FERN.Lab: Increasing scientific literacy of non-experts in the field of remote sensing and earth observation

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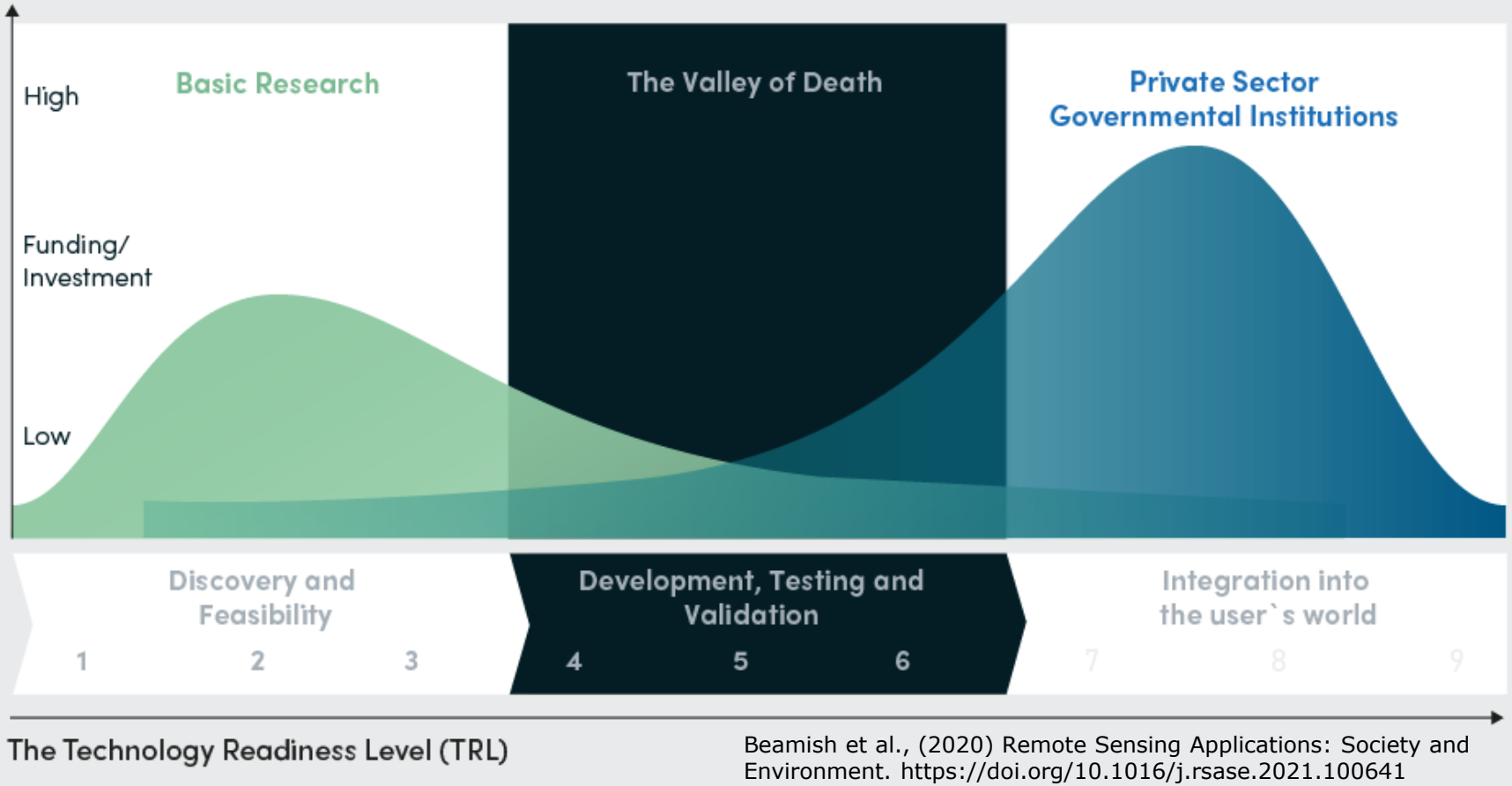
Helmholtz Centre Potsdam GFZ German Research Centre for Geosciences

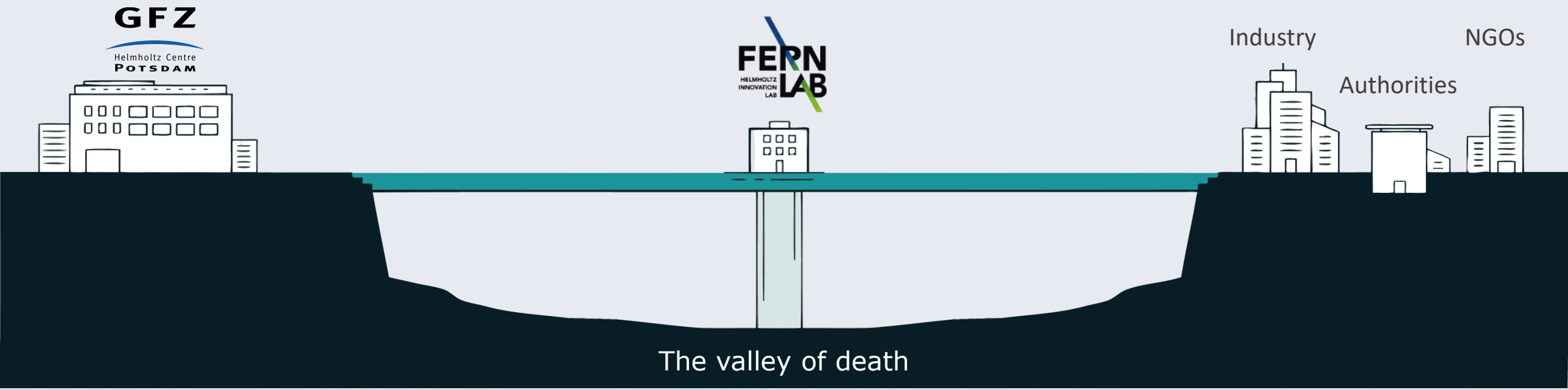
Helmholtz TEACH 4 Conference 21-22.11.2024

