

# NATIONAL REPORT

ON THE GERMAN CARTOGRAPHIC ACTIVITIES

Deutsche Gesellschaft für Kartographie DGfK  
(German Society of Cartography)

Report Period 2003 - 2007

2007

Compilation: Prof. Dr. Doris Dransch, GeoForschungsZentrum Potsdam

# TABLE OF CONTENTS

1. ACTIVITIES OF THE DEUTSCHE GESELLSCHAFT FÜR KARTOGRAPHIE DGFK (GERMAN SOCIETY OF CARTOGRAPHY).....	1
1.1 SOCIETY ORGANISATION AND ACTIVITIES.....	1
1.2 COMMISSIONS .....	2
1.2.1 Applied Cartography – Geovisualisation (formerly “Practical Cartography”).....	2
1.2.2 Education and further education.....	3
1.2.3 High Mountain Cartography.....	4
1.2.4 Law and Cartography .....	4
1.2.5 Geoinformation and Visualization .....	5
1.2.6 Cartographic Terminology .....	5
1.2.7 Map Curators .....	6
2. CARTOGRAPHIC ACTIVITIES OF THE GOVERNMENT.....	6
2.1 TOPOGRAPHIC CARTOGRAPHY OF GERMANY .....	6
2.1.1 ATKIS® Components .....	7
2.1.2 AFIS®-ALKIS®-ATKIS® project .....	11
2.1.4 Toponymy .....	11
2.1.5 Data utilisation .....	12
2.1.6 European collaboration.....	13
2.1.7 Further information .....	14
2.2 THE BUNDESWEHR GEOINFORMATION OFFICE, AGEOW (BGIO) (FEDERAL ARMED FORCES GEOINFORMATION OFFICE) .....	14
2.3 BUNDESANSTALT FÜR GEOWISSENSCHAFTEN UND ROHSTOFFE (BGR) (FEDERAL INSTITUTE FOR GEOSCIENCES AND NATURAL RESOURCES).....	15
2.3.1 Activities of BGR and its cartographic responsibilities.....	15
2.3.2 Important official national maps.....	16
2.3.3 Maps in European and international cooperation .....	18
2.3.4 Maps in projects of Technical Cooperation for development in partner countries .....	21
2.4 BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE (BSH) (FEDERAL MARITIME AND HYDROGRAPHIC AGENCY).....	21
2.4.1 Cartographic responsibilities and activities of BSH .....	21
2.4.2 Important cartographic products and projects .....	22
2.4.3 New developments .....	22
2.4.4 International cooperation .....	22
2.5 BUNDESAMT FÜR BAUWESEN UND RAUMORDNUNG (FEDERAL OFFICE FOR BUILDING AND REGIONAL PLANNING, BBR).....	23
2.6 DEUTSCHER WETTERDIENST (DWD) (GERMAN WEATHER SERVICE) .....	24
2.6.1 Cartographic responsibilities and activities of DWD .....	24

2.6.2 Important cartographic products and projects .....	24
3. CARTOGRAPHIC ACTIVITIES OF PRIVATE ENTERPRISES.....	24
4. CARTOGRAPHIC TRAINING AND RESEARCH AT INSTITUTIONS OF HIGHER EDUCATION ..	25
4.1 TECHNISCHE FACHHOCHSCHULE BERLIN (TFH BERLIN) (BERLIN UNIVERSITY OF APPLIED SCIENCES)	25
4.2 HOCHSCHULE FÜR TECHNIK UND WIRTSCHAFT DRESDEN (HTW DRESDEN) (DRESDEN UNIVERSITY OF APPLIED SCIENCE) .....	26
4.3 HOCHSCHULE KARLSRUHE – TECHNIK UND WIRTSCHAFT (UNIVERSITY OF APPLIED SCIENCES KARLSRUHE) .....	26
4.4 DRESDEN UNIVERSITY OF TECHNOLOGY (TU DRESDEN) .....	27
4.5 UNIVERSITY BONN .....	28
4.6 LEIBNIZ UNIVERSITY HANNOVER (WWW.UNI-HANNOVER.DE).....	29
4.7 TU MUNICH.....	30
4.8 UNIVERSITY TRIER.....	31
4.9 RUHR UNIVERSITY BOCHUM .....	33
4.10 GEOFORSCHUNGSZENTRUM (GFZ) POTSDAM.....	34
5. MAP COLLECTIONS IN LIBRARIES .....	34
5.1 THE MAP DEPARTMENT OF THE BERLIN STATE LIBRARY .....	34
5.2 STATE AND UNIVERSITY LIBRARY GOETTINGEN, MAP COLLECTION .....	36

