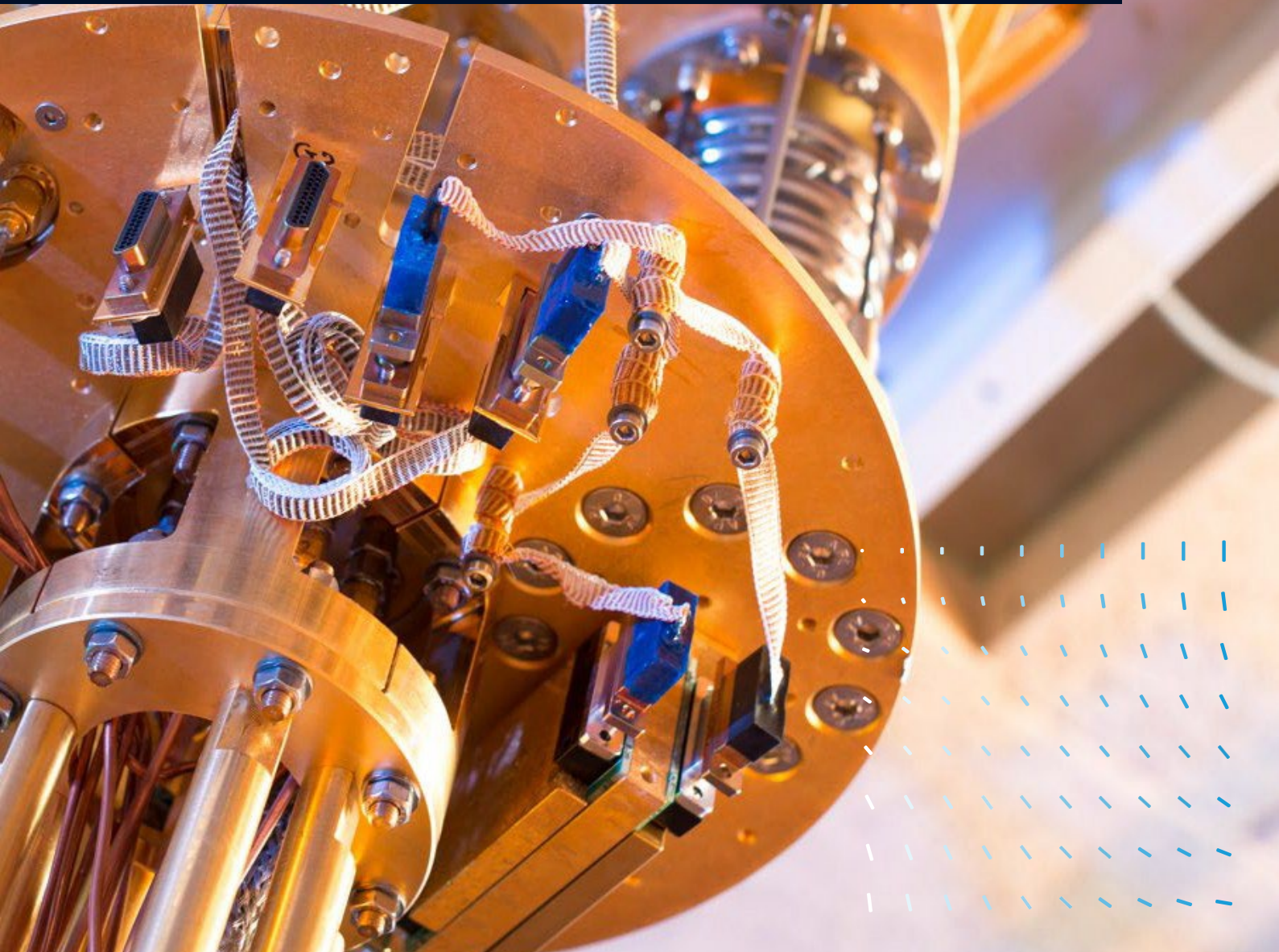




Self-assessment report QuTech 2019 - 2021



QuTech
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Summary

QuTech is a mission-driven research center for quantum computing and quantum internet that aims to develop scalable prototypes of a quantum computer and inherently safe quantum internet based on superposition and entanglement, by bringing world-class scientists, engineers and industry together in an inspiring environment. It was founded in 2014 by TU Delft and TNO. In June 2015 a covenant (the “QuTech Partner Covenant”) was signed, in which the Minister of Economic Affairs and Climate Policy (EZK), the Minister of Education, Culture and Science (OCW), Top Sector Holland High Tech, The Dutch Research Council (NWO), TU Delft, and TNO supplied QuTech with a 10-year funding perspective. The covenant stipulates that two midterm reviews of QuTech's scientific research and engineering activities are to be conducted by an international assessment committee. The first took place in January 2019, covering the period 2015-2018. The second, covering the period 2019-2021, in April 2022.

We perform cutting-edge research exploring new concepts across the different hardware and software layers of the quantum computer and quantum internet stack. A common theme and conscious choice is to focus on qubits hosted in the solid state, for their strong potential for scaling. Within this domain, we pursue electron spins in quantum dots, superconducting quantum circuits, spins attached to an NV- center in a diamond lattice, and qubits intrinsically protected from noise through physical properties of the device. We find great benefit in cross-fertilization between the various approaches.

Our quantum computer demonstrator *Quantum Inspire* and quantum internet demonstrator *Quantum Network Explorer* make quantum technology accessible to a wider audience and future users. The demonstrators allow us to integrate our best technology candidates, increase the visibility of QuTech and serve as a launching platform for building the supply chain, together with (local) start-ups and private partners. Complementing the demonstrator efforts is the QuTech Academy, which contributes to educating the future quantum workforce through a multitude of activities.

We are developing a strong Intellectual Property (IP) portfolio in order to be well equipped to creating long-term partnerships with private partners and to support local start-ups, e.g. by granting IP-licenses. We strongly contribute to national and EU programs, such as Quantum Delta NL and the EU Quantum Internet Alliance, and work together with European partners in national programs.

In 2021, we started a Foresight Process to recalibrate QuTech's strategy for the period 2025-2035, beyond the present partner covenant. This process is based on a thorough understanding of possible future scenarios about how the global quantum field could develop and its possible implications for QuTech. The QuTech strategy and organization should be robust and adaptable to all scenarios in order to remain viable. The picture that emerges is that in addition to performing world-class research, we have the ambition to achieve world-changing innovation. Specifically, we aspire to create an economic footprint in the Netherlands and EU, to be fully engaged in the (local) ecosystem, to team up with start-up companies and other players in it, and to ensure that quantum technology is applied to advance society.

QuTech is a collaboration between

