



Federal Agency for  
Cartography and Geodesy



# Remote Sensing

in the Federal Agency for  
Cartography and Geodesy



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# What is remote sensing?

“Remote sensing is the study of the methods used for extracting and analysing information about the Earth’s surface by measuring and interpreting its energy fields. The electromagnetic radiation emitted or reflected by the Earth serves as the information carrier.” (DIN 18716/3)

Remote sensing is one from the many current research topics at the Federal Agency for Cartography and Geodesy. Our main activities in this field are:

- We implement and provide the German land cover model LBM-DE
- We are active participants in ESA’s Copernicus mission and are currently responsible for the national coordination of the Copernicus land monitoring services for Germany
- We compile and harmonise 3D-Geodetic data (DGM, EuroDEM, UAV)
- We will take over the duties of the ZKI within the next four years

A more detailed introduction to these projects is provided in the next section.

# DGM (Digital terrain model)

## Harmonised 3D-Data for Germany

The BKG and the state surveying and mapping authorities together lead the task of the harmonisation of the digital terrain models for the German federal republic. The DGM is available for the whole of Germany in grid sizes of 5, 10, 25, 50, 200 and 1000 metres with landscape dependent elevation accuracy.

The updating procedure for the German DGM is divided into two main tasks:

- Alignment of the elevation data according to the state borders
- Conversion of the elevation data from individual states into a uniform grid size

Thereafter, larger DGM-differences in the overlapping regions along the state borders are checked using in-situ methods. Here, the heights of local areas are verified and the older data are either replaced completely, or in parts. Differences between the DGMs at the state borders are mainly caused by varying dates. Further causes for these deviations can be due to different detection methods. In this way, future data updates from the different states will be incorporated into the existing digital terrain model. At present, an update is planned approximately once a year.

# Copernicus

## Free Satellite data for everyone

The European Earth observation programme, Copernicus, is an initiative headed by the European Commission in partnership with the European Space Agency (ESA) with the aim to provide an independent European Earth observation system. The member countries of both institutions are responsible for the installation and organisation of the Copernicus mission. Copernicus uses satellite data from previous missions together with data from the newly launched, and the planned, Sentinel missions to expand its observation capabilities. Using the satellite data, together with the data provided by the federal agencies and the geospatial data from the member states, Copernicus strives to provide the Copernicus information services. These fall into six services, namely land monitoring, marine environment monitoring, emergency management, atmosphere monitoring, Climate change and security.

The land monitoring service also conducts the implementation and the processing of the Corine Land cover data (CLC), which, for Germany, is based on the generalisation of the LBM-DE. The BKG is responsible for the German national coordination of the Land monitoring services within the Copernicus programme.



Sentinel 2 - Image



# LBM-DE (Land cover model)

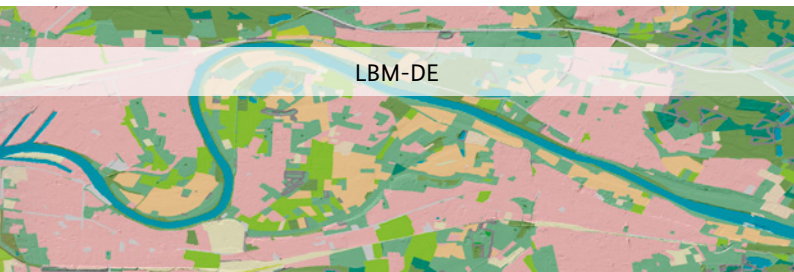
**How does the urban landscape change over time?**

**How drastically do the natural grasslands change?**

**Are there more arable areas compared to meadows and pastures?**

The European commission has been attempting to answer these questions since the mid-1980s with the Corine Land Cover programme. Since these aspects are important not only at the European but also on a national level, the LBM-DE programme was initiated in 2009. Environmental protection and compensatory measure play an increasingly important role in, for example, construction projects of supra-regional importance. The BKG creates and updates the land cover model for Germany (LBM-DE) for purposes such as these. This is then provided as the national contribution for the CLC project. Together with the German Environmental Agency which is legally responsible for the production of the German CLC, the BKG has successfully implemented a procedure based on geospatial data and satellite images for updates.

