Space optics & electronics

The acquisition of data from space enables and supports technologies all over our planet. Earth observation and space exploration are the global basis for future key technologies

Nowadays, Earth observation has countless applications. Currently numerous organizations, authorities, companies and institutions rely on Earth observation data in the fields of environmental protection, health, climate research, precision farming, meteorology, security, urban development and many more while the community of users is growing constantly. Exploring the universe provides important information about the formation of our solar system and fundamental scientific Knowledge.

EARTH OBSERVATION

„Monitoring the Earth and its Ecosystems from Space“

PRECISION FARMING

„Supporting Efficient and Sustainable Agriculture“

METEOROLOGY

„Improving Weather Forecasts and Accuracy of Climate Data“

ENVIRONMENTAL PROTECTION

„Surveillance of Human Impact on Ecosystems“

SCIENCE

„Boost the Understanding of Atmospheric Processes“

SECURITY

„Improving Prevention and Response to Natural Disasters“

SPACE EXPLORATION

„Supporting Scientific Research in Deep Space“

Earth observation programme Copernicus

How is our planet changing? How is the climate changing? Which role does humankind play in it? On the answers to these questions depend the future, the existence and the welfare of humanity. On the answers to these questions depend the measures which will be taken and decisions which are going to be made. The “Copernicus” program is a central element helping to find the answers and marks the beginning of a new era of imaging the earth from space. Copernicus is coordinated by the European Commission and the space segment of the program is financed and developed by the European Space Agency ESA. The “Sentinel” satellites will deliver an unprecedented wealth of earth observation data. They all have technology from Jena on board.

It is the aim of Copernicus to make use of already existing earth observation satellites and to establish a more powerful global satellite system. Copernicus will be continuously observing the global changes as well as identifying and developing solutions and counter measures for the dramatic environmental changes.

Contributions from Jena-Optronik

- **Sun Sensor FSS for Sentinel-1 -** Objectives: land and ocean monitoring
- **Star Sensor ASTRO APS, electronics and optical filter for Sentinel-2** - Objectives: land monitoring
- **Opto-mechanical structure, subsystems, telescope and scan systems of for Sentinel-3** - Objectives: marine observation
- **Optics for Sentinel-4** - Objectives: air quality monitoring
- **Optics and filter for Sentinel-5** - Objectives: air Quality Monitoring
- **Star Sensor ASTRO APS for Sentinel-6** - Objectives: ocean surface topography

Sentinel-2

Jena-Optronik's contribution in the framework of Sentinel-2 compasses the design of the overall instrument electrical architecture of the main payload MSI (Multispectral Imager) as well as the development, manufacturing and testing of the Video Compression Unit VCU, a key subsystem of the MSI.

- Spectral filter assemblies
- Front End Electronics (FEE)
- Image processing

Sentinel-3

Within Sentinel-3 Jena-Optronik is significantly involved in the main instrument SLSTR (Sea and Land Surface Temperature Radiometer) by developing essential components for it. Beside the thermal and mechanical engineering of the SLSTR, the Jena-Optronik GmbH is responsible for the opto-mechanical structure, several subsystems, telescope and scan systems of the Sentinel-3 family.

- Scanner and actutor control electronics
- Optical test & calibration benches

Sentinel-4

Europe developes ist next generation of weather satellites, to be part of the global weather forecast network.

Jena-Optronik is part of it, with its star sensors, optical filter assemblies, control electronics.

The Sentinel-4 mission is dedicated to monitoring the composition of the atmosphere for the COPERNICUS programme. This mission will be carried on the MTG satellites operated by Eumetsat.

- Spectral filter assemblies

- Lens optics for imagers & spectrometers
- Focal Plane Assemblies (FPA)
- Optical test & calibration benches

Sentinel-5

Sentinel-5 is no satellite but a payload which will monitor the atmosphere from polar orbit aboard a MetOp Second Generation satellite (MetOp-SG).

- Spectral filter assemblies
- Lens optics for imagers & spectrometers
- Optical test & calibration benches

Space exploration

We develop components and systems to explore the solar system and planets:

- Instrument for the NASA Fermi Mission (former GLAST)
- Components of the camera HRSC for ESA's Mars Express
- Anticoincidence System ACS for INTEGRAL (ESA Mission)
- Instrument Processing Facilities for ENVISAT and EPS instruments
- Re-entry capsule MIRKA
- Contingents for the ROLIS camera within Rosetta mission
- Optics and test facilities for of HRSC for ESA Mars Express mission
- Laser Scanner for EXOMars/Mars Sample Return

The lens systems of the High Resolution Stereo Camera HRSC on ESA's highly successful MarsExpress mission were developed in Jena. Moreover, the complex optical test equipment for this camera was also made by the specialists from Jena-Optronik.

The Anti-Coincidence System ACS for the Spectrometer Instrument on ESA's INTEGRAL mission was designed, assembled, integrated and tested in Jena. The mission was launched in 2002 and will end in 2010.

The company gained various experiences in developing cameras for orbiters and landers of planetary missions, like NetLander, DAWN, BepiColombo and Space shuttle flights. Jena-Optronik contributed to ESA's ROSETTA mission by delivering the ROLIS-D lens system and camera housing. The mission has a planned operational duration of 12 years and was launched on March 4th 2004.

Future planetary missions can use the Smart Panoramic Optical Sensor Head, which was developed in Jena within the framework of an ESA study. Its features include a maximum light sensitivity, collection area and time coverageas well as real time analysis and object detection.

Furthermore the company lead Germany's first successful re-entryexperiment: The Micro Re-entry Capsule MIRKA was launched in 1997 andre-entered the atmosphere 14 days later providing very valuable data on aero-thermo-dynamical re-entry Parameters.