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# BUILDING A GLOBAL QUANTUM INTERNET MADE IN EUROPE

*Prof. Dr. Stephanie Wehner  
Director Quantum Internet Alliance &  
Professor @ QuTech, Delft University of Technology*



Co-Funded by  
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# What are quantum technologies?



0

# What are quantum technologies?



1

Classical information: Bits 0 **or** 1

# What are quantum technologies?



$0 + 1$

Classical information: Bits 0 **or** 1

Quantum information: Both 0 **and** 1

# Quantum bits have unusual properties



Cannot be copied



Special connection at a distance: entanglement

-> Private connection

-> Coordination unattainable classically

# Why a Quantum Internet ?



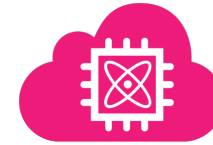
## Security and Privacy

- Secure Communication
- Authentication
- Privacy Enhancing Technologies
- Position Verification
- Secure Quantum Computing in the Cloud



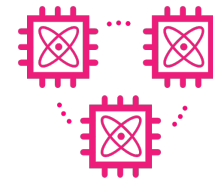
## Novel features

- Quantum improved imaging and sensing
- Proof of deletion
- Quantum money



## Accelerate Networks

- Exponential Savings in Communication
- More accurate clock synchronization
- Improved Load Balancing
- Improved Distributed Control



## Scalable Quantum Computing

- Quantum Computing Clusters

# A Team of Global Leaders in Quantum Technology

## Universities and Institutions



## Research & Technology Organisations



## Industry Players



## Quantum Startups



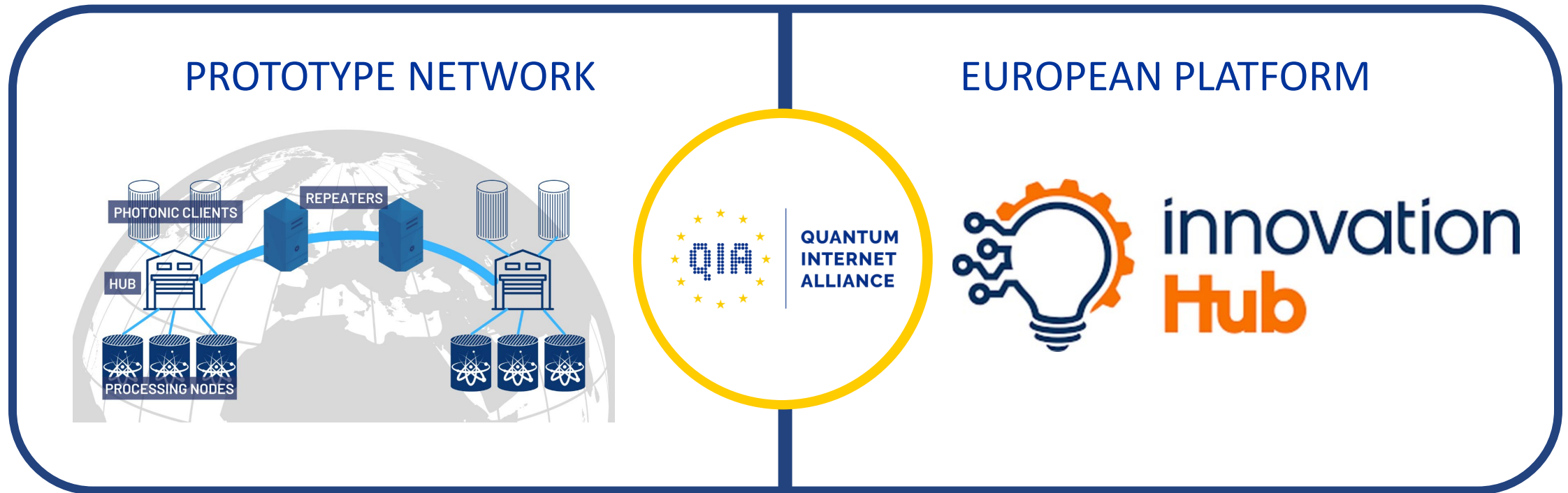
## Others



**Focus in diversity: all types of platforms, system track**

# A Global Quantum Internet Made in Europe

QIA is developing a **full-stack prototype network** validating all key sub-systems and simultaneously driving an innovative **European Quantum Internet ecosystem** capable of scaling all sub-systems to **world-leading European technology**



