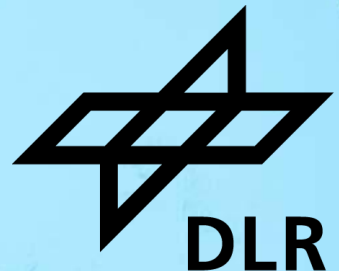


DLR PERSPECTIVE ON SPACE-CRETE

SPACE-Crete info day 02.10.2026



Congratulation!

- Excellent scope
- Striking project
- Successful funding

Thank you for being able to join!

- Contributing to technology



INNOVATION IN SPACE

Opportunities

Challenges

Benefits

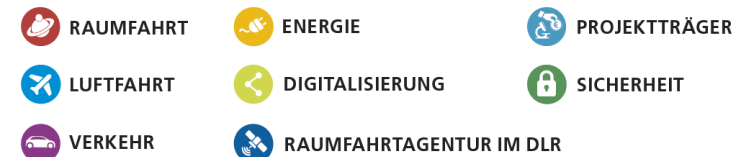
Perspectives

DLR at a glance



DLR relies on the knowhow of its **51 instituts** with more than 11000 employees distributed across **31 locations** in Germany

- Large **research agency** of Germany for **Areospace- and Spacetechnology**
- **Space Agency**: Planing and Administering German activities in space for the federal government
- **DLR-Project Agency**: Funding agency for research and development projects in Germany
- International collaborations with world wide offices in Brussel, Paris, Tokio and Washington



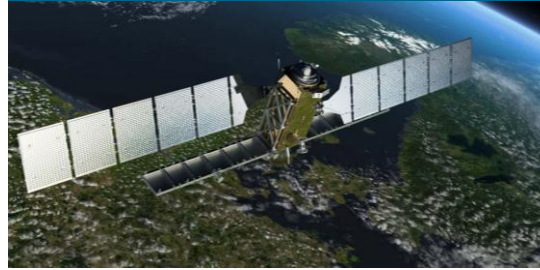
Research at DLR



AEROSPACE



SPACE



ENERGY



TRAFFIC



SECURITY

civil & defense related Security Research



DIGITALISATION, QUANTUM TECHNOLOGIES AND SYSTEMS MODELING



- Largest Research Center in Europe for Aerospace and Space
- Close Collaborations in Science, Research and Industry



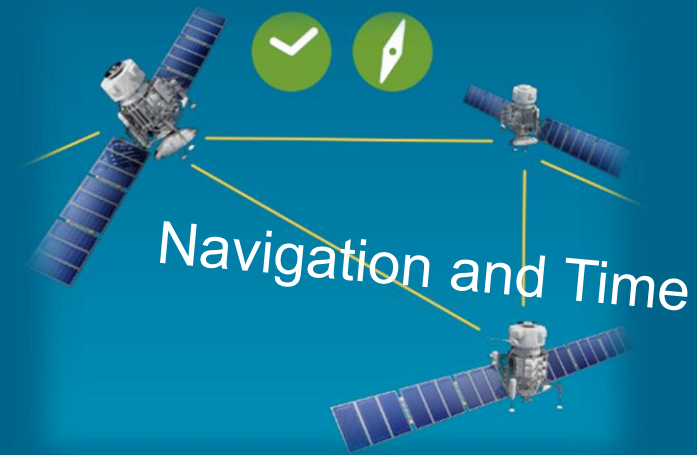
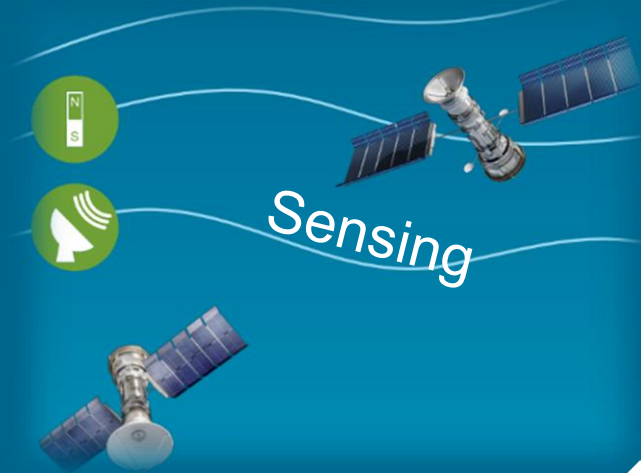
Institute of Quantum Technologies

