

**Commission Expert Group on
Quantum Flagship:
High Level Steering Committee**

(work in progress)

QUANTUM EUROPE 2016

(Amsterdam 17th May, 2016)

*EU Commissioner for Digital Economy and Society, Günther Oettinger, announced the **investment of one billion Euro** in a new **Flagship** on quantum technologies. “Building on the strong support for the Quantum Manifesto, we aim to launch an ambitious, large-scale Flagship initiative to unlock the full potential of quantum technologies, accelerate its development and bring commercial products to the consumer marketplace.”*



Günther Oettinger:

“This initiative cannot be ‘more business as usual’, or should I say, ‘more science as usual’. It has to make a difference for Europe and for European industry. In the coming months, we need to further mobilise actors in the preparations as success will depend on a strong commitment of all relevant stakeholders, on the concrete engagement of European industry players and on the support of Member States. We should also build from the experience of the two ongoing flagships to design an open initiative, with clear and ambitious goals and with an effective governance structure. We need to identify priorities and map them to the potential funding sources within H2020 but also locally at national level. I expect the most high risk – high gain part of the agenda to be at the core of the flagship effort which should be taken-up by our risk taking Future and Emerging Technology programme. Other chapters with shorter time to market like communication and sensing may be better served by more industry oriented funding schemes. In this context, the Commission will soon call an independent High Level Steering Committee to take the drive of this important preparatory phase. The members should represent all stakeholders and I will announce their names in the coming weeks.”

Quantum Manifesto

The [Quantum Manifesto](#) was written by the European quantum community and is endorsed by over [3400 supporters](#): industries, research institutes and scientists in Europe. It is a call to develop Europe's capabilities in quantum technologies creating a lucrative knowledge-based industry, leading to economic, scientific and societal benefits. It paved the way for the European Flagship.



Quantum Manifesto

- *A European Flagship initiative is both timely and needed.*
- *Technologies are at a tipping point and global investments are rising.*
- *Ambitious unifying goals and roadmaps need to be established.*
- *The preparation and set-up should be efficient, open and flexible to ensure a quick start and a solid base.*
- *Partnerships with the private sector are key for commercialization and the involvement of industries.*
- *High risk, high gain technologies should be at the core of the Flagship programme.*
- *Training and education at all levels is vital to attain a future workforce for quantum industries.*
- *International cooperation is necessary to meet the scientific and technological challenges ahead.*
- *To organize the preparations of the Flagship, a High Level Group (HLG) will be established with a broad European representation of academia, industries and institutions.*

HLSC main tasks

Is to advice the Commission on:

*(1) a **Strategic Research Agenda**, taking into account industrial aspects. It should include a long term roadmap for the flagship as well as a more detailed agenda for the H2020 ramp-up phase that should start as of 2018.*

*(2) an **Implementation model**, it should propose a concrete implementation approach both for the short term ramp-up phase within H2020 as well as for the longer term beyond H2020.*

*(3) A **governance model**, including both the internal governance of the flagship itself as well as the relations with Member States, with the Commission and with the relevant funding agencies.*

Do's and don'ts for the QF

- Don't divide the budget in small pieces. Working together makes a programme larger than the parts. – Mike Mayberry (Intel)
- Use the European dimension, use every brain – VB
- Avoid politics and bureaucracy – Freeke Heijman (Ministry of Economic Affairs)
- Industry still regards quantum technology as risky. Co-funding can bridge the technology gap - Andrew Shields (Toshiba)
- High expectations may result in disillusion. Support a mix of feasible goals and blue sky research – Michael Bolle (Bosch)
- Don't force people to work together. Support bottom-up partnerships— Leo Kouwenhoven (QuTech)
- Quantum technology development needs centres of excellence at scale, a critical mass – Marc de Jong (McKinsey & Company)
- Leave room for blue sky research – Serge Haroche (Collège de France)

High-Level Steering Committee

chair: Prof. Dr. Jürgen Mlynek

- Prof. Dr. Rainer Blatt, Innsbruck
- Prof. Dr. Vladimir Buzek, Bratislava
- Prof. Dr. Tommaso Calarco, Ulm
- Prof. Per Delsing, Goteborg
- Prof. Elisabeth Giacobino, Paris
- Prof. Dr. Marek Kus, Warsaw
- Prof. Eugene Polzik, Copenhagen
- Dr. Maria Luisa Rastello, INRIM
- Prof. Lluís Torner, Barcelona
- Prof. Dr. Wim Van Saarloos, Leiden
- Prof. Ian Walmsley, Oxford
- *Mr. Paolo Bianco, Airbus Defense & Space UK*
- *Dr. Markus Matthes, ASML*
- *Dr. Cyril Allouche, Atos SE*
- *Dr. Fabio Cavaliere, Ericsson*
- *Dr. Grégoire Ribordy, ID Quantique*
- *Ms. Jaya Baloo, KPN*
- *Dr Graeme Malcolm; M2 Lasers*
- *Dr. Michael Bolle, Robert Bosch*
- *Dr. Norbert Lütke-Entrup, Siemens AG*
- *Dr. Guido Chiaretti, ST Micro*
- *Mr. Daniel Dolfi, Thales*
- *Dr. Iñigo Artundo Martinez, VLC Photonics*

