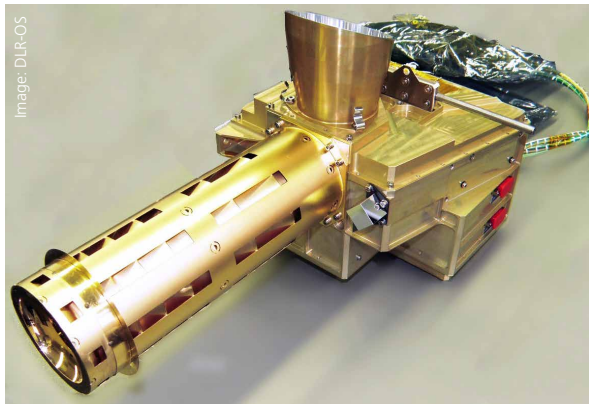
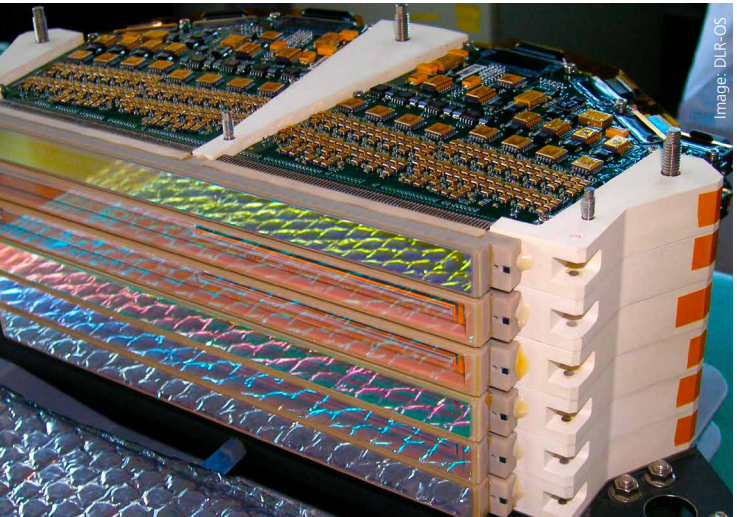


MERTIS: Mercury Radiometer and Thermal Infrared Spectrometer.

Cooperations

With its R&D activities the institute contributes to the grand societal challenges, such as climate change, security and digitalisation. It partners with industry, for example by developing cutting-edge technologies or by licensing its know-how. Its cooperation with national and international universities and research institutes is essential for having a strong link to scientific research.

Focal Plane Assembly of KOMPSAT-3a.



About DLR

DLR is the Federal Republic of Germany's research centre for aeronautics and space. We conduct research and development activities in the fields of aeronautics, space, energy, transport, security and digitalisation. The German Space Agency at DLR plans and implements the national space programme on behalf of the federal government. Two DLR project management agencies oversee funding programmes and support knowledge transfer.

Climate, mobility and technology are changing globally. DLR uses the expertise of its 55 research institutes and facilities to develop solutions to these challenges. Our 10,000 employees share a mission – to explore Earth and space and develop technologies for a sustainable future. In doing so, DLR contributes to strengthening Germany's position as a prime location for research and industry.

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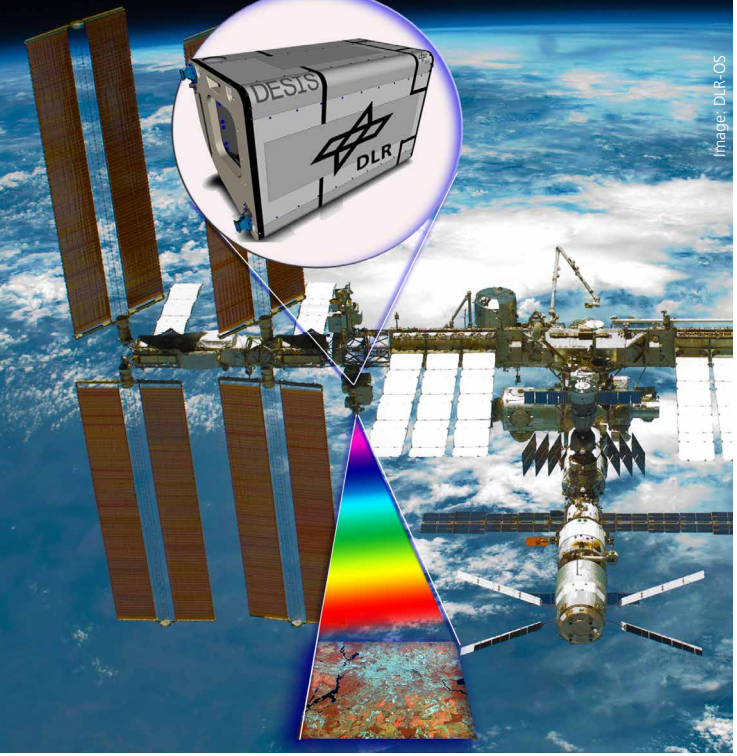