Location: Ulm
Director: Prof. Dr. Kai Bongs
7 Departments
About 100 Employees

- Theoretical Physicists
- Experimentalists
- Engineers
- Technicians

Credit: © DLR

Mission



Institute of Quantum Technologies



Bringing Quantum Technology to Application in Space

SPACE-CRETE

Credit: © DLR

Pillars of SPACE-Crete



SPACE ✦ Crete

CRETAN CENTRE OF EXCELLENCE IN EMERGING SPACE TECHNOLOGIES

Optical and
Quantum
Communication

Intelligent Space
Systems

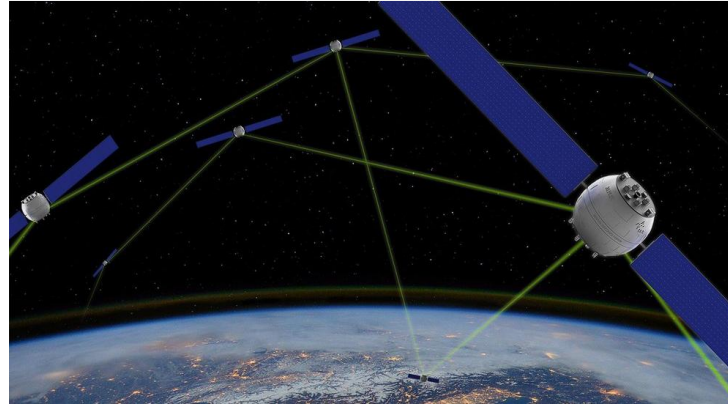
Quantum Sensing

Relevant DLR competences for SPACE-Crete

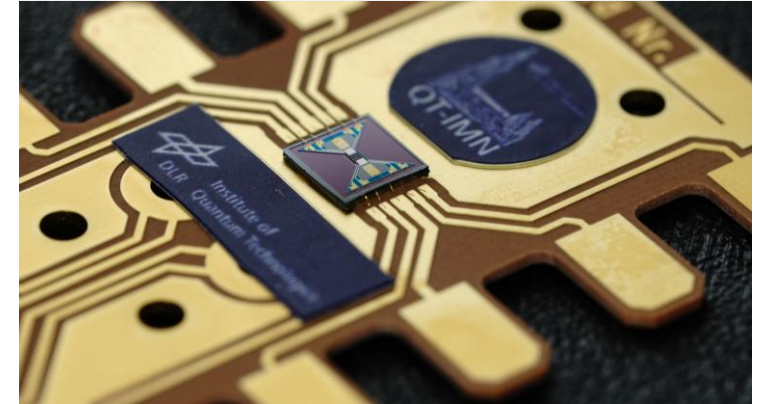
Benchmark in development in optical communication



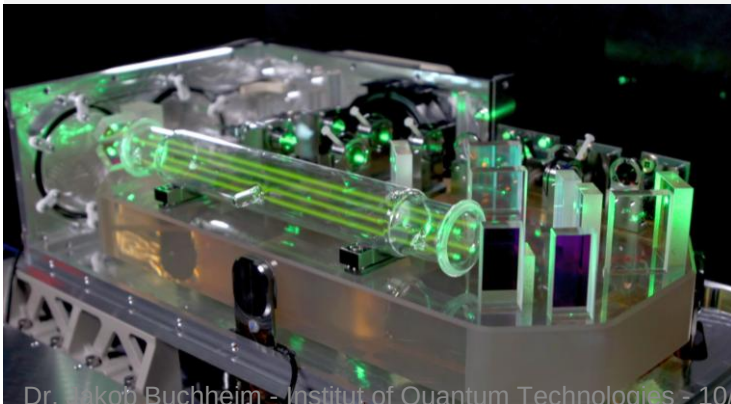
Designing concepts for satellite based quantum communication



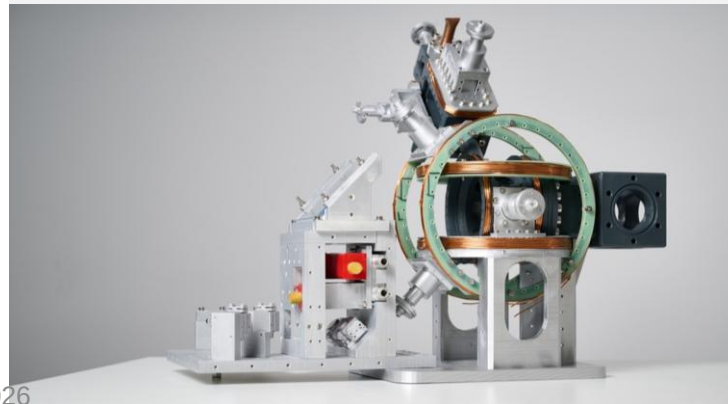
Micro-technology roadmap for quantum systems



