TNO

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General

TNO is one of the largest contract research organisations in Europe. TNO employs more than 4.500 professionals. It focuses on strengthening the innovative power of companies and public and governmental organisations. TNO is active in five core areas: TNO Science and Industry; TNO Defence, Security and Safety; TNO Built Environment and Geosciences; TNO Information and Communication Technology; TNO Quality of Life. TNO Space is the point of contact for national and international clients. TNO Space co-ordinates the space-related activities in the various TNO core areas with locations at Delft, Rijswijk, The Hague, Utrecht and Soesterberg.

Space products

TNO has more than 30 years experience in the development of innovative space technology. Many space projects were carried out in different fields covering space optical instruments and systems, radiometric calibration, high-precision mechanisms, propulsion, SAR systems, MMI, crew support and others. TNO played an important role in ESA and NASA projects as e.g. IRAS, ISO, Hipparcos, Sciamachy, GOME and OMI.

TNO is currently involved in space science, exploration and earth observation projects such as Gaia (e.g. basic angle monitoring system); Darwin (cryogenic optical delay line); LISA (mechanisms); ExoMars (Raman/LIBS spectrometer); EarthCare MSI (spectrometer); TROPOMI (spectrometer, calibration) and many others. Examples are also listed on the market portal Space of the TNO website.

Product developments in the areas of space science, exploration, earth observation instruments, AOCS components, propulsion and electronic systems are clustered according to the following technology lines:

- High Stability Optical Instruments (spectrometers, interferometers)
- Precision Mechanisms & Control (adaptive optics, metrology)
- Micro Sensors & Actuators (sun sensors, micro spectrometer, lab-on-chip)
- Front-End Electronics & Radar Instruments (antennas, SAR, MMIC)
- Micro Propulsion & Igniters (cold gas generators)
- Novel Materials (e.g. SiC)
- Human Space Flight (MMI, crew support systems, Desdemona facility)

TNO develops and delivers (in close co-operation with Dutch industry and SMEs) recurrent space systems and space products such as sun sensors, space mechanisms, igniters, high frequency electronics, radar systems and MMICs.

Space applications

Space data often have to be combined with observations taken in the atmosphere and on earth. Models and data processing are then required before the information is ready for end users. TNO has a broad portfolio covering various application areas and is therefore supportive in the realization of services and applications in the following GMES, Galileo and SatCom domains (in co-operation with industry and SMEs in the Netherlands and abroad):

- Atmosphere (TEMIS, PROMOTE, MACC, SMOGPROG; SEVESEO)
- Water and soil (TERRAFIRMA, PSIC4, AEGOS, FCR-2015)
- Security (PRESENSE; DECLIMS, MARNIS, LIMES, TANGO; GMOSS, G-MOSAIC)
- Galileo (PACIFIC, MAGES, various GPS projects in the area of mobility and ITS)
- SatCom (IMS, Capacity Building CBICT)
- User-driven integration of Earth Observation, Navigation and Telecom (IAP)

Technology Transfer

Technology transfer is considered as an important part of the Dutch space policy. In order to promote the transfer of space technology, the Dutch Technology Transfer Programme (DTTP) was formally started in 2001. It is an initiative of the Dutch Ministry of Economic Affairs, ESA and TNO. The management of this programme is performed by TNO Space.

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