

OPTICAL INSTRUMENTS

Product Information

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We develop laser-optical instruments and quantum-optical payloads for Earth observation, science and satellite navigation.

Solutions for your mission

We specifically excel at developing systems requiring highly stable laser sources, with a focus on:

- Laser metrology
- Optical frequency references
- Quantum Optics

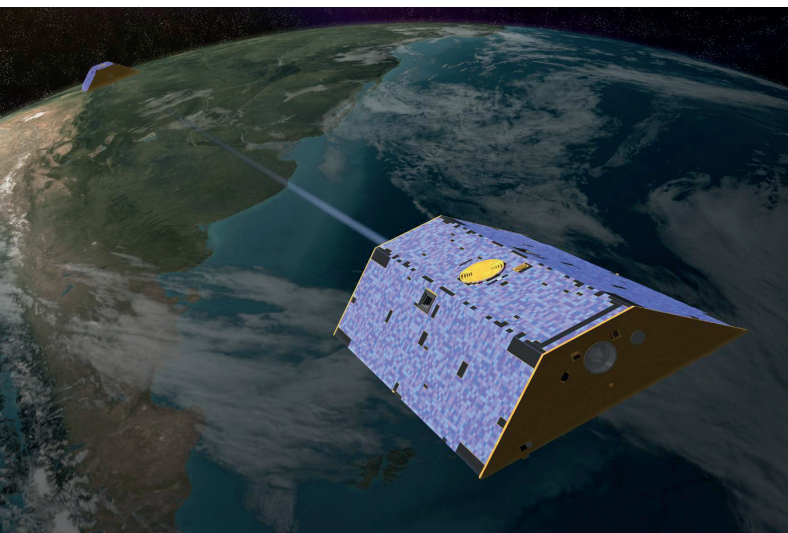
We transfer your ideas into a space qualified solution fitting to your needs, be it a component, a subsystem or a complete instrument.

The SpaceTech team

SpaceTech has built up a team of specialists covering the required areas of laser-optical, quantum-optical mechanical and electrical design.

This way we find efficient and robust solutions for your needs.

Artist concept of the Gravity Recovery and Climate Experiment GRACE (source: NASA/JPL)



Full lifecycle

SpaceTech covers the full development cycle of laser-optical instruments:

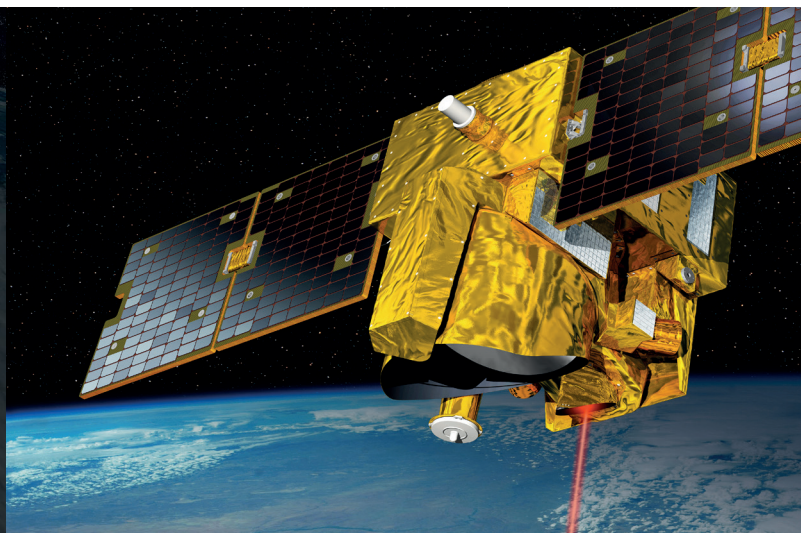
- Instrument concept design
- Detailed instrument design
- Manufacturing and test from component to instrument level

Heritage

Our instruments and subsystems find their application mainly in climate research and fundamental science missions, but also in optical communication and navigation.

Prominent examples of our activities are GRACE-FO (in-orbit since 2018), MERLIN, LISA, NGGM, GRACE-C and COMPASSO and optical clocks for the next generation of navigation systems.

