



# Quantum Europe 2016

## A New Era of Technology

Freeke Heijman 16 March 2016  
Ministry of Economic Affairs

[clip](#)



**RU**  
**2016**



## **Long term goal**

*Booming European Quantum Industry  
Strategic and technological independence*



## **What is needed?**

*EU leadership for integrated effort on science, engineering and entrepreneurship*

## **Why now?**

*Quantum Science has reached certain maturity level  
Other parts of the world are speeding up*



# Governments and companies are showing increased interest

**1999**  
EU invests €50-75 M in quantum technologies via FET program over next 7 years



**2004**  
USA ARDA invests in Quantum Information Science and Technology Roadmap



**2010**  
Canadian government invests €78 M in quantum technologies over next 7 years



**Dec 2013**  
UK Government invests £270 M in quantum technologies in next 5 years



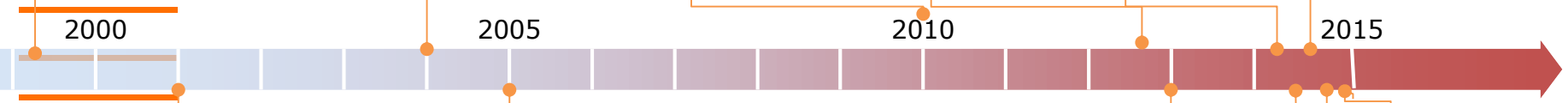
**June 2015**  
NL Government invests €135 M in QuTech Delft over next 10 years



**2015**  
Chinese government plans major investment in quantum computing



**201.**  
EU investment



**2001**  
SK Telecom starts R&D on quantum communication



**2005**  
Microsoft starts Station Q at UC Santa Barbara



**2013**  
Lockheed Martin buys D-Wave Two<sup>1</sup>



**July 2014**  
IBM invests \$3 B in research initiative that includes quantum computing



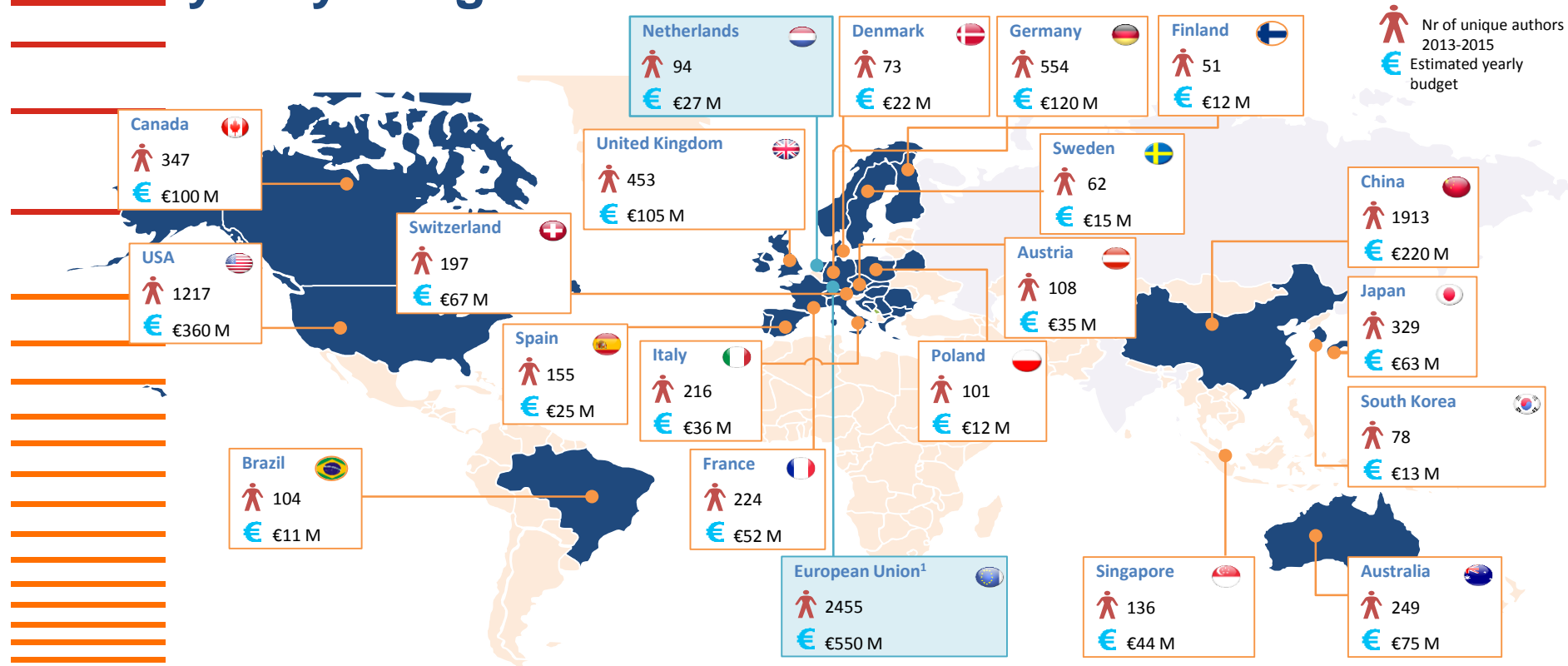
**Sep 2014**  
Google absorbs John Martinis' research group (UC Santa Barbara)