Knowledge and technology transfer



Beamish et al., (2020) Remote Sensing Applications: Society and Environment. https://doi.org/10.1016/j.rsase.2021.100641

Knowledge and technology transfer



Knowledge and technology transfer

Source: Transferbarometer – translated with DeepL https://transferbarometer.de/

Research-based cooperation and exploitation Application of research results for social and economic benefits	**Relationship management** Development and development of personal relationships for possible later transfer activities	**Research infrastructure** Provision of technical (large devices, databases) and non-technical equipment (libraries, collections)	**Entrepreneurship** Mediation of entrepreneurial thinking and acting as well as support for start-up activities
Transfer-oriented teaching and professional development and further training Involvement of non-scientific partners in teaching and learning formats	**Scientific advice for decision-makers** Formalized activities to support science-based decisions	**R&D with society** **society** Participation of social actors in the research process and the development of solutions	**Science dialogue** Dialogue-oriented formats of science communication with society

FERN.Lab – Helmholtz Innovation Lab

The mission of FERN.Lab is to initiate, promote and support transfer activities for the valorisation of remote sensing in society.

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Strategic Development & Capacity Building

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Strategic Development & Capacity Building

Innovative Method Development

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Strategic Development & Capacity Building	Innovative Method Development	Agile Product Development

FERN.Lab – Helmholtz Innovation Lab

Manager
Dr. Alison Beamish

A Cozacu — KT Expert — Innovation Manager

Methods Lead
Dr. Robert Behling

F Kästner — Dr. D Scheffler

Software Lead
Dr. Romulo Goncalves

D Rabe — A Madadi — J Knoch — J Wenzel

Innovation Management & Knowledge Transfer

Scientific Method Development

Software Development

Our approach

By engaging in transfer activities FERN.Lab aims to:

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1. **Maximise social impact** by making state of the art RS methods available through user-oriented developments

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FERN.Lab – Helmholtz Innovation Lab

SARXidTagebaufolgen

Risk assessment of infrastructure damage

SARsInfra

Observing infrastructure hazards

WRaINfo

High-resolution weather radar data for agriculture

MiSaC

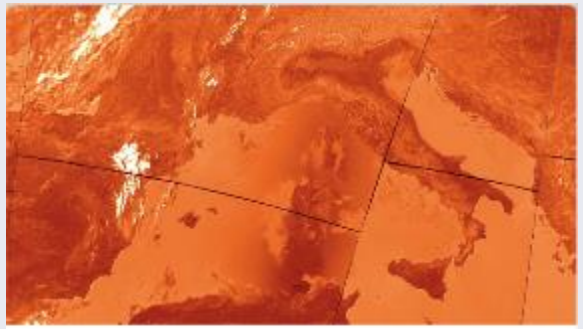
Minimal Sampling Classifier Webservice

OverFly

UAV data for heathland vegetation monitoring

CropClass

Identifying and monitoring crops



FinaS

Homogenization of multi-sensor satellite data

HeatS

Homogenization of thermal satellite data

FERN.Lab – Helmholtz Innovation Lab

Agriculture

Risk ass

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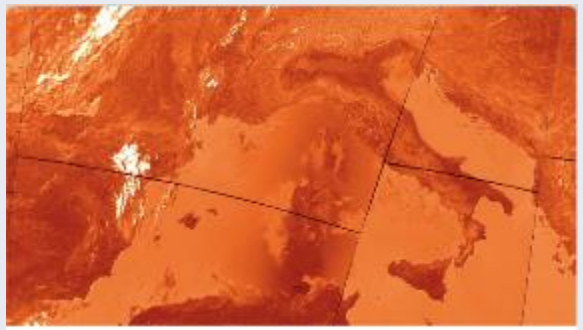

FinalS

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FERN.Lab – Helmholtz Innovation Lab

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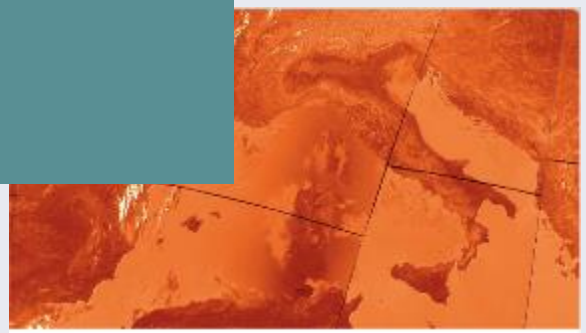

