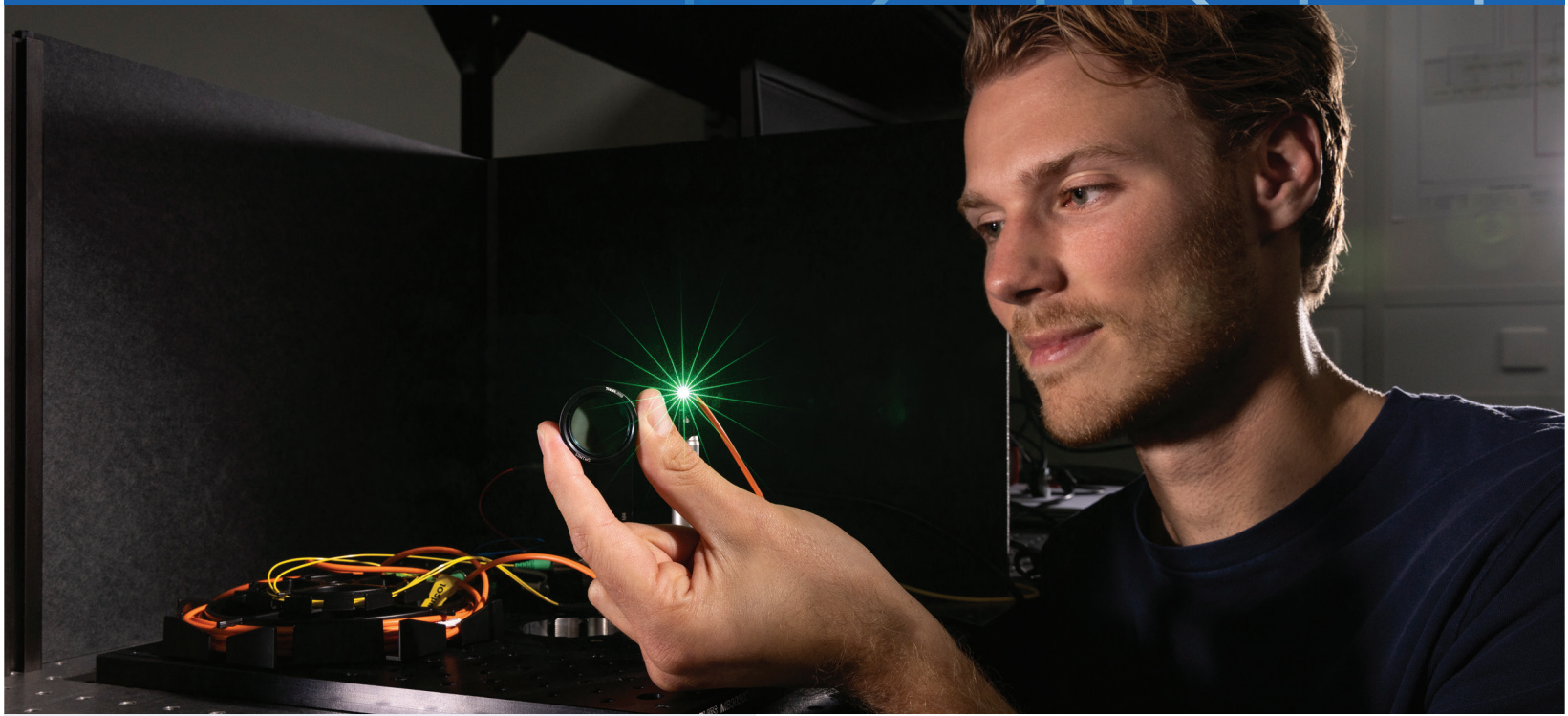


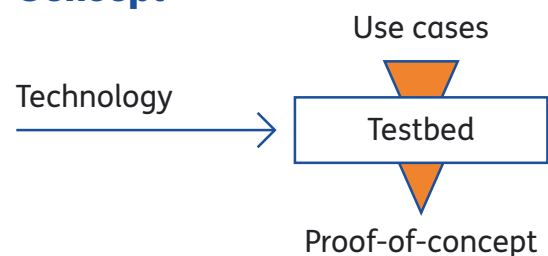
Quantum Sensing Testbed



TNO wants to use its technology and know-how to accelerate the industrialization of quantum sensors. To that end, we set up a Testbed where our partners and customers can test state-of-the-art quantum sensors.