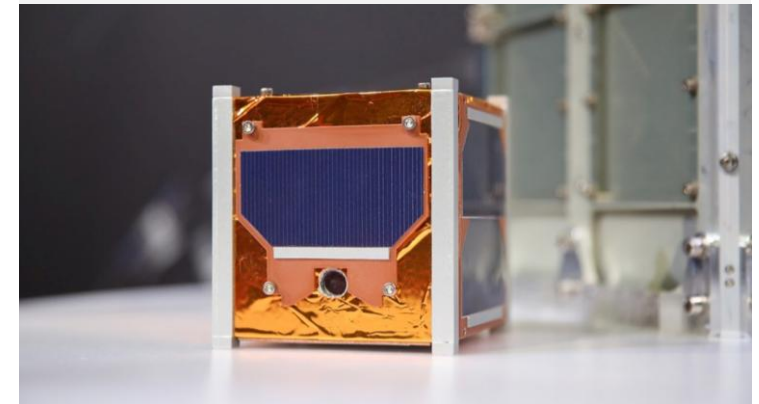
Development of space compatible quantum sensors



Space based quantum science expertise



Operation of satellite demonstrators for quantum communication

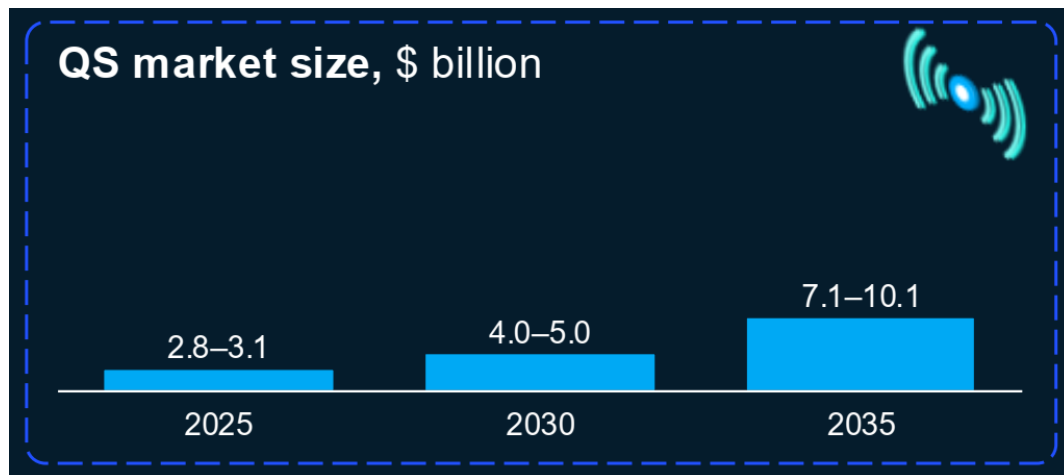




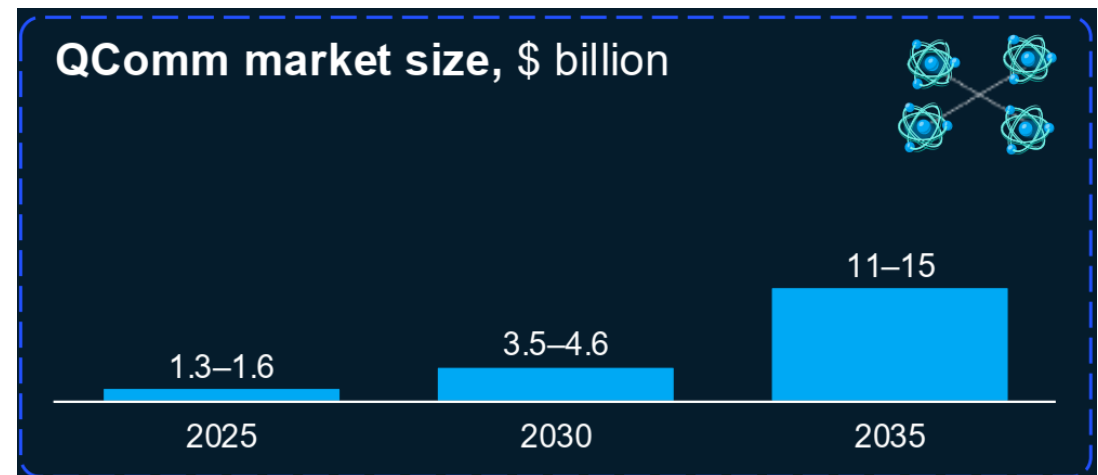
OPPORTUNITIES

Market of Quantum Sensing and Quantum Communication

Quantum Sensing



Quantum Communication



Source: Expert interviews; press search; *Quantum Technology Monitor 2025*, McKinsey; McKinsey analysis