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# A World-Leading European Platform

QIA's team—joining all relevant disciplines, all types of actors along the value chain and leading European quantum network hardware platforms—works to establish a ***world-leading European Platform for Quantum Internet Development*** that acts as a catalyst for an innovative ecosystem

*A focal point for  
European Quantum  
Internet development*

*A launch pad for European  
research and innovation*



**innovation  
Hub**

*A catalyst for an innovative  
European Quantum  
Internet ecosystem*

*Building for One Europe*



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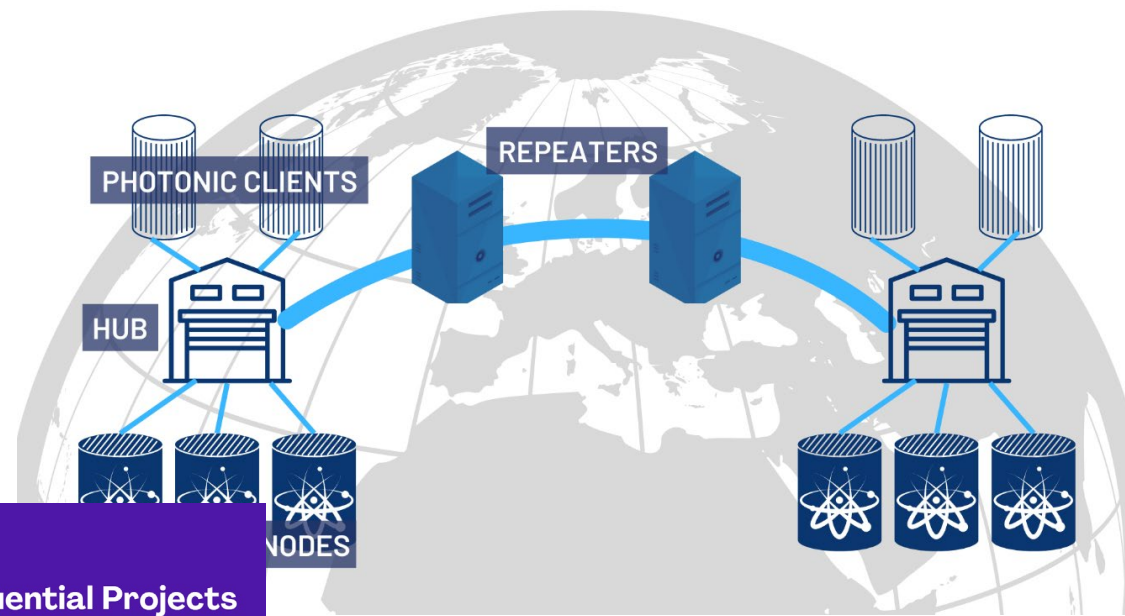


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# Moonshot Mission: Prototype Quantum Internet



**Project Management Institute**

### Top 10 Most Influential Projects by Industry

Our top ten lists the most influential projects of 2021 by industry. We've created top ten lists for twenty two industries.