The instruments in this Testbed (see backside) are based on Nitrogen Vacancy (NV) centres on diamond. These centres are defects on the diamond lattice sensitive to magnetic fields, currents, rotation and temperatures.

Concept



Examples of use cases

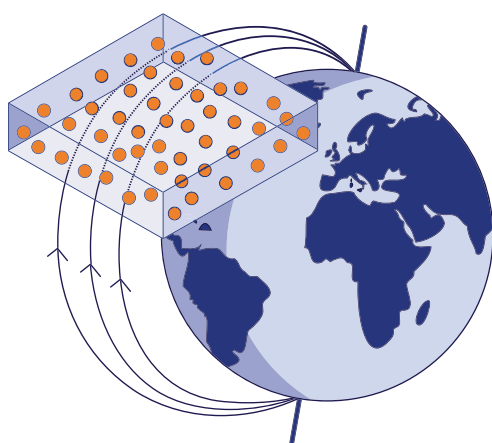
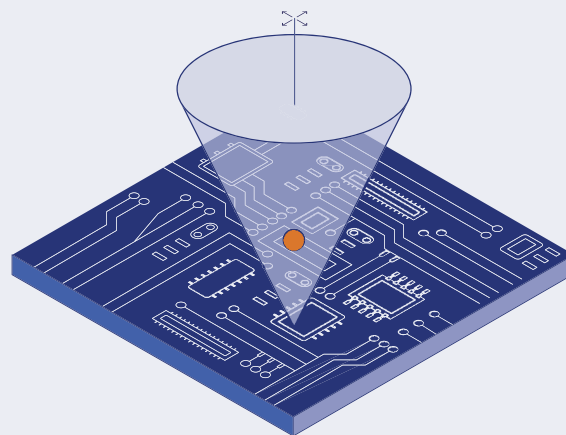
- ☐ ☐ Instrument and component benchmarks
- ☐ ☐ Sample measurements
- ☐ ☐ Feasibility studies

Scanning probe microscope

Equipped with a diamond probe with a single NV centre, this instrument can measure non-destructively and with high-resolution magnetic fields, currents and temperatures.

Target performance

- Resolution ~50 nm
- Sensitivity ~5 $\mu\text{T}/\sqrt{\text{Hz}}$
- Speed: 100 pixels / s



Compact Vectorial Magnetometer

Using an ensemble of NV centres on a macroscopic piece of diamond, these compact instruments can measure vectorial magnetic fields with high sensitivity.

Target performance

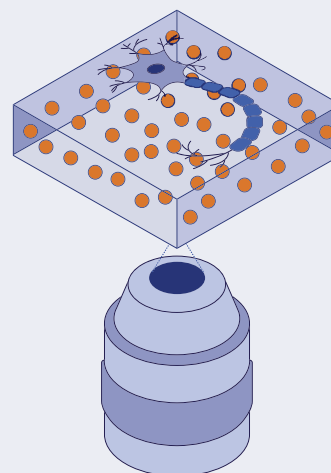
- Resolution ~3 mm
- Sensitivity ~1 nT/ $\sqrt{\text{Hz}}$
- PICs and Fiber based solutions

Wide Field Magnetometer

Using a piece of diamond as a 'sample holder', this microscope can image magnetic fields and currents in seconds.

Target performance

- Resolution ~400 nm
- Sensitivity ~500 nT/ $\sqrt{\text{Hz}}$



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