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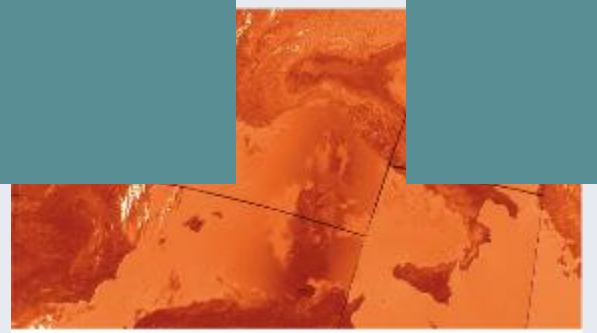
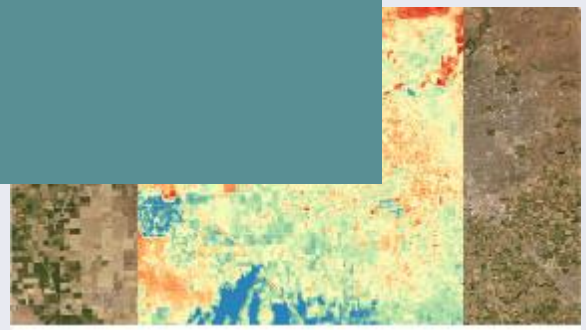


FireCCI

Homogenization of multi-sensor satellite data



HeatCCI

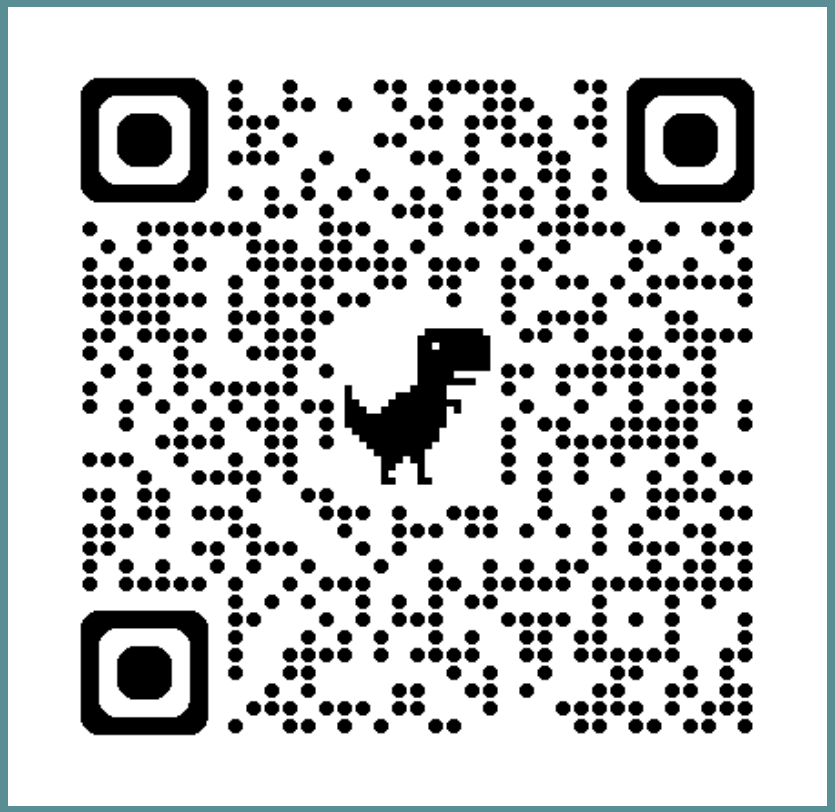
Homogenization of thermal satellite data

FERN.Lab – Helmholtz Innovation Lab

SARXidTagebauÜberwachung

Risk assessment of infrastructure damage

https://fernlab.gfz-potsdam.de/developments.html



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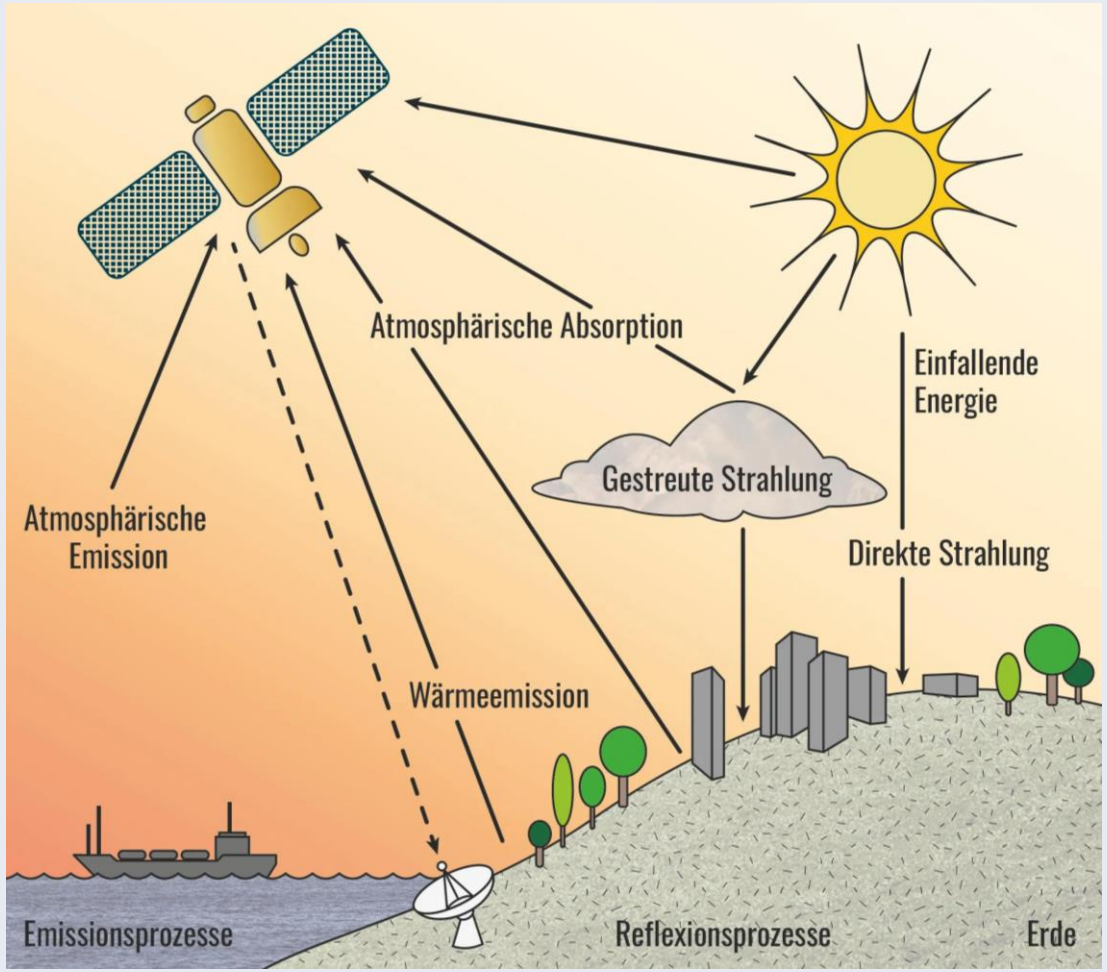
What is remote sensing?



