

Germany

Federal Agency for Cartography and Geodesy (BKG)

GeoAI: The modern measurement of the world

“If you want to understand how AI is changing our world, you should not just look at texts and images - but at maps. GeoAI makes decisions more informed because it opens up large amounts of data. And we need that more urgently than ever.”

Professor Paul Becker

President, Federal Agency for Cartography and Geodesy, Germany

Germany’s Federal Agency for Cartography and Geodesy (BKG) is pioneering the use of GeoAI as a key technology that enhances collaboration, improves data quality, and strengthens insights for evidence-based decision-making.

Artificial intelligence (AI) extends far beyond applications such as text generation, image creation or autonomous driving. An area of particular relevance that has long received too little attention is the intelligent analysis of geospatial data, known as GeoAI. Public administration employees who work daily with complex geospatial, building and environmental data can benefit significantly from these technologies.

The fields of application for GeoAI are diverse. They range from analysing changes in forest structures and parking space utilisation to identifying damaged buildings after extreme weather events such as flooding. In many cases, the required information is incomplete or outdated. AI-based analyses using satellite, aircraft and drone data help to close these data gaps efficiently.

One prominent example of how such methods are already being put into practice is the Land Cover Model Germany (LBM-DE) maintained by BKG. It provides nationwide information on land cover and land use. Until now, updating

this dataset has involved considerable manual effort.

In the future, AI will increasingly support this process.

A model developed by the German Aerospace Centre (DLR) automatically identifies land cover directly from high-resolution satellite imagery, while uncertain areas can be selectively reviewed by experts.

Beyond land cover mapping, GeoAI also plays an important role in ensuring safety-critical operations. For the management of air traffic, German Air Traffic Control (DFS) requires reliable information on obstacles in the vicinity of airports. AI-based systems automatically detect and classify objects such as vegetation, buildings or infrastructure elements that exceed critical heights. The necessary high-resolution 3D data are currently being collected by BKG as part of the ‘Digital Twin Germany’ (DigiZ-DE) project.

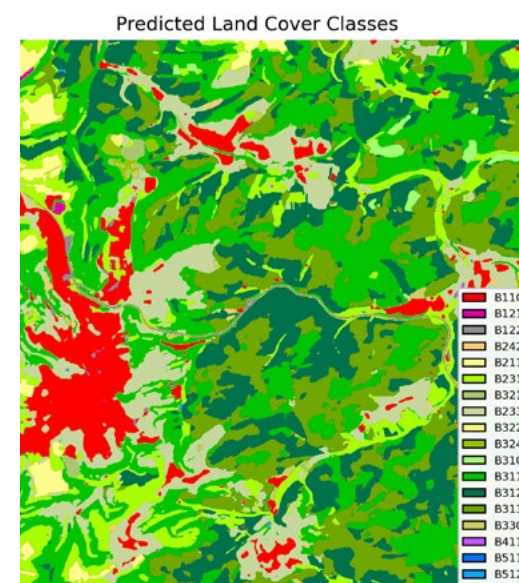
Successful implementations of GeoAI not only depend on powerful algorithms and data, but also on strong collaboration across sectors. To fully exploit the potential of GeoAI, close cooperation between public administration, science and industry is essential. The ‘Forum GEO.KI’ organised by BKG, together with the Federal Environment Agency’s AI Lab, clearly demonstrated that GeoAI is not a niche topic, but a key technology connecting multiple disciplines and institutions.

Benefits

- Reveals patterns in large geospatial datasets to make developments visible for evidence-based decisions.
- Relieves experts, enabling faster and more frequent dataset updates.
- Improves data precision, compliance, and reliability.
- Meets growing demand for up-to-date information in administration, politics, and business.
- Supports digital transformation in environmental monitoring, urban planning, and crisis management.
- Lays the foundation for more efficient processes and a modern, data-driven public administration.



Marking of flight obstacles



Entropy map showing where the AI is certain or uncertain in its decision