Opportunity to push innovation in space

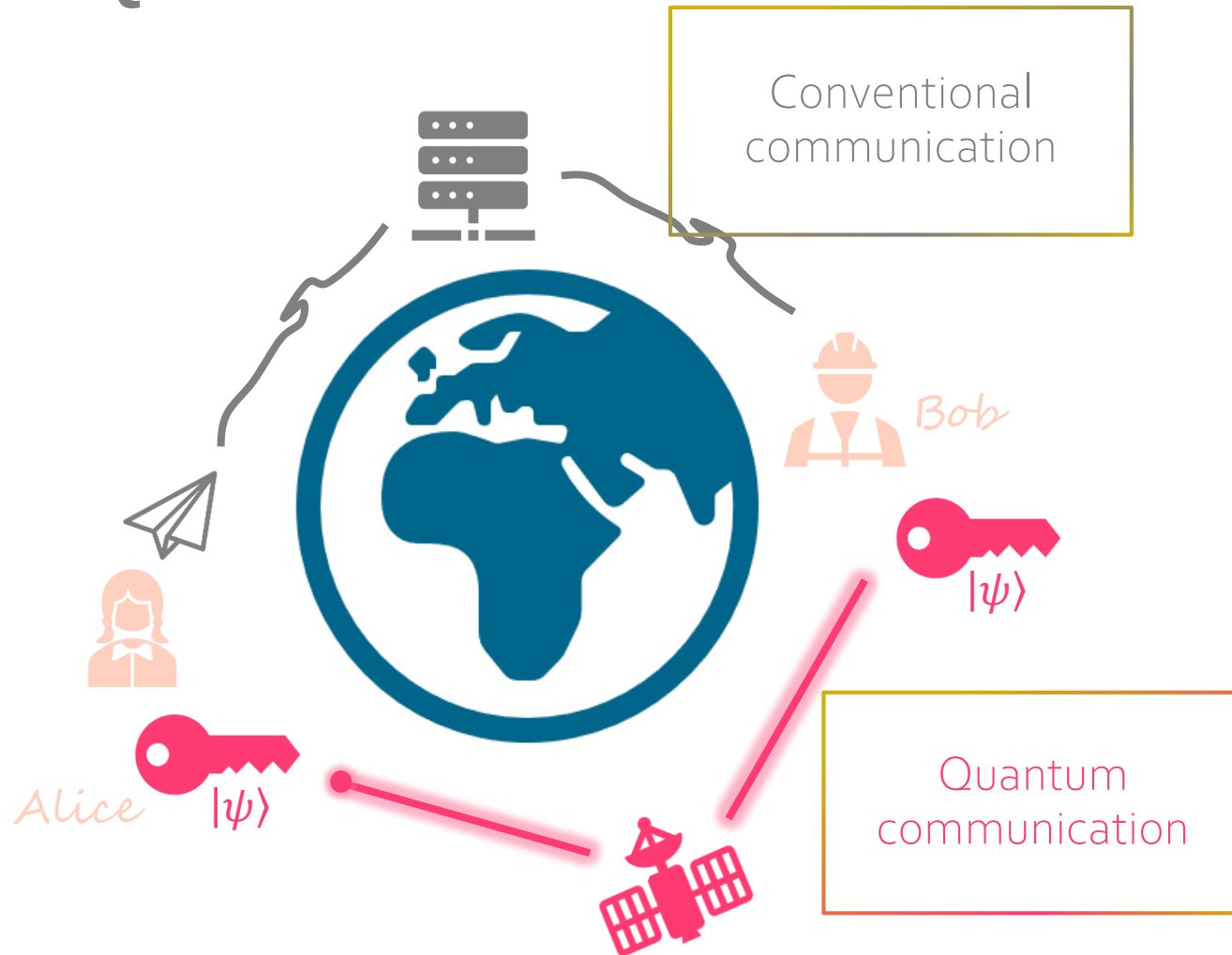


- Quantum technologies are maturing for real world application
 - Space based deployment kickstarts wider adoption
- Security interest in Europe exist demanding technology sovereignty
 - (Quantum) Communication Infrastructure, Quantum Sensing
- Space systems are accessible as never before
 - LEO and VLEO satellite constellation
- Deep expertise present in science and technology
 - Multidisciplinary development

CHALLENGES

Credit: © DLR

Quantum Communication



- Send single photons around the globe and receive them
- Keep corresponding entanglement partner for the duration of travel
- Make use of the entanglement

Quantum Key
Distribution

Entanglement
Distribution

Advanced Quantum
Information Networks

Challenge to push innovation in space



- Reliable partners
 - SPACE-Crete is an excellent platform to establish long term collaboration
- Financial resources
 - SPACE-Crete gives a perfect framework to access further funding
- Access to advanced technology
 - SPACE-Crete brings outstanding researcher for space technology together
- Ability to test the equipment
 - SPACE-Crete offers the platform to test

BENEFITS

Collaboration example: Quantum Memory Prototype for Space (QMEM)



ESA funded project

Scope: Develop miniaturized magneto-optical trap (MOT) as prerequisite for a compact quantum memory for space



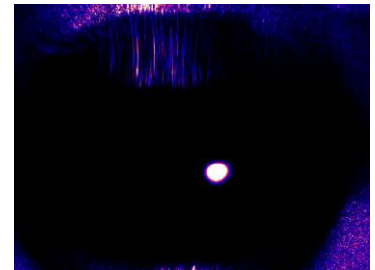
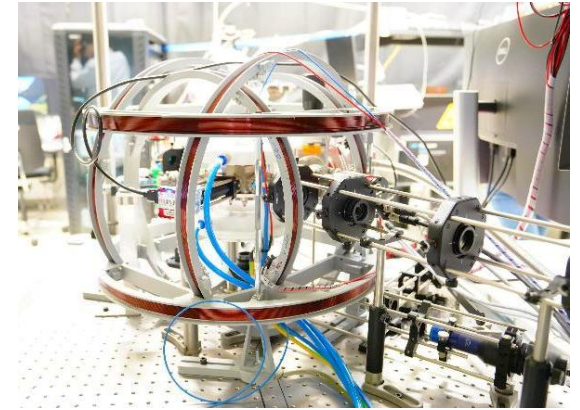
Project Partners:

Miniaturization of
science chamber to
chip-size (DLR)

Our
approach

Include space
readiness require-
ments and TVAC
tests (TESAT)

