The European Flagship on Quantum Technology

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Member of the Quantum Flagship Strategic Advisory Board
Quantum Technology Flagship

April 2016

The European Commission announced a Flagship initiative on quantum technologies, as part of the European Cloud Initiative.
Amsterdam 17 May 2016
Presentation of Quantum Manifesto
August 2016
The **High Level Steering Committee** is set-up to advise the Commission on the **design, implementation and long-term governance** of the Flagship.

The Final Report on all aspects of the Flagship was delivered in November 2017

**Main Pillars and priorities**
QT Flagship Governance

Stakeholders (QT community)
- QCN (Quantum Community Network)

Intelligence gathering

Decision making and Advice
- Decision making bodies
  - Board of Funders
  - European Commission

Advisory body
- Strategic Advisory Board

Implementation
- Science & Engineering Board
- QT Flagship Projects
- QuantERA Projects
- National activities,...

Coordination and Support Action
Goals of the Flagship

• **Place Europe at the forefront** of second quantum revolution
• Common denominator and *clear EU added value* needed
• Attractive to Stakeholders (Entrepreneurs / SME / Business)
• Industrial perspective: how to create new technologies and products
• Address technology readiness levels

**Budget of €1 billion, duration of 10 years**
First Flagship call

- November 2017 Opening of the Quantum Technologies Flagship Call 132 Meuros.

- February 2018: Closure of the call

- 141 submitted proposals,

- June 2018: 20 projects, involving over 500 researchers, have been selected

- The CSA Qflag was also funded

- October 29 2018 Official Launch of the Flagship projects
Launch of the Flagship October 29, 2018
Next flagship calls

Horizon 2020 FET Work Programm 2020

Opening 9 Jul 2019, closing 13 nov 2019

- RIA Topic : Semiconductor quantum computing and quantum software : 19.7 M€
- CSA on International cooperation in QT 0.5 M€
- CSA on Education in QT 0.3 M€

Opening 6 Feb 2020, closing 7 May 2020

- QuantERA II (ERA-NET-Cofund) 15 M€
Governance Bodies

- **Science & Engineering Board**
  - Chair: Thierry Debuischert (Thales)
  - Vice-Chair: Stephanie Wehner (QuTech)

- **Strategic Advisory Board**
  - 16 Independent experts from academia, industry and RTOs
  - Chair: Jürgen Mlynek
  - Vice-Chair: Jaya Baloo

- **Quantum Community Network**
  - One national representative per MS+AC
  - Chair: Tommaso Calarco
  - Vice-Chair: Yasser Omar
Composition of the SAB

**Academic Members**
- Prof. Dr. Jürgen Mlynek (Chair) - Humboldt University of Berlin
- Prof. Dr. Elisabeth Giacobino - Laboratoire Kastler-Brossel
- Prof. Dr. Vladimir Buzek - Slovak Academy of Sciences
- Prof. Dr. Wim van Saarloos - Netherlands Organisation for Scientific Research
- Prof. Dr. Maria Luisa Rastello - Istituto Nazionale de Metrologia
- Prof. Dr. Marek Kus - Polish Academy of Science
- Prof. Dr. Ana Sanpera - Universitat Autonoma de Barcelona
- Dr. Radu Ionicioiu - National Institute of Physics
- Prof. Dr. Daniel Esteve - CEA
- Prof. Dr. Peter Loosen – Fraunhofer Gesellschaft

**Members from Industry**
- KPN - Ms. Jaya Baloo (Vice-Chair)
- ERICSSON - Dr. Fabio Cavaliere
- AMETIC - Mr. Ulises Arranz Cuellar
- CREATETOCH INSTRUMENTS S.A. - Dr. Grzegorz Kasprowicz
- INFINEON TECHNOLOGIES AG - Mr Christoph Sandner
- AIRBUS - Dr. Thierry Botter
Missions of the SAB

The EC expectations on the SAB for the upcoming two years are:

- Define the scope and objectives of the steady-state phase of the Quantum Flagship
- Advise on how to ensure the digital autonomy of the European Union
- Advise on international cooperation
- Deliver a Quantum Flagship Strategic Roadmap as input for the Horizon Europe (HE) and Digital Europe Programme (DEP)
DRAFT
Strategic Research Agenda (SRA)

09.10.2019
The QFLAG Coordination and Support Action

APRIL 2019 - MARCH 2022

Strategy and Structuring
Rob Thew (Uni Geneva)

Innovation and Infrastructure
Rogier Verberk (TNO)

Applications and Markets
Philippe Chomaz (CEA)

Education, Training and Outreach
Chiara Macchiavello (Uni Pisa)

Governance, National Programs and Management
Markus Wilkens (VDI TZ)

... and many more: Lydia Sanmartí-Vila, Alina Hirschmann, Silvia Carrasco (ICFO); Thomas Strohm (Bosch), Yves Samson, Dijana Samson, (CEA), Claudius Klein (VDI TZ) ....
The Strategic Research Agenda
Working Groups

Core team, chaired by Rob Thew

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<thead>
<tr>
<th>Communication</th>
<th>Computation</th>
<th>Simulation</th>
<th>Sensing &amp; Metrology</th>
<th>Basic Science</th>
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<tbody>
<tr>
<td>Andrew Shields</td>
<td>Thomas Monz</td>
<td>Jens Eisert</td>
<td>Fedor Jelezko</td>
<td>Toni Acin</td>
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<tr>
<td>Stephanie Wehner</td>
<td>Walter Riess</td>
<td>Francesca Ferlaino</td>
<td>Piet Schmidt</td>
<td>Philippe Grangier</td>
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<td>Harry Buhrman</td>
<td>Renato Renner</td>
<td>John Morton</td>
<td>Frank Wilhelm</td>
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<td>Cyril Allouche</td>
<td>Martin Plenio</td>
<td>Iuliana Radu</td>
<td>Christiane Koch</td>
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and many other members for each subject, together with the SEB chair, Thierry Debuisschert
SRA Structure (1)

For the 4 pillars:

- Communication,
- Computation,
- Simulation,
- Sensing and Metrology

Several issues are addressed

- Socio-Economic challenges: infrastructures, economic and human resources, institutional support and investment of companies, contact with end users
- Research and Innovation challenges
- Supply chain

A roadmap is proposed for the next 3 years and 10 years
SRA Structure (2)

- Necessary scientific and technological resources
  - Theory
  - Software
  - Engineering
  - Control
  - Basic Science

- Supporting Innovation
  - identify use-cases
  - reinforce infrastructures and supply chain
  - scale up from the lab to product and services
  - Innovation Roadmap
SRA Structure (3)

- International Cooperation
  - A worldwide research and innovation is necessary
  - isolation would be unrealistic, define a clear framework
  - address the IP issue

- Education and Training : roadmap

- Gender Equality : roadmap
KPIs

Next
define KPI key performance indicators for the strategic goals as

- Ensure Scientific Excellence
- Foster Collaboration
- Stimulate Innovation
- Train QT Researchers
- Train QT Aware workforce
- Reach Out to Public
- Other
Thank you for your attention