**General Purpose Quantum Network**

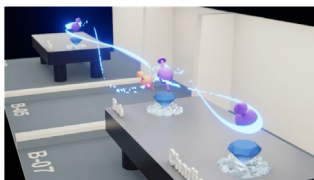
**Full-Stack**

**Long-distance backbone**

**Scalable Connectivity**

**Different types of user devices**

First 3 node processor network



Connectivity over Telecom fibers



First network operating system

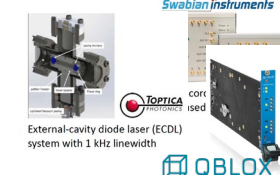


**QNodeOS**  
By QuTech

Portable Nodes



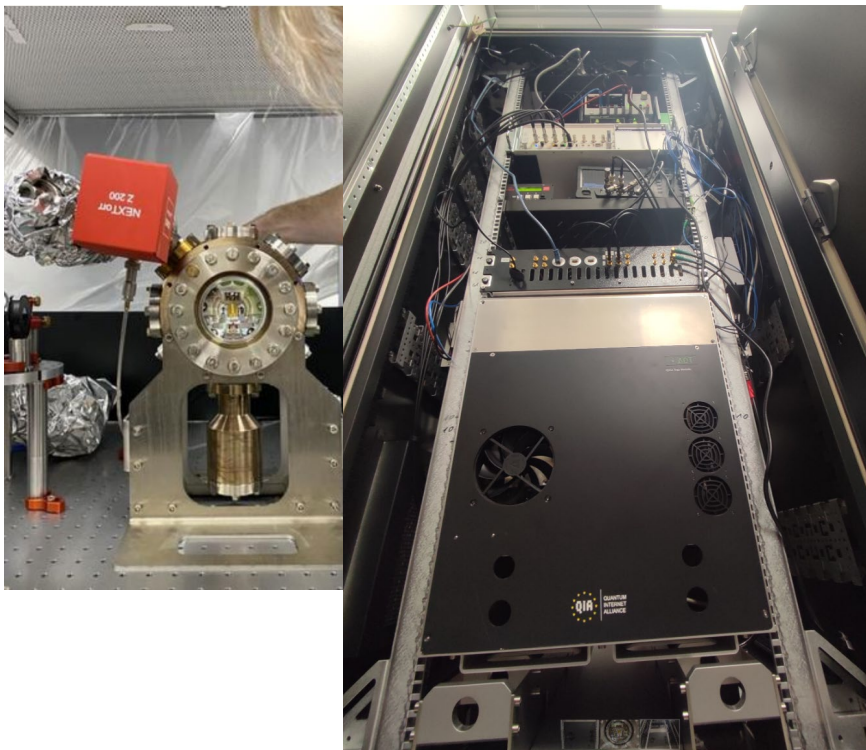
Enabling technologies



Use Case Development



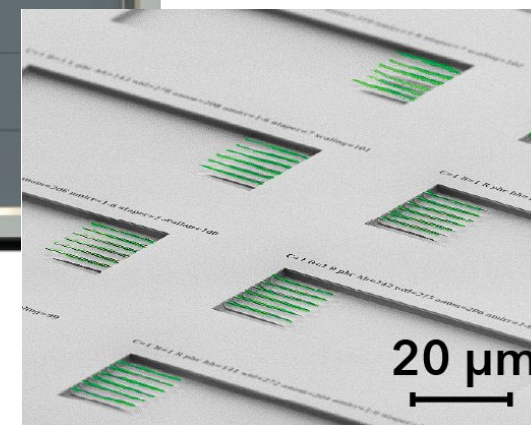
# Network Nodes are going into a rack



Ion Trap Network Connected Processor



QDrive - Quantum Memory  
based on Cold Atomic Ensembles



SnV Network Connected  
Processor



# Network Nodes can now be programmed



The first system to program and execute quantum network applications on end nodes

Independent of the underlying quantum hardware



Nature, 639, 321–328 (2025)

US Patent App. 18/707,836



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# Network Nodes can soon be used by you!

