

# TNO | INNOVATION FOR LIFE

"In close cooperation with industry, TNO delivers breakthrough technology for space and science."

#### **About us**

**TNO** is a not-for-profit independent Dutch research organisation with more than 50 years of space heritage.

Since 1964 TNO has designed, built and calibrated a growing list of mainly optical instruments and modules. Starting with the very first scientific instrument built for ESA, TNO has a proven track record in space instruments and components spanning half a century.

TNO has consistently delivered breakthrough technology and components, ranging from Earth Observation, Space-based and Ground-based Astronomy, Satellite Communication and Space Situational Awareness.

### **Solutions**

TNO collaborates with partners in the development of future mission technologies and payloads from requirements definition to design, integration, testing and calibration.

In-house technologies include:

- · Free-form optics manufacturing.
- Fine steering mirrors.
- Deformable mirrors with actuator spacing from 5-20 mm and up, linearity > 99%, power. dissipation <30 mW per actuator, different diameter sizes
- High precision mechanisms with piston error below 1pm/sqrt(Hz) and extreme thermal dimensional stability.



## **Company facts**

- Founded: 1932
- Space Team: 350+ FTEs

#### **Company highlights**

## TNO highlights for space missions include:

- Optical and mechanical systems for:
  - NASA Aura OMI,
  - ESA/Copernicus TROPOM (S5P) and Sentinel 5
  - ESA Envisat Sciamachy
  - ESA GAIA

## In Ground Based Astronomy TNO has provided:

- ESO VLTI delay line technology
- ESO VLTI and EELT Laser Guide Stars
- ESO EELT primary mirror support structure



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