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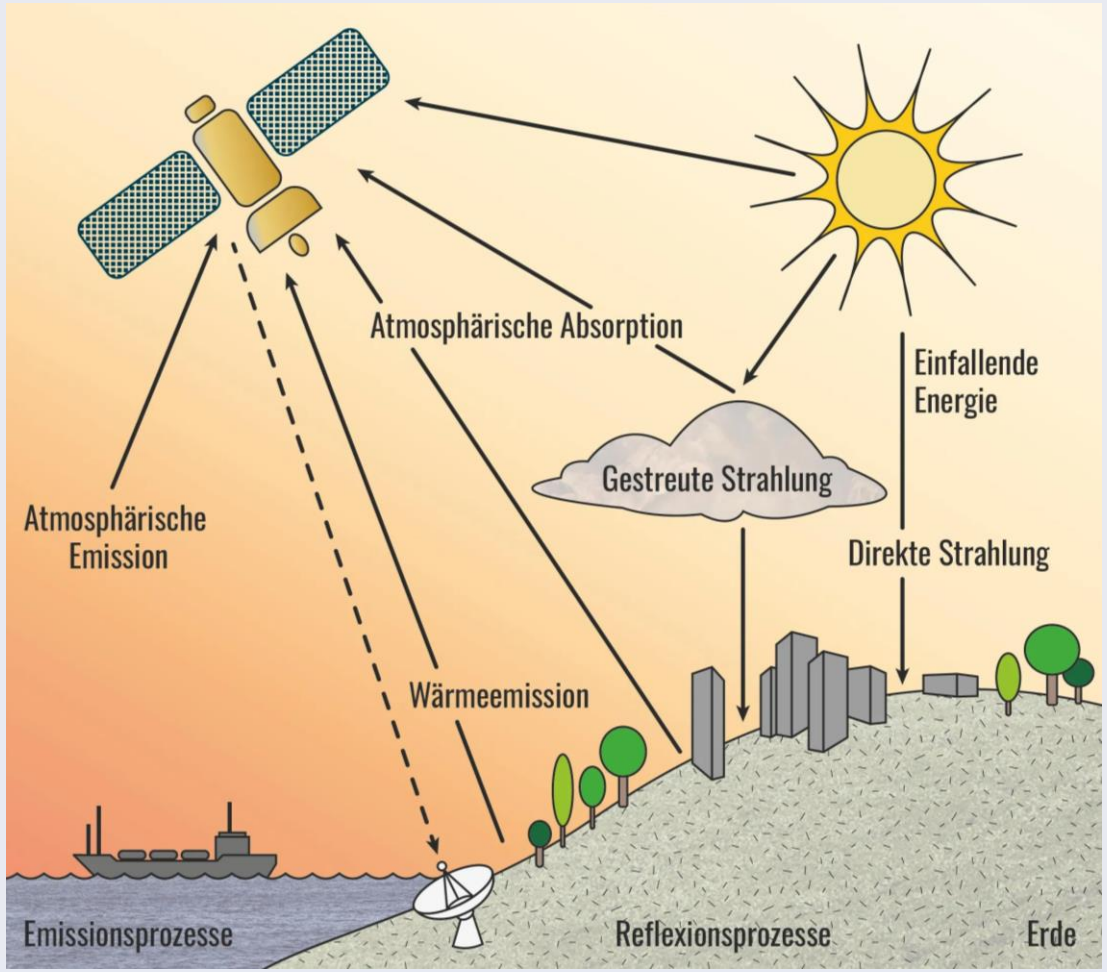
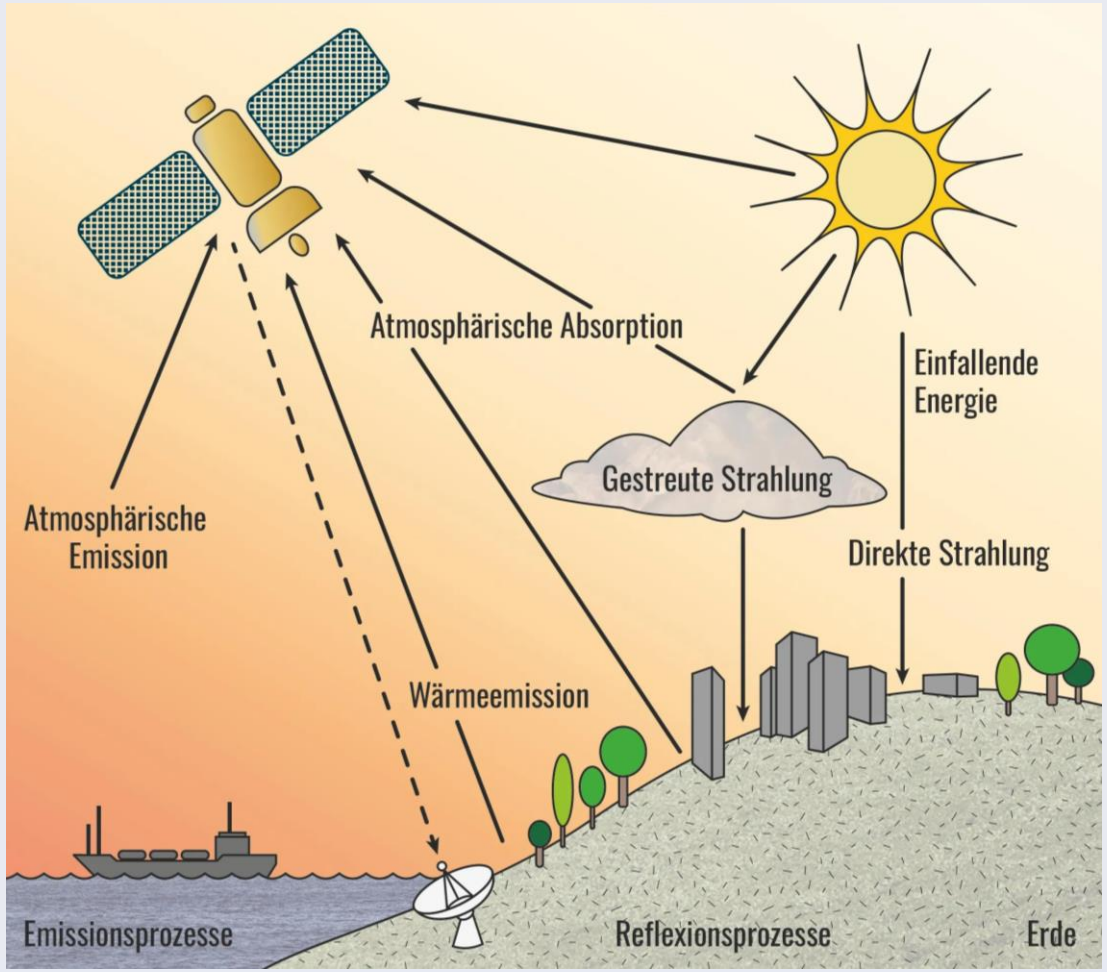