Building on the extensive objects of the Digital basis landscape model (Basis DLM), landscape changes can be recorded and documented by evaluating multi-spectral satellite images. Through the use of several satellite images spread over the whole vegetation period, the separation of grassland and arable land is possible. In contrast to the Corine Land Cover project, the minimum mapping unit in the LBM-DE is 1 ha and the minimum mapping width is 15 meters. Therefore, the LBM-DE data have to be generalised before being intergrated into the European CLC project.



# Center for Satellite Based Crisis Information (ZKI)

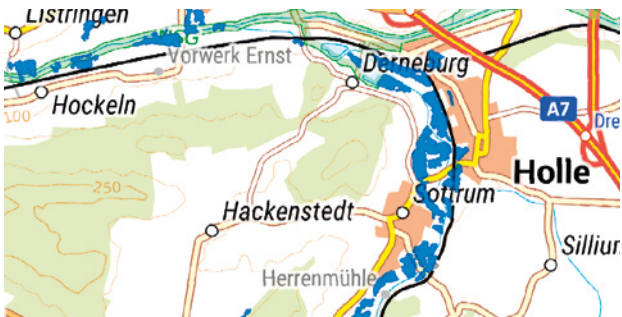
## Innovative collaboration between the nation and current scientific research

Since 2013, the ZKI-DE service has been providing the federal agencies with current procurement and analysis of current geo-information, offering new management options to the public administration. This innovative collaboration between the Federal ministry of the Interior (BMI) and the German Aerospace Center (DLR) strives to serve the needs of the federal agencies using the latest remote sensing data for emergency situations, as well as support and solve issues relating to civil and public security.

Since the end of 2016, a new framework agreement has been made between the BMI and DLR, which provides for another four year co-operation (2017-2021) between them. The purpose of this is to prepare, equip and enable the BKG to be responsible for the standard tasks of the ZKI-DE service thereafter. From 2021, the BKG will continue this service independently.



[www.zki.dlr.de](http://www.zki.dlr.de)

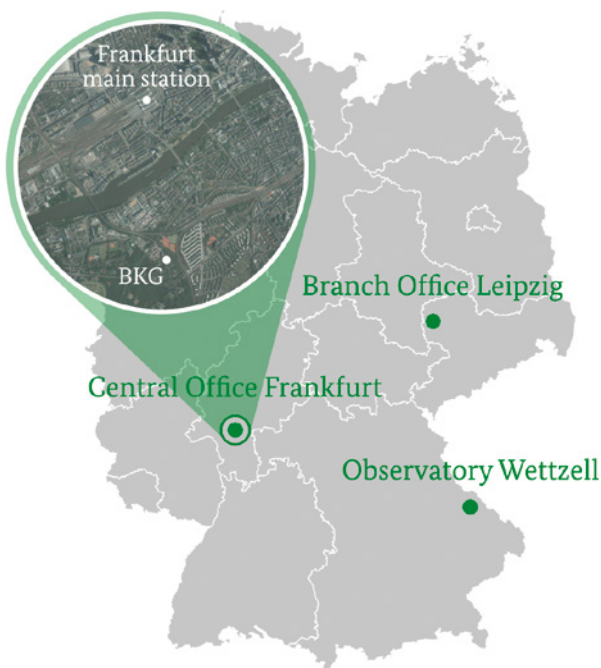


*Flood extent on 26.07.2017 in the region near Halle (Lower Saxony) extracted from Sentinel-1 images*

# Federal Agency for Cartography and Geodesy

BKG is the central provider of the federal government of Germany for basic topographic and cartographic data as well as geodetic services and reference systems.

Where can you find us?



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