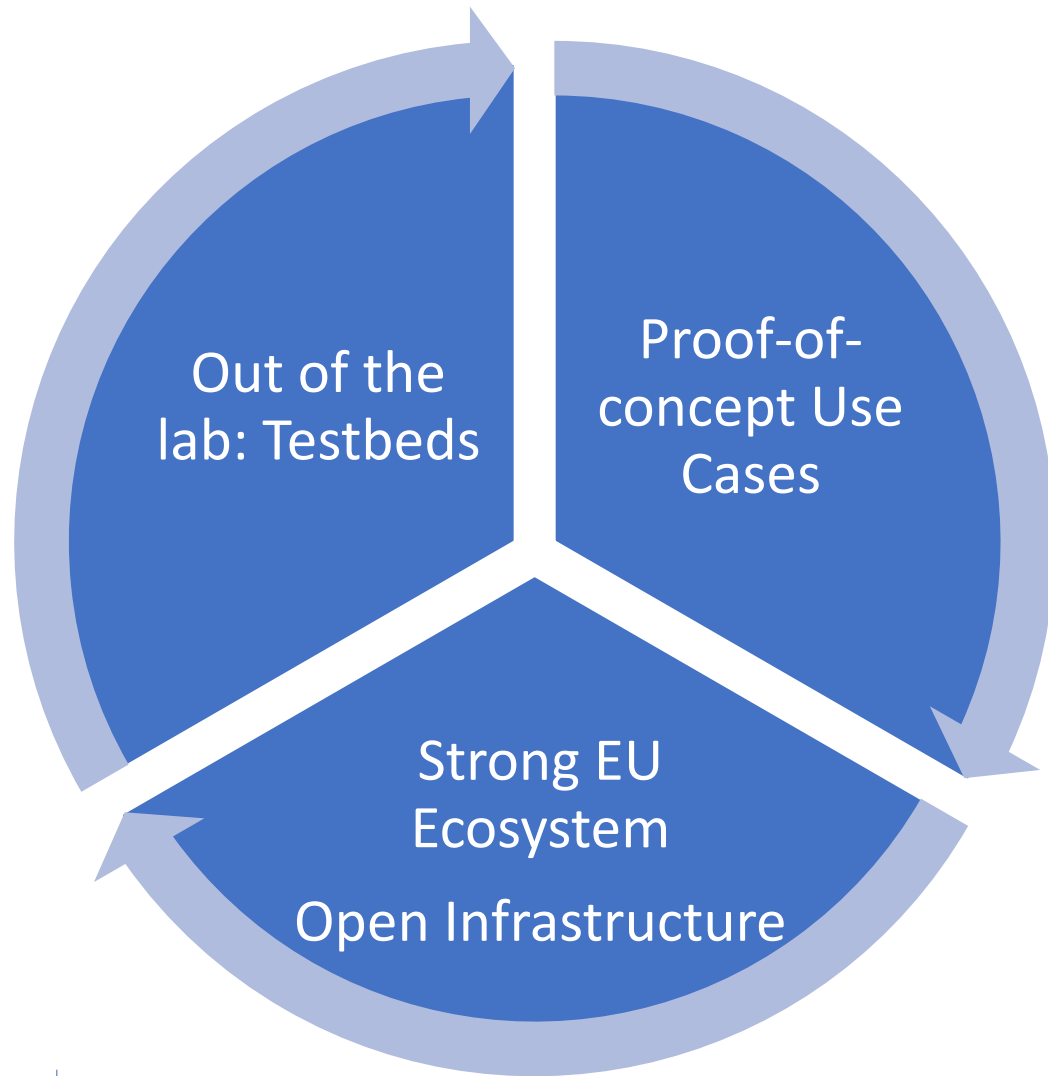


Advancing the ecosystem by enabling application development and workforce education



-> QI Lab Tours after lunch

# Beyond R&D



## From Lab to EU innovation

➔ Panel @ 15h: Quantum Internet Ecosystem and Open Infrastructure

Concept developed by “Team EDIC” – Key Drivers representing Quantum Internet developments in 11 member states

# Quantum Internet Policy Lab



Pieter Vermaas

**Kick-off @ 14h!**



# THANK YOU!

[www.quantuminternetalliance.org](http://www.quantuminternetalliance.org)

[info@quantuminternetalliance.org](mailto:info@quantuminternetalliance.org)



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