Passive

What is remote sensing?

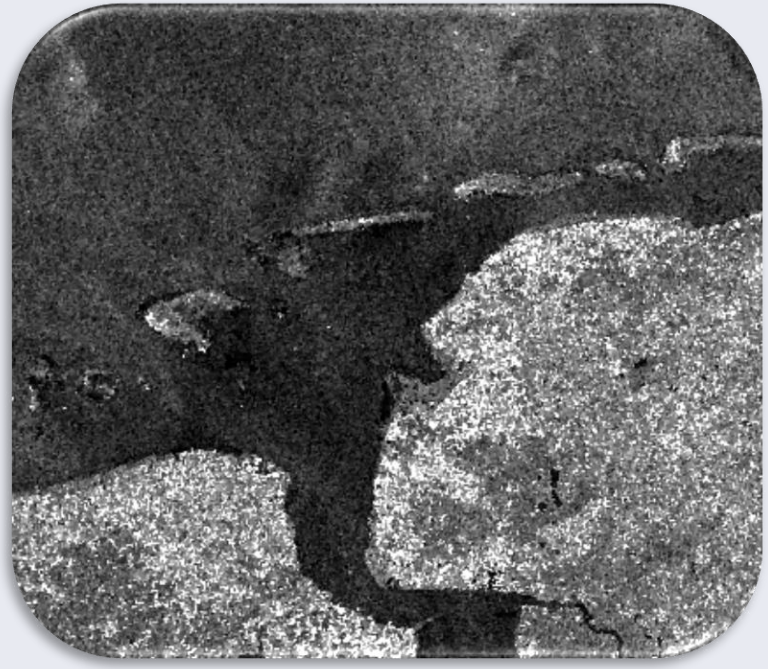


Passive

Active

What is remote sensing?

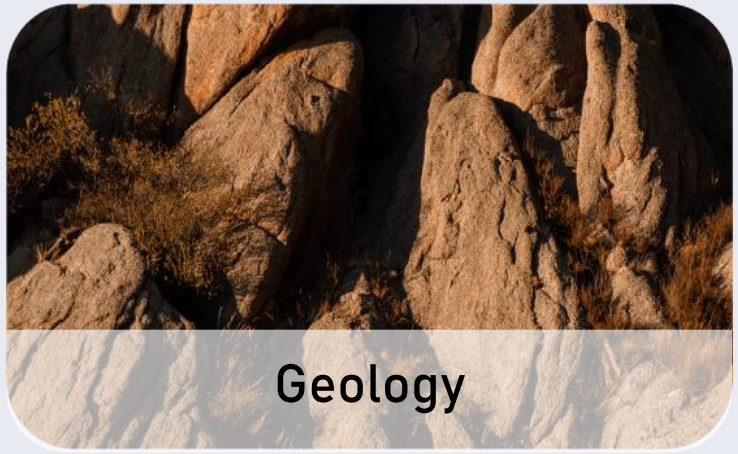
Optical
passive



RADAR
active

Thermal
passive*

Wide range of applications



What is remote sensing?