# **1. Activities of the Deutsche Gesellschaft für Kartographie DGfK (German Society of Cartography)**

## **1.1 Society Organisation and Activities**

The [Deutsche Gesellschaft für Kartographie DGfK](#) is the national professional organization of the cartographers of the Federal Republic of Germany and of those persons who have an interest in cartography.

The aims of the society are:

- to promote cartography in research, training and practice
- to support all involved in the field of cartography with apprenticeships and further training, especially for entrants
- to cultivate national and international co-operation in cartography and with other specialist fields
- to promote knowledge of cartographic science for geospatial planning and projects
- to support and nurture the cartographic culture in Germany

Executive bodies of the DGfK are the Vorstand (Executive Committee) the Vorstandsrat (Executive Council) and the Mitgliederversammlung (General Assembly). The Society is regionally organized in Regional Branches (Sections), professionally in Commissions.

The Sections and Commissions organize professional and social meetings, lectures, seminars, and excursions for their members and guests. At present the Society has about 2000 members.

The DGfK holds an annual "Deutscher Kartographentag" (German Cartographic Conference). The annual general meeting of the society also takes place during this event.

During this event the "Ravenstein Förderpreis" will be delivered, an award to honour young talented cartographic students and professionals for their qualified work.

The "Kartographischen Nachrichten", the only cartographic periodical in German, is also published by the DGfK. There are six issues per year which our members receive free of charge. In articles, reports, reviews, and much other information, also job advertisements, this periodical mirrors cartographic news in Germany and abroad (especially Switzerland and Austria).

Apart from the "Kartographischen Nachrichten" members of the DGfK also receive, nearly bi-annual, the "Kartographisches Taschenbuch" (Cartographic Pocketbook) which contains an extensive list of addresses in the field of cartography. Together with the "Staatsbibliothek Preußischer Kulturbesitz, Kartenabteilung" the "Bibliographia Cartographica" is published annually. It is the only regular documentation of international cartographic literature.

DGfK is a member of the International Cartographic Association ([ICA](#)). On a european level DGfK is a founder member of the European Cartographic Union ([ECU](#)) since 1999. Nationally, DGfK contributes to the Deutsche Gesellschaft für Geoinformation "DDGI" (German Society for Geoinformation) and the GeoUnion. In this way our society is engaged on an international and national level and is involved in the development of cartography.

#### Annual Meetings, "Deutscher Kartographentag" (German Cartographic Conference)

2004 Stuttgart. Joint Conference with INTERGEO, the Conference of the Gesellschaft für Geodäsie, Geoinformation und Landmanagement "DVW" (Society of Geodesy, Geoinformation and Land Management). Main Topic of the cartographic program „Principle Competences of Cartography.“

2005 Rostock. Joint Conference with the Deutsche Gesellschaft für Photogrammetrie und Fernerkundung "[DGPF](#)" (German Society of Photogrammetry and Remote Sensing). Topic „Geo-Government“

2006 Wien. Joint Conference with the International Symposium on Spatial Data Handling

2007 Leipzig. Joint Conference with INTERGEO, the Conference of the Gesellschaft für Geodäsie, Geoinformation und Landmanagement "DVW" (Society of Geodesy, Geoinformation and Land Mangement). Main Topic: "Knowledge and Activity for the Earth"

## **1.2 Commissions**

### **1.2.1 Applied Cartography – Geovisualisation (formerly "Practical Cartography")**

The Commission on Applied Cartography – Geovisualisation continues with its primary task as being to inform practitioners who are engaged in cartographic activities about tendencies as well as new technologies and procedures for practical use. For that reason several symposia and workshops were held..

