community to be able to access them.
  - We should not go too far as overselling
  - Look for existing matching software's and evaluate their use to find new use-cases.
- Standardization (QFLAG)
  - Standardisation should be a stand-alone project and not part of innovation WG.
- Intellectual property (QFLAG)
  - Prepare guidelines for the flagship that consortia can use to deal with IP agreements
  - Joint effort is required
# Quantum Community Network, October 30th

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**QCN Chair:** Tommaso Calarco, **QCN Vice-Chair:** Yasser Omar

Light brown color: not yet nominated or not yet officially confirmed.
Engaging with Education

- Need to educate and train engineers and IT specialists to enable them to deal with quantum concepts on a more applied level.
- To keep Education in focus it should be addressed in explicit calls for projects.
- Development and evaluation of teaching concepts for non-specialists (especially engineers and computer scientists)
- An Education & training link between the Digital Europe and the Quantum Flagship was mentioned at the meeting. More links to other programs will be helpful, e.g.
  - EU programme for the Competitiveness of Small and Medium-Sized Enterprises
  - Connecting Europe Facility
  - European Earth observation program
  - European Satellite navigation system
  - Youth Employment Initiative
- Unified coordination of education & training project calls within the Quantum Flagship.
Closing remarks

- Role of basic science is important, however, the goal of the Flagship is to bring technology into markets.
- Suggestion: in Grenoble results of kickoff event should be disseminated
- We should have a clear selection rule and a clear evaluation and decision processes
- Strategy is important. Benchmark against rest of the world – what is our strength, where are we weak?
- Link to national activities and also strengthen bilateral and multilateral funding