Observer: Prof. Maria Chiara Carroza

1st meeting – 20th Sept 2016

HLSC agenda – topics discussed

- **Purpose and Objectives of the High Level Group**
- **Defining the Strategic Research Agenda**
- **Governance Structure and Implementation Models**

During the first HLSC meeting, on the 20th September, T. Calarco presented the following documents:

- *The Quantum Technologies scientific roadmap, which is the result of the process initiated by the ERA-Pilot initiative in 2005 and now in its 9th version, and has been edited by the members of the QT Virtual Institutes and Virtual Facilities.*
- *A consensus report resulting from the work QUTE Flagship Working Group, which was nominated last June by the Strategic Advisory Board of the Coordination Action QUTE-Europe;*

Purpose and Objectives of the High Level Group

- High Level Steering Committee prepares the Flagship-Initiative
- Advise the Commission on:
 - Strategic Research Agenda: Detailed Agenda for H2020 ramp-up phase (as of 2018), and long-term Roadmap post H2020
 - Implementation Model: Concrete implementation approach
 - Governance Model: Internal Governance of the Flagship, and external relations with Member States, the Commission, national Funding Agencies, Institutions (scientific and business) and Initiatives
- Flagship no mere research initiative, but designed from the outset with the aim to convert scientific advances into industrial innovation, thereby requiring industry participation from the beginning
- Expert group will represent science (12 people) and industry (12 people)

Purpose and Objectives of the High Level Group

- Industrial representatives were not appointed by Sept 20th (response to “Call for Expression of Interest” – 42 applications)
- **Transparent, inclusive and broad method with respect to input generated from the Quantum Technology Community**
 - Consolidate contributions from the wider group of relevant stakeholders from academia, industry and Member States
- First indications with main orientations (intermediate report) of the High Steering Committee to be given by the end of 2016 (December)
- Final Report (covering all aspects of the Flagship) to be delivered by summer 2017

Defining the Strategic Research Agenda

- Strategic Research Agenda 1st Priority (Research Topics, Milestones, Timeline)
- Innovative Spirit: Place Europe at the forefront of 2nd Quantum Revolution (in particular considering the post H2020 period)
- Attractive to Stakeholders (include Entrepreneurs / SME / Business)
- Possible areas to be included: Metrology, Sensing and Imaging, Information Theory, Simulation, Communication and Computation
- But: Research Agenda needs common denominator; and a clear EU added value, building on top of existing national research initiatives and their strategic research priorities (complementary but not overlap)
- Good approximation of Scientific Basis for Research Agenda compiled in Quantum Manifesto and Quantum Road Map (->The QUTE-EUROPE Coordination Action)

Defining the Strategic Research Agenda

- Need for industrial perspective (How to create added value? Is industry aware of quantum potential?)
- Address technology readiness levels
- Take into account different promotion schemes (e.g. “Man-on-the-Moon” vs. imminent applications)
- Take into account Education, Young-Researchers, Interdisciplinarity, Entrepreneurial-Spirit

Governance Structure and Implementation Models

- Governance Structure depends on clear and explicit Strategic Research Agenda (Define objectives, decide operation)
- Goal to create a simple and efficient organisational structure
- Establish differentiation between Funding Agencies vs. Flagship Initiative
- Take into account experiences of the existing Flagship Initiatives
- Governance Structure: Project, sub-projects; scientific board; separation of science, day-to-day management, and strategic decision-making; include a scientific advisory board
- Possible sub-division into Hubs/Pillars in accordance with Strategic Research Agenda (e.g. UKNQT- Hubs / UK National Quantum Technologies Programme, Euramet)
- Listening to input from industry/business essential before decisions on governance structure and implementation mechanisms can be made.