- (Almost) global coverage
- Area-based information
- Near real-time
- Unbiased/independent
- Versatlie

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- Continuing professional development

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- Stakeholder impact and uptake

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- Scientific Dialogue

Continuing professional development

User-oriented

Development of a demand-oriented educational program in the field of EO data, environmental monitoring of moors, protected areas, forests and urban areas

Continuing professional development

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Development of a demand-oriented educational program in the field of EO data, environmental monitoring of moors, protected areas, forests and urban areas

Self-paced

Enabling users to use the materials toolbox independently

Continuing professional development

User-oriented	Development of a demand-oriented educational program in the field of EO data, environmental monitoring of moors, protected areas, forests and urban areas
Self-paced	Enabling users to use the materials toolbox independently
Sustainability	Provision of long-term self-study training materials on the learning platforms EO-College and FERN.Lern

Continuing professional development

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Massive Open Online Courses

Continuing professional development

Massive Open Online Courses

HYPER EDU EnMAP education initiative

Funding period 2021-2023

Basic MOOC Introduction to Hyperspectral Remote Sensing — 2021 — ~2600

Mini MOOC Imaging Spectroscopy for Agricultural Applications — 2022 — ~560

Mini MOOC EnMAP Data Access and Image Pre-processing Techn. — 2023 — ~260

Mini MOOC Imaging Spectroscopy for Soil Applications — 2024 — +130

Funding period 2024-2026

Basic MOOC Introduction to Hyperspectral Remote Sensing — 2024

Mini MOOC Imaging Spectroscopy for Forest Applications — 2025

Mini MOOC Imaging Spectroscopy for Geological Applications — 2025

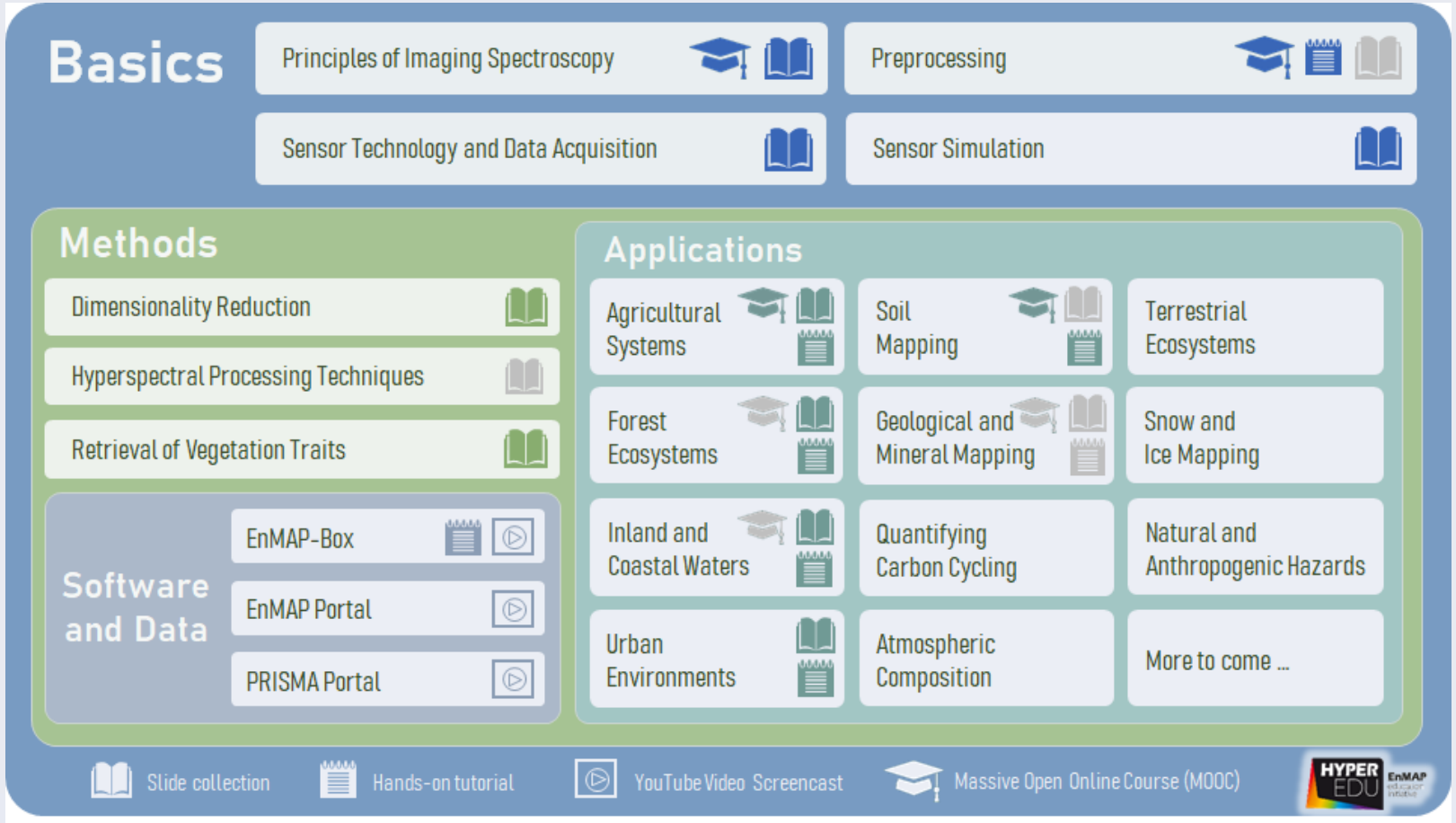
Mini MOOC Imaging Spectroscopy for Water Applications — 2026

Check out the basic MOOC trailer here!