Compact and stable
light-conditioning
system (FORTH)



Benefits of pushing innovation in space



- Better lives
 - Quantum sensing from space gives more precise data on climate, water and navigation
- Secure Europe
 - Independent optical and quantum communication will allow physics-based secure communication
- New industries
 - Space demands the highest performance and reliability. Technologies proven there, such as lasers, detectors and onboard AI, can thrive in terrestrial markets

PERSPECTIVES

Credit: © DLR

Collection of ideas for teaming up:

- Use of optical telescope for quantum communication demonstrations via satellite between Oberpfaffenhofen and Skinakas
- Maturing laser optics technology for quantum system deployment in space
- Testbed demonstration for free-space link for quantum communication devices
- Jointly developing SWAP optimized quantum sensors for space
- Proof of principle demonstrations to assess chip-based miniaturization potential of quantum systems

Opportunities

Challenges

Benefits

Perspectives

SPACE ✦ **Crete**
CRETAN CENTRE OF EXCELLENCE IN EMERGING SPACE TECHNOLOGIES

A large, complex robotic arm or space station component is shown against a dark blue night sky. The structure is made of various metal beams and plates, with some blue cables visible. In the background, a bright light source, possibly a star or a distant city, is visible on the horizon.

THANK YOU FOR THE ATTENTION

Topic: **DLR Perspective on SPACE-CRETE**
SPACE-Crete info day 02.10.2026

Date: 2026-10-02 (YYYY-MM-DD)

Author: Jakob Buchheim

Institute: Institute for Quantum Technologies

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