#### Symposia:

The aim of the bi-annual cartographic symposium in Königslutter am Elm is to report on new standards, trends and developments to present projects from the practical sphere and to introduce new cartographic applications. Following symposia took place during the last years:

- 2004: "Der X-Faktor – Mehrwert für Geodaten und Karten " ("The X-Factor – Added value for geodata and maps")
- 2006: "XYZ – aufgelöst; kartographische Anwendungen für Gegenwart and Zukunft."
- (" XYZ – solved! Cartographic applications for the present and the future.")
- 2007: "Kartographie - Ihnen werden wir's zeigen" ("Cartography – We'll show you how")

### Workshops:

- 2005: „OGC - warum and wie?? “ ("OGC – Why and how??"),
- 2006: "Aktuelle automationsgestützte Verfahren zur Generalisierung topographischer Daten" ("Automated procedures for generalising topographical data")

### Publications:

DGfK Series: Kartographische Schriften, Kirschbaum Verlag, Bonn

#### Volume 9

"The X-Factor – Added value for geo data and maps ("Der X-Faktor - Mehrwert für Geodaten and Karten"). ISBN 3 7812 1603 9.

#### Volume 12

"XYZ – aufgelöst; Kartographische Anwendungen für Gegenwart and Zukunft" ("XYZ – solved! Cartographic applications for the present and the future"). ISBN 3 7812 1652 7.

#### Volume 14

"Kartographie - Ihnen werden wir's zeigen" ("Cartography – We'll show you how"). ISBN 978-3-7812-1677-8.

## **1.2.2 Education and further education**

The commission "Education and further education" was appointed newly in 1988 and has resulted from the study group "Gesamtausbildung". The commission members (instructors, school teachers, college lecturers and representatives of the commercial and official cartography) meet twice the year.

Essential goals and tasks of the commission are:

- Production and dissemination of the "**Focus Kartographie**", an education guide for cartographers ensuring a practical and national education.
- Cooperation on the training regulations for cartographers with committees of the professional formation institute (BiBB), the responsible ministries (Federal Ministry for economy or Federal Ministry of the Interior), the Arbeitsgemeinschaft der Vermessungsverwaltungen der Länder der Bundesrepublik Deutschland ([AdV](#)), the association of Kartographische Verlage und Institute (VKVI) as well as the trade unions.
- Cooperation with the International Cartographic Association ([ICA](#)) within the "[Commission on Education and Training](#)".
- Cooperation with the central special committee of the printing industry (ZFA) on cartographic exams.
- Cooperation with the executive board and jury of the „Kartographie-Stiftung Ravenstein“. Task: Organizing the competition "Ravenstein Förderpreis" for talented young cartographers.
- Organisation of the youth forum at several German cartographic Conferences.

- Supporting the web site [www.kartographie-ausbildung.de](http://www.kartographie-ausbildung.de) by extended information offers for trainees, studying and further specialists, and interested parties.

### Publications

“Focus Kartographie, ein neues Lehrbuch für die Berufsausbildung in der Kartographie“, 3rd edition on CD-ROM in pdf format. Cartographers counts Focus as one of the standard reference in the professional education and is used as well as by students and experts of the cartography as a reference book.

### Current project

At present, the training regulations are getting revised and checked, whether a fusion with the measurement technician is possible. The newly ordered profession gets the job title Geomatiker/in or Geoinformatiker/in and consists of the two fields measurement and cartography or Geodatenaufnahme and Geodatenvisualisierung.

### **1.2.3 High Mountain Cartography**

The Commission on High Mountain Cartography of the German Society of Cartography is almost equivalent to the Commission on Mountain Cartography of ICA. We therefore refer to the report to ICA of that commission and to the website [www.mountaincartography.org](http://www.mountaincartography.org).

### **1.2.4 Law and Cartography**

It is the aim of the Commission on Law and Cartography to take up and to discuss legal subjects, which are important to cartography. One major topic is the legal protection of maps and databases. Since some years between the official and the private cartography the problem is under dispute whether a topographic map is a database or not. Another main focus of the commission is the Web as a way of making open the content of maps to the public. Using the Web you have to pay attention to much more legal regulations at the same time than selling maps in a shop.

Activities of the last two years:

#### Lectures:

- “Legal problems about using maps on the point of view of the producers of maps”
- “Legal instruments of geo-government”
- “In which way geo-information is protected under law?”
- “Maps and Law in the Web – Do you feel like or is it frustrating, if you offer or use maps in the Web?”