**2015**  
Intel invests \$50 mln. in QuTech



# ~7000 researchers worldwide, estimated yearly budget ~€1.5 B



1 Combined estimated budget of EU countries



# Approach

- Manifesto for strong support in stakeholder communities
- Presidency Conference to raise awareness
- Parallel approach with Commission and organized community
- Presidency note and hand-over to Slovaks



# Timeline

*Fall 2015: CEO roundtable, Call for European strategy  
Oettinger/Kamp, 2 pager Juncker, Merkel, Hollande*

- **March: Quantum Manifesto for endorsement**
- **April: Communication European Cloud Initiative**
- **6 April: STOA event European Parliament**
- **17-18 May: Amsterdam Conference**
- **26-27 May: Competitiveness Council**
- **June-June: preparatory phase**

# Manifesto

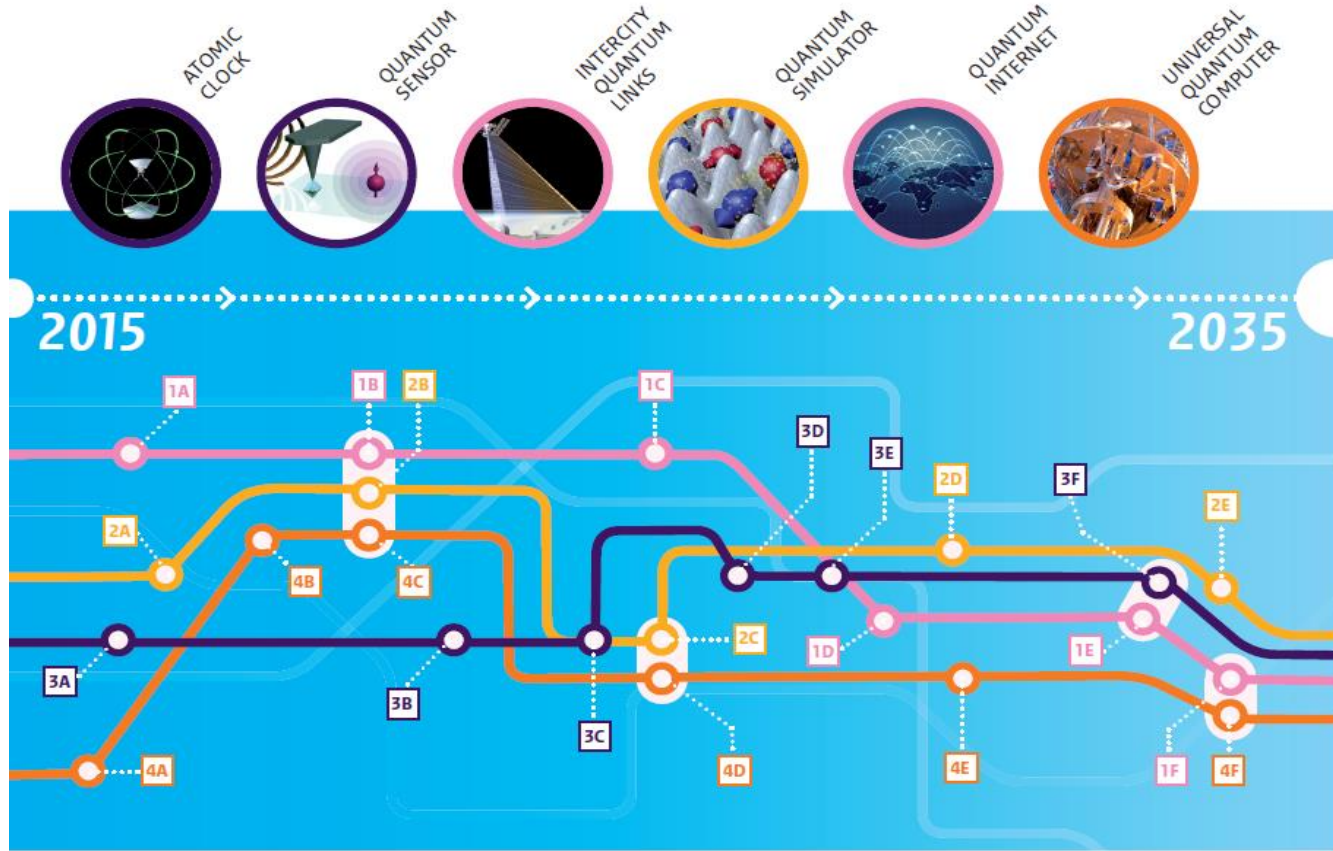
- Quantum Technologies are of strategic importance and will change global industries and markets
- Europe has the opportunity to lead the second quantum revolution
- Timeline with expected killer apps and technology milestones
- Call for flagship-scale initiative

## PROCESS

- European team without chair
- Broad consultation



# Quantum Manifesto







# 17-18 May Amsterdam Conference

Hand-over of Manifesto

Keynotes include:

- Commissioner Oettinger
- Mike Lazaridis
- Mike Mayberry
- Michael Bolle
- Krysta Svore
- John Martinis
- Alain Aspect





# Lessons learned HPB / Graphene

- Carefully manage leadership roles of top scientists and don't bother them with governance and administration
- Ensure good governance with open, bottom-up processes
- Flagship brings research communities together and exposed to one another.
- Leave room for scientific or any other form of debate
- "Federating" the research communities takes time
- A Flagship is not a bundle of H2020 projects
- Manage expectations and keep communications open and transparent