Conclusions & Next steps

- Meeting on 20th Sept was just the first exchange of ideas among participants. Decisions are to be taken later on, once the full membership of the High Level Steering Committee is in place (industry representatives)
- Completion of High Level Steering Committee (industry representatives)
- Clarification and Consolidation with respect to Flagship-recommendations
 - 1st Research Agenda
 - 2nd Governance Structure
 - 3rd Implementation Model
- Circulation of relevant Presentations and Documents (in particular Quantum Manifesto and Quantum Road Map)
- Consultation with Community, in particular business and industry
 - Workshop with all relevant Stakeholders & QUROPE-Community
- Workshop and next meeting of High Level Steering Committee in Berlin, 10th Nov 2016

PUBLIC CONSULTATION

The High Level Steering Committee for the Quantum Technologies Flagship has decided, as result of their first meeting, to initiated a consultation process in order to collect the community consensus about the possible structure and governance of the Flagship.

<https://ec.europa.eu/futurium/en/content/quantum-flagship-online-consultation-gute-consensus-paper-and-scientific-roadmap>

The results of the consultation will be presented at the Quantum Technologies Flagship workshop, which has been organized for the 10th Nov 2016. The event will see the participation of 170 representatives from the QT field. While the registrations are already closed, it will be possible to follow the workshop in streaming and to interact via chat. Please check regularly on QUROPE.COM: we will announce there the details of the stream.

The HLSC members will be present at the workshop, and will use the resulting outcomes as an input in view of preparing its recommendations to the EC.

BERLIN WORKSHOP AGENDA

On the 27th of September a community wide consultation has been launched <https://goo.gl/forms/EnvJzC6OmdVDNW82> it is possible to participate to [the consultation](https://goo.gl/forms/EnvJzC6OmdVDNW82).

Merger of the scientific roadmap and industry white paper into a coherent document (t“flagship research agenda”) that will be presented at the Berlin workshop :

<https://goo.gl/forms/2vjdqv1gCQRa6WEF2>

Berlin event - each pillar giving its own presentation through the corresponding VI/VF directors and industry counterparts (Richard Murray and Thierry Debuisschert are looking for them). VI/VF Executive secretaries will present instead the results of the consultation.

The governance paper. The group is composed by: Trevor Cross, Peter Müller, Søren Isaksen, Peter Knight and Andrew Shields, and it is moderated by Thomas Strohm. Maria Luisa Rastello and Jörn Stenger will join these meetings in order to advise about the EURAMET structure.

QuantERA – building community

QuantERA timeline so far:

- *Letter of Intent* circulated and signed in 2014
- *Kick-off meeting* in Kraków on 1-2 June 2015
- *Working Group meeting* in Paris on 23 September 2015
- *Workplan* advanced, most *tasks* assigned

FETPROACT-03-2016: FET ERANET Cofund in Quantum Technologies

Budget: **10 M€ [EC Contribution]**

Planned opening date: **08 December 2015**

Deadline: **12 April 2016**

Specific Challenge: Research on quantum technologies in Europe is currently funded through several targeted initiatives at European, national and regional level. The aim is to foster synergy between these initiatives in the area of quantum technologies in order to create collaborations among the best groups in Europe and fostering broader partnerships around them to spread excellence and to broaden the European footprint of this emerging technology area.

QuantERA PLANS

Cofunded call

- *Expected budget ca. **37 M€***
- *Expected budget ca. **37 M€***
- **32 funding agencies from 26 countries**
- *Launch: **January 2017***
- *Funding decisions: **late 2017***
- *STREP-size projects*
- *Low TRELs targeted*

Other activities

- *Exploring additional calls*
- *Cooperation outside Europe*
- *Mapping scientific community and public policies*

Scientific Advisory Board

- ***Alain Aspect** (Institut d'Optique)*
- ***Tommaso Calarco** (Universität Ulm)*
- ***Francesca Ferlino** (Universität Innsbruck)*
- ***Ataç İmamoğlu** (ETH Zürich)*
- ***Peter L. Knight** (Imperial College London)*
- ***Hans Mooij** (TU Delft)*
- ***Anna Sanpera** (Universitat Autònoma de Barcelona)*
- ***Andrew Shields** (Toshiba)*
- ***Marek Żukowski** (Uniwersytet Gdański)*

QuantERA CONSORTIUM 26 countries

FWF

Der Wissenschaftsfonds.



Valsts izglītības attīstības

ANR



Bundesministerium
für Bildung
und Forschung

fnrs
LA LIBERTÉ DE CHERCHER

FNSNF

UE fiscedi

ISE RD
ERA

המנהלת הישראלית למו"פ האיורופי
THE ISRAEL-EUROPE R&D DIRECTORATE

EPSRC

Engineering and Physical Sciences
Research Council

FCT



NATIONAL SCIENCE CENTRE