DESIS on the Intenational Space Station.

The Institute of Optical Sensor Systems

The Institute of Optical Sensor Systems focuses on research and development of active and passive optical sensor systems operating in the UV, visible, infrared and THz spectral range. The instruments are applied in space research and space exploration, onboard airborne platforms and for robotic systems. The institute participates in the scientific analysis of the data obtained with these systems. This includes Earth observation, robotics, planetary research, transport and security. The development of sensor-oriented algorithms for information processing lays the foundation for autonomous optical sensor systems.

Our vision: Optical sensors with capabilities beyond human perception for space applications.

Competencies

Focal plane units and imaging systems: The institute develops unique focal plane units for high-resolution Earth observation satellites. This includes the entire development chain from modelling and design to calibration, verification and validation in space. Another focus is on development, implementation and verification of specialized airborne optical remote sensing instruments, in particular high-performance multi-spectral camera systems.

Spectroscopy: The institute is renowned for its research and development capabilities in infrared, terahertz, LIBS (Laser Induced Breakdown Spectroscopy) and Raman spectroscopy for in-situ and remote sensing. Applications are in planetary research, astronomy and security. The expertise covers the entire area from laboratory spectroscopy to development of complete spectrometers.

Data and information processing: The institute develops methods and tools for data processing. This software is used to evaluate sensors and data and to extract user relevant information up to a semantic level. This is complemented by the development of automatic processing chains, for example using artificial intelligence for information extraction and high-resolution 3D data generation.

Space system engineering: The institute has the capability to develop and build hardware and software for space instruments. It is involved in numerous national and international space projects. Based on this expertise the institute also transfers technologies to commercial partners for specific applications.

MACS-HALE sensor platform.

Missions and contributions by the institute (selection, lead agency in brackets):

BepiColombo (ESA): Mercury Radiometer and Thermal Imaging Spectrometer (MERTIS) for exploring Mercury's surface.

CHEOPS (ESA): Focal plane module of the Characterizing Exoplanets Satellite.

DESIS (DLR/ Teledyne Brown): DLR Earth Sensing Imaging Spectrometer for Earth observation and climate research on board the International Space Station.

EnMAP (DLR): Development of the detector and the VNIR focal plane assembly for an imaging spectrometer for Earth observation.

BIROS (DLR): Bi-spectral Infrared Optical System – a small satellite for infrared Earth observation and fire detection.

GRACE-FO (NASA): Development of the wavefront detector and the PID-controller of the steering mirror being part of an instrument measuring the Earth's gravity.

InSIGHT (NASA): Development of a radiometer measuring the surface temperature and contributions to the mole on Mars.

IPS (DLR): Integrated Positioning System for real-time navigation and 3D modeling.

KOMPSAT (KARI): Development of the VNIR focal plane for the Korean satellites KOMPSAT3, 3A and 7 for Earth observation.

MACS (DLR): Modular Aerial Camera System for security applications, geodata acquisition and reconnaissance.

MMX (JAXA): Development of a compact Raman spectrometer for the Martian Moons Exploration (MMX) rover.

PLATO (ESA): Contributions to payload performance investigations, system engineering and the data processing system for ESA's Exoplanet mission.

SOFIA (NASA/ DLR): Development of the laser local oscillator for the terahertz heterodyne spectrometers GREAT and upGREAT for astronomical observations.