

Quantum Flagship Kickoff Event

October 29 & 30 2018, Vienna

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Overview

Launch event of the Quantum Flagship under the AT Presidency

- ✓ Present the first 20 funded projects
- ✓ Consult the QT stakeholders at large
- ✓ Constitute / structuring the SEB governing body

Overbooked participation: Day 1(500-), day 2 (300+)







	AM – Projects overview and networking						
9:00	Introductory remarks Quantum Flagship: The ramp-up phase and its governance						
10:00	Overview of funded projects Pre-Announcement of the next QuantERA call Open floor: Stakeholders' expectations towards the Flagship						
	Main outcomes						
✓ Broad consensus on the governance structure							
✓ Good coverage of QT areas except quantum computing							
→ need to reinforce (semiconductors)							
✓ Strop	ong national interest in QT						
	→ additional QuantERA call without EU top up						
🗸 The	Flagship is expected to federate all QT activities in Europe						





PM – Festive launch of the Flagship

- 14:00 Welcome remarks by the Austrian Presidency
- 14:15 Opening of the Quantum Flagship by Roberto Viola
- 14:30 Scientific / Industrial keynote by A. Zeilinger / T. Breton

15:10 High level <u>policy debate</u> on perspectives for QT in Europe 11 Ministers/State Rep: AT, RO, FR, DE, IT, ES, PT, SI, FI, NL, CH

Main outcomes

- ✓ The launch of the Flagship is a key milestone for Europe
- ✓ Full support from all present MS in continuing the QT Flagship
 - \rightarrow Playground for ground breaking research on QT
 - \rightarrow Go for large scale deployment of Quantum Key Distribution
 - \rightarrow Possibly consider going for Quantum Computer mission



8:30-9:00



Open Session Closed Session (projects) QSA track SEB track Festsaal Johannessaal Engaging with the SRA WG and the Innovation WG Innovation Exploitation and IPR (IPR helpdesk / EPO) Open discussions based on input expressed by participants upon Innovation Exploitation and IPR (IPR helpdesk / EPO)

	Open discussions based on input	Innovation Exploitation and IPR (IPR helpdesk / EPO)				
9:00-13:00	expressed by participants upon	Flagship projects' common activities				
	registration.	Collaboration Agreement				
	Details at the event	International collaboration				
13:00-14:00	Joint lunch - Aula					
14:00-15:00	Innovation and Education discussion	Benchmarking				
15:00-16:00	Engaging with the QCN	Election of chair and vice chair				





Open debate

- ✓ European QT community largely represented
- ✓ Thematic debates for application areas & basic science
 - \rightarrow Active contribution to future challenges
 - → Vision in 3 years (first challenges)
 - \rightarrow Vision in 6-10 years (next steps)

Main outcomes

- ✓ Need to reinforce activities in standards & certifications
- Need fabrication facilities (foundries, full supply chain)
- V Need to achieve links between theory, SW, HW, and engineering
- ✓ Need to attract large users in new QT

SEB track



Open debate / main outcomes

- **Broad interest in IPR issues & patenting**
 - → Provide services from EPO & IPR Helpdesk
- ✓ Strong need for collaboration across projects
 - \rightarrow Proposed EC coordination support (education /
 - communication / outreach)
- ✓ Collaboration agreement: Sensitive issue (IP, confidentiality)
 - → Provide EC legal support
- ✓ First input for international collaboration
 - \rightarrow Delicate issues: Export and customs (US), IP, etc.
 - \rightarrow EC: Questionnaire about challenges / weaknesses in EU
- ✓ First input / proposal of benchmarks



Quantum Technologies FET Flagship:

Governance

QT Flagship Governance







Governance Bodies

Strategic Advisory Board

- Call closed 15/11
- 20+ applications
- First meeting: February 2019, Grenoble?

• Science & Engineering Board

- Chair: Thierry Debuischert (Thales)
- Vice-Chair: Stephanie Wehner (QuTech)



How do we work together?

• Strategic Advisory Board

- Consult stakeholders & Flagship Projects
- Chair regularly attending BoF

• Science & Engineering Board

- Contribute input on strategic orientations to SAB
- Regularly present @ BoF progress, KPIs, etc.

• Stakeholders, incl. QCN

- Contribute to S&T roadmapping, benchmarking, INCO, education
 + links to national initiatives
- Support Governance Bodies & QT Community

• Annual Event (c.f. QT launch event 2018)

- Public part
 - general policy
 - stakeholder forum
- Closed part
 - SEB meeting
 - SAB meeting



Quantum Technologies FET Flagship:

Next Steps

QT Flagship: next steps

 Identify collaborative activities across Flagship Projects

European Commission

- Technology challenges
- Engineering / manufacturing
- Benchmarking activities
- Common challenges
- Define scope & objectives of post-ramp-up
 - Continuity
 - Spin-offs / feeding other programs
 - Focus?
 - Complementarity / positioning with national initiatives
- Skills, Training & Education



=> SAB





Towards a EU QT-ecosystem





Under Negotiation **Next Multi-annual Financial** Framework



HPC + Quantum Simulation



Commission

HPC + QT TIMEFRAME

	_				_					
2019	2020	2021	2022	2023	2024	2025	2026			
		Horizon Europe								
OT Flagship										
	Digital Europe Program									
QT Simulation										
JU:	pre-exascale	/N		exascale			hybrid?			
		\$								
Certified quantum advantage Quantum optimization Beyond HPC										
	50-qubits			100-qubits	TRU					
			\sim							
Playground, pilot sites + funding of visionary applications: new algorithms, new applications										

Work in Progress



Quantum Communication Infrastructure: Digital Europe Program

Towards a quantum communication infrastructure

• Building on H2020 QKD Pilot

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- Interconnected terrestrial quantum networks
- Going beyond point-to-point links
- Phased deployment approach
- Integrate Flagship results
- Linking European capitals & major centers of economic activity
- Connected with satellite-based nodes (Galileo, GEO, LEO)
- \Rightarrow Provide pan-European QKD / Quantum Communication as a service
- \Rightarrow Applications: Quantum internet, Quantum Key Distribution, security, electronic signature, time-stamping,



QKD on Galileo (joint activity with DG GROW)

Goal 1: to secure space-to-ground Galileo satellite communication (operating in Medium Earth Orbit – MEO: ~23000 km): Up/downlink communications (tele-command) for the Galileo 2nd Generation (G2G)



Context:

4 transition batch satellites to be launched in 2025-2026 to prepare the Galileo 2nd Generation (G2G, launch around 2030)
1% of the platform mass dedicated to QKD payload, i.e., ~22 kg

Goal 2: to secure ground-to-ground Galileo infrastructures: One satellite serving as trusted relay sharing keys between two remote grounds stations



<u>2018:</u> Under preparation Mission High Level Requirements document (for Space and Ground systems)