#### Publications:

- Michael Rösler-Goy: "Topographic maps are protected like a database - Court prohibits the digitalization of maps". KN 2005/6, p. 325.
- Michael Rösler-Goy: "The legal protection of a database is also valid for topographic maps – New verdict lays the foundation for a cooperation between the survey departments and the companies publishing cartographic products", KN 2006/2, p. 66.
- Dietrich Diez: "The District Court of Stuttgart protects topographic maps like a database". KN 2006/6, p. 319.

### **1.2.5 Geoinformation and Visualization**

The commission's goal is to consider new developments in information visualization and information management and their influence on cartography and geoinformation science.

During the report period the commission has prepared and hosted GEOVIS 2007 a two days conference at [GeoForschungsZentrum Potsdam](#) on recent developments in geoinformation and visualization. The conference topics dealt with

- Virtual 3D-City models,
- Augmented Reality,
- Mobile map use,
- Explorative Geovisualization
- Hazard- and Riskmaps

About 50 scientist and practitioners from cartography, geo-science as well as computer graphics, scientific visualization and risk management attended the conference. The conference proceedings have been published in the DGfK Series: Kartographische Schriften, Vol. 10. Krischbaum Verlag.

### **1.2.6 Cartographic Terminology**

The commission's work during the reporting period focused on the following tasks:

- Revision of the terms and definitions of the FIG "Dictionary of cartography", prepared for publication by the German Federal Agency of Cartography and Geodesy ([Bundesamt für Kartographie und Geodäsie](#)).
- Investigations to central terms of cartography, e. g. "visualization", "map design", "presentation", "cartographic media", "space" etc.
- Numerous entries on cartographic key words in the thirty-volume edition of "Brockhaus Enzyklopädie" (21<sup>st</sup> ed.), 2005/06.
- Cartographic Anglicisms. Role, meaning, evaluation and application of English terms in German cartography. Meetings in June 2004 in Dresden, in October 2005 in Stuttgart.

With the end of the edition of the "Lexikon der Kartographie und Geomatik (Encyclopaedia of Cartography and Geomatics) the Commission closed its work. It is planned to rebuild and to rename the commission into "Theoretical Cartography".



### 1.2.7 Map Curators

The commission on map curators holds annual meetings to discuss current issues regarding cataloguing of maps in archives and libraries, and to prepare instructions for the daily work in map collections. Main topics of the last meetings dealt with the reader service, especially the offer of reproductions and questions regarding copyright. Due to the increasing number of electronic offers an uncertainty had arisen in the use of copyright regulations in daily work. To develop a practical basis we asked the commission on “Recht und Kartographie” (law and cartography) for assistance. Mr. Diez, head of the commission, worked out some cornerstones.

The exchange of experience between the heterogeneous map collections led to discussions about common standards.

The map curator commission is working on a project application for the Deutsche Forschungsgemeinschaft ([German Research Foundation](#)). This project aims at the development of a graphic search tool for maps for all the map holdings in archives, libraries, university departments or museums of German research institutes.

The required technical parameters have been described already – they base on licence-free GIS structures to achieve a reasonably priced and flexible system.

## 2. Cartographic Activities of the Government

### 2.1 Topographic Cartography of Germany

The creation and management of topographic map books in Germany is traditionally in the responsibility of the 16 Federal States. It is part of official surveying and mapping which provides the ownership and geo-topographic reference data of the State territory based on an official spatial reference in a standard and neutral way for the State, the economy and society. While the State surveying authorities/agencies are responsible for managing the topographic data in the Federal States, the provision and presentation of corresponding analogue and digital topographic geobasis data for the federal area is in the responsibility of the Federal Agency for Cartography and Geodesy ([BKG](#)) within the Federal Ministry of the Interior.

Printed topographic maps have still been the main product of official topographic cartography until recently. In today's information society, they are a component of a national geodatabase. The Working Committee of the Surveying Authorities of the States of the Federal Republic of Germany ([Adv](#)) has reacted to this development with setting up the **Amtliche Topographisch-Kartographische Informationssystem** “[ATKIS](#)®” (Authoritative Topographic-Cartographic Information System) (Figure 1). ATKIS® provides standardised topographic data for the whole country, and thus, it contributes to the national geodatabase in Germany, the national Geospatial Data Infrastructure “GDI-DE”.

