DLR – German Space Agency

German Earth Observation Capabilities

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The German Earth Observation Program

1. **Germany largest participant in European EO Programs**
   - EOEP, GMES and EUMETSAT Programs

2. **Complementary German national EO Program**
   - Missions, Technology, Data Exploitation

Activities in the **national** Earth Observation Program:

**Missions**
- TerraSAR, TanDEM, RapidEye, EnMAP

**Scientific and technological Mission Preparation**
- HRWS, MetImage, Lidar, IR Detectors

**Development of Applications**
- SCIAMACHY products, EnMAP algorithms

**Market Development**
- DeCover, DeSecure, DeMarine
TerraSAR-X

- Public Private Partnership between DLR & EADS Astrium / Infoterra GmbHs
- Scientific and commercial exploitation
- Application:
  - agriculture & forestry
  - risk management & security
  - cartography & planning
  - mining & exploration
  - environment
  - geology


TanDEM-X… a second TerraSAR

- Public Private Partnership agreement signed already (August 2006)
- Main mission objective: high precision, global Digital Elevation Model (DEM)
- National SAR interferometry mission
- Astrium (D) main contractor with 25 subcontracts
- Launch planned mid 2009

Additional mission objectives:
- Ocean Currents
- Traffic Monitoring
- Glacier Mass Balance
- Polarimetric InSAR
- Super Resolution
- Digital Beamforming
EnMAP

- Hyperspectral instrument with over 200 channels
- Mission goal: Investigate wide range of ecosystem parameters
- Main contractor in Phase A and B: Kayser-Threde GmbH (D)
- Present Status: Preparation of Phase C/D
- PI: Geo Forschungszentrum Potsdam

RapidEye

- Commercial initiative of RapidEye AG with technology support from DLR
- Five identical small satellites in one orbital plane
- CCD Camera, build by JenaOptronik
  - 5 spectral bands & spatial resol.: 6.5 m
  - Strip width: 78 km
  - Launch: mid 2008
- Mission target: daily repetition

Mission target: daily repetition

Launch in 2012

Water quality

Forestry
Next Generation SAR - HRWS

- Digital Beamforming Techniques
- HRWS = Measurement of a broad, continuous swath with high resolution at same time
- Development and test of SAR-Demonstrator-Breadboard (Receive-only)
- Objective: Technology readiness level (TRL) 6 in 2010

METImage

- Imaging radiometer instrument
- Measures physical parameters in atmosphere, sea & land surface for meteorological tasks
- Present Status:
  → Preparation of Phase B
- MetImage intended as instrument of next EUMESTSAT polar system
- 2008: METImage will be the showcase project in East Germany (Jena-Optronik GmbH)
Lidar/Dial - Technologies

- Efficient High Power Pump laser transmitters with Ramp-delay-fire Cavity control
- Development and Test of a compact Transmitter Breadboard
- Objective: future Lidar missions for Winds, Water Vapour, CO2 etc.

Infrared - Detectors

Short Wave IR-Sensor:
- Large area 2-dim Infrared-Sensor modules
- Pulse Tube Cooler and Flexure Bearing Compressor
- Application for e.g. EnMAP, Sentinel-4

Mid – Thermal IR Sensors:
- Pre-development and test of SW/MW and TIR detectors for MetImage
Emissions from ship traffic (NO2) - SCIAMACHY
Global emissions of Methane

SCIAMACHY on ENVISAT

In the News: Vegetation emits Methane (!?)
Operational information products - Landcover

GMES-Services

landcover mapping

for national data needs

additional geo-data

information products for EU reporting obligations

Environment

Security

Regional Planning

Water

Forest

Operational information products - Landcover

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Environment

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Water

Forest
The road to success:

- German Earth Observation Programme achieved a world-wide visible role in the overall EO community

- Today's success is based on technology developments and projects started in the 1980s:
  - E-SAR (Airborne, since 80’s), X-SAR (‘94), SRTM (2000), ProSmart-1, -Ext, -2: today TerraSAR-X, TanDEM-X
  - ROSIS, DAIS, HYMAP, ARES (Airborne), MOMS (90’s), MOS (’96-’04), SCIAMACHY (2002), ProSmart-1, -Ext, -2: today EnMAP

- Essential for success:
  - long-term programmatic continuity
  - reliable partnership with science and industry
  - reliable and continuous availability of data