Access all hyperspectral MOOCs on eo-college.org!

Continuing professional development

Massive Open Online Courses + training material



Check out all the course offerings here on eo-college.org

Continuing professional development

Continuing professional development

KONSAB

- Remote sensing data for forestry and agriculture

Continuing professional development

KONSAB

Remote sensing data for forestry and agriculture

SAPIENS

Satellite data for planning, industry, the energy sector and nature conservation

Continuing professional development

KONSAB

Remote sensing data for forestry and agriculture

SAPIENS

Satellite data for planning, industry, the energy sector and nature conservation

FPCUP

Satellite remote sensing for official environmental monitoring

Continuing professional development

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KONSAB Web-Seminar

Teil 1 – Einführung in die Fernerkundung

KONSAB Lern-Video

Erstellung einer Dünge-Applikationskarte

KONSAB Lern-Video

Erstellung einer Ertragspotenzialkarte

KONSAB Lern-Video

Satellitendaten finden und herunterladen auf CODE-DE

Continuing professional development

SQuBA | Status Quo and Needs Assessment of Training Measures in the Field of Satellite Remote Sensing/Copernicus

Funding by: Federal Ministry for Digital and Transport

Funding ID: 313/2024/8140736

project executing/management agency: DLR Space Agency

Project coordinator: GFZ Potsdam

Funding period: 10/2024 - 12/2024

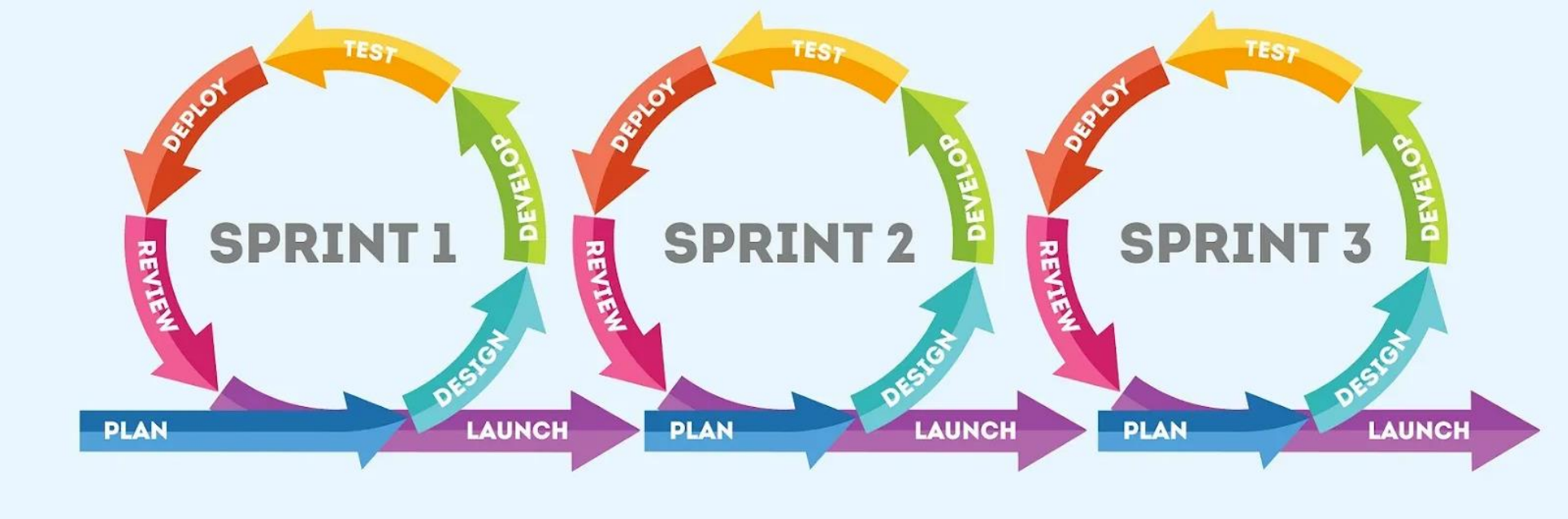
Copernicus
Europe's eyes on Earth

Problem: Lack of German language RS training material

Goal: Identify needs, relevant topics, and challenges

Outlook: Certified national training program for public agencies