MERLIN climate satellite (source: CNES/Illustration D. Ducros)



Laser metrology

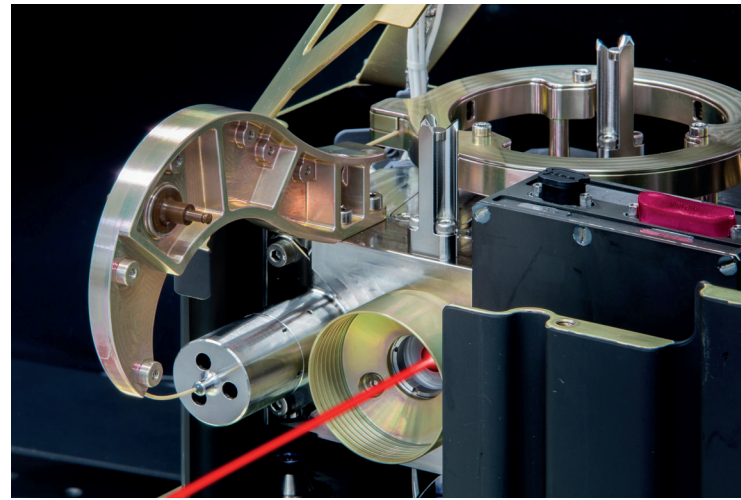
Laser optical metrology instruments allow the measurement of distance changes with nanometer accuracy over hundreds to millions of kilometers. This requires ultra-stable laser sources (down to single Hz frequency noise), optomechanical components (down to single nm/K and $\mu\text{rad/K}$), and low noise electronics.

Optical frequency references

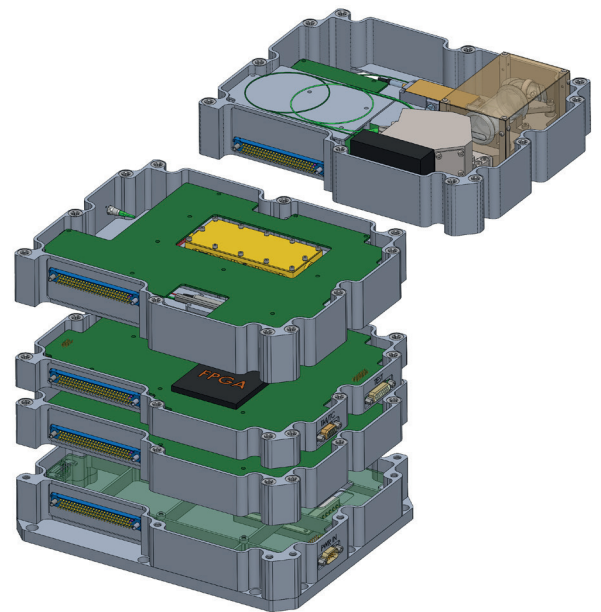
Optical frequency references are key elements for all trace-gas lidar systems, providing precise absolute frequencies accuracy from some kHz to MHz. Depending on the instrument concept, they contain own laser sources, gas cells, fiber networks and specifically designed optical interferometers or wavemeters

Quantum optics

Photonic quantum technology enables a whole new range of instruments, ranging from optical clocks & quantum accelerometers, to quantum computers and a multitude of fundamental science experiments. SpaceTech develops quantum optical systems and subsystems for space, such as laser sources, control electronics and spectroscopy units.



GRACE FO Optical Bench



Example of a modular optical frequency reference containing a laser source, a fiber network, molecular reference & wavemeter

Are you interested in our existing components or in need of a new development? Please contact us!

SpaceTech (STI) is a privately owned company and independent from large aerospace companies. Located in Immenstaad, Germany, on the shore of Lake Constance, we are ideally situated in the center of a high-tech area together with several other aerospace companies and have access to a strong network of experienced suppliers. Founded in 2004, STI has developed into an established and well recognized medium size enterprise in the space industry.

STI offers a wide spectrum of products and services for space missions, from challenging prototypes for institutional science and earth observation missions to low cost series production for mega constellations. Our main capability is the design, development and manufacturing of innovative, high quality space equipment. Our products in particular include:

- Solar arrays, from body mounted to multi hinge solar array wings with SADA
- Photonic and quantum-optical instruments and components, ICARUS systems
- Satellite structures, deployment mechanisms, and electronics
- Small satellite system design, production, integration

Key to STI's success is our profound knowledge of satellite system and subsystem design which allows us to find smart solutions for each customer and mission from a holistic point of view. SpaceTech systems and equipment operate flawlessly on more than 660 satellites in orbit. We are known in the space industry for our straight-forward and pragmatic approach, tailored processes and robust in-orbit operation.

The momentum as a young and dynamic space enterprise with innovative ideas is a perfect match for many of the new space challenges. This is why SpaceTech attracts highly qualified personnel, many with long standing and exceptional experience in the space business but also young and highly motivated engineers and scientists. And this is why we can deliver you the best solution for your needs.

When can we launch your space vision?



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