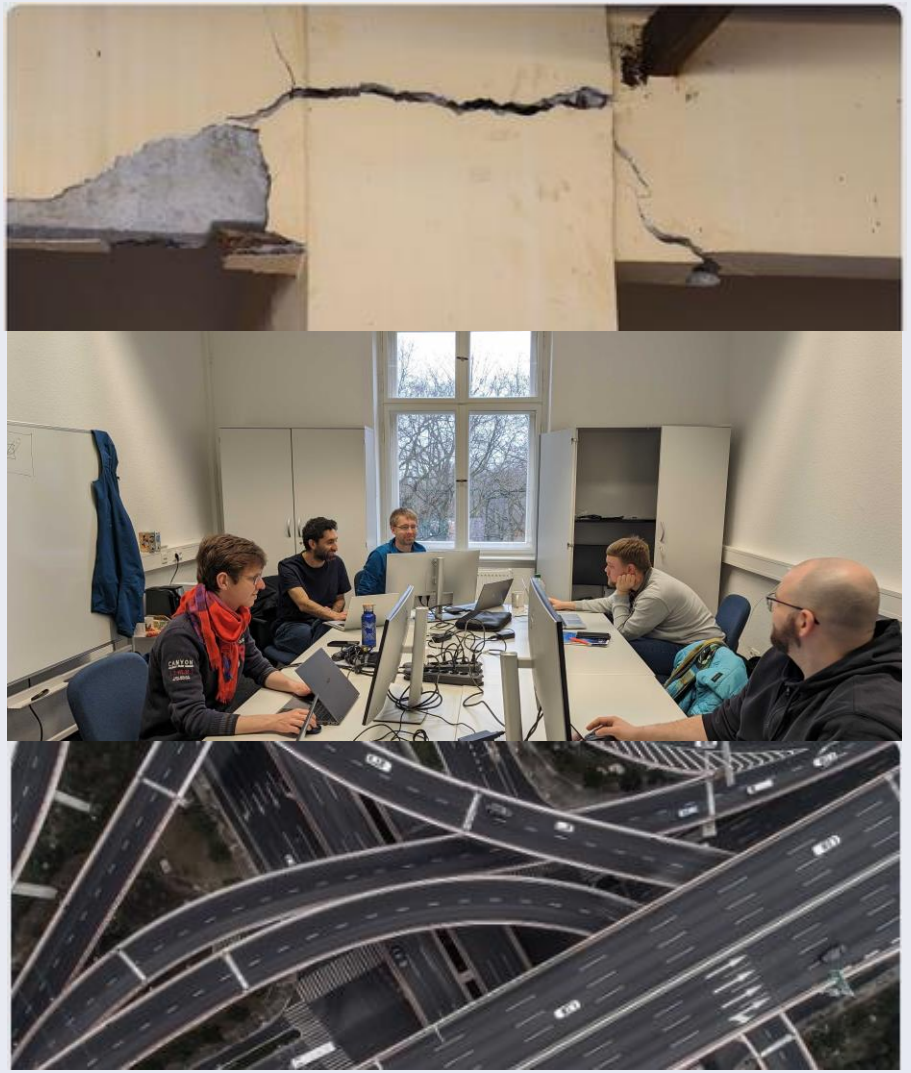
Stakeholder impact and uptake



Source: https://zeda.io/blog/what-is-agile-product-development-life-cycle-the-guide

Stakeholder impact and uptake

- **Goal:** Automated algorithm to monitor surface deformation and infrastructure risk
- **End-users:** land surveying office, state office for road construction and transportation
- **Stakeholder engagement:** co-designed, development sprints, co-deployment

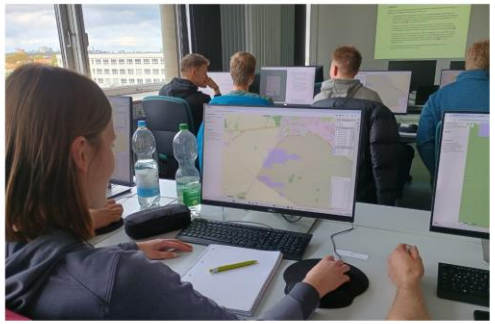


Leibniz Universität Hannover

Landesamt für Vermessung und Geoinformation Schleswig-Holstein

LBV.SH Schleswig-Holstein Landesbetrieb Straßenbau und Verkehr

Stakeholder impact and uptake



Photos (c) Clara Nicolai

- **Goal:** Web service for tracking local precipitation events in real time using high-resolution weather radar data (100 x 100 m; 5 minute intervals)
- **End-users:** Agricultural professionals and municipal officers
- **Stakeholder engagement**: co-designed, development sprints, user workshops with evaluations, 1:1 training

Scientific dialogue

Copernicus Network Offices

Professional networks for people and organizations using or interested in using Copernicus data

- Forests
- Municipalities
- Transportation
- Soils

Scientific dialogue

European Commission

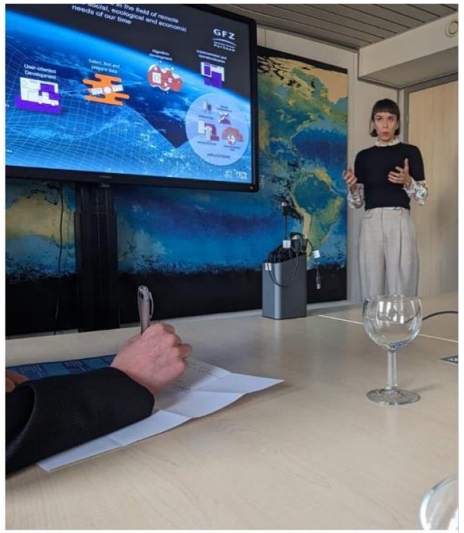
European Parliament

esa

European-level engagement

Understanding the policy strategic and technical activities of politicians, directorate generals, and the European Space Agency

- Space policy
- Environmental policy
- Science communication
- Strategic development



Thank-you!

Want to know more or collaborate? Get in touch!

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