The geospatial data infrastructure in Germany is a joint project of the Federal government, Federal States and local authorities. GDI-De aims at increasing the application of geospatial data in decision processes within public administration, economy and politics. GDI-DE contributes to the Europe INSPIRE and world wide GSDI.

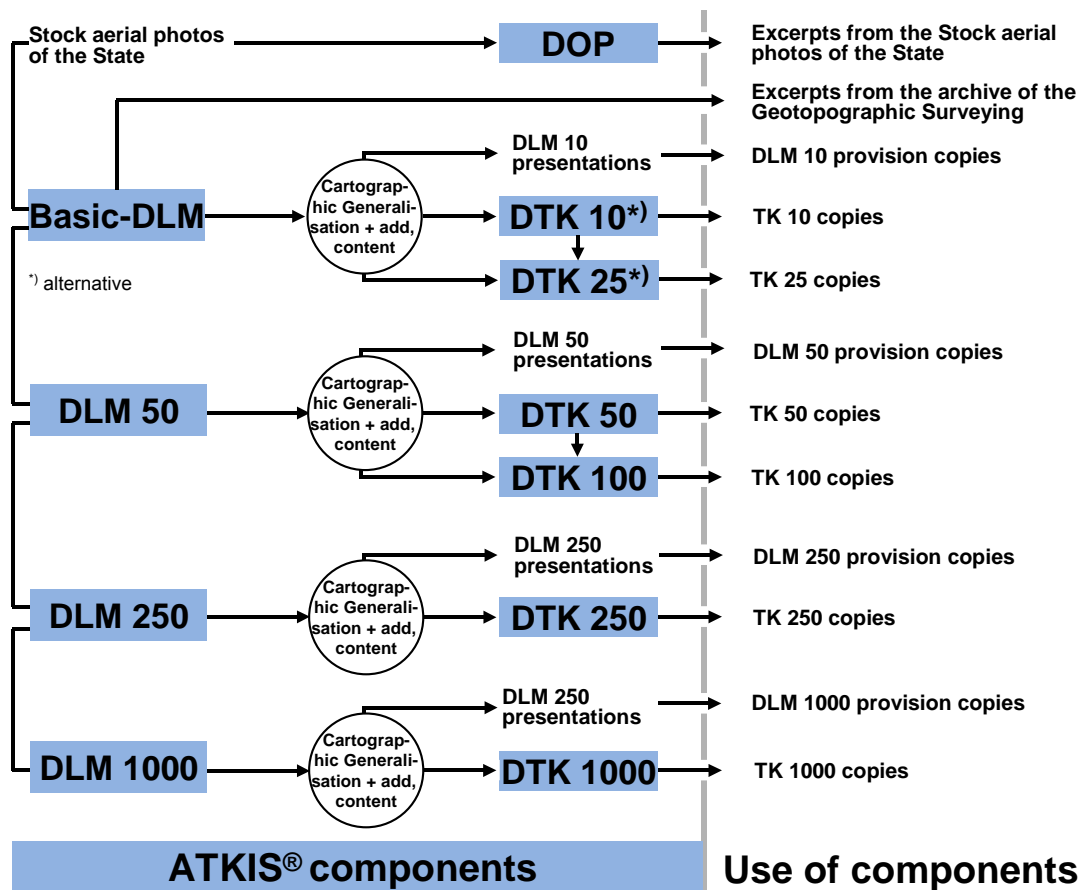


Figure 1 ATKIS® components

### 2.1.1 ATKIS® Components

#### ATKIS® digital landscape model (DLM)

The basic DLM (DLM25) is the topographical basis for the derivation of the DLM50, DLM250 and DLM1000 small scale digital landscape models and the derived maps. It is being set up gradually; currently it is available nationally in its 2<sup>nd</sup> stage and will be completed with more than 120 topographic objects at the end of 2008.

In the “**ATKIS®** Generalisation” project, under the control of seven of the State surveying authorities, the prerequisites have been created for being able to derive the DLM50.1 in an automated way from the basic DLM using model generalisation. With this DLM50.1 (available since the end of 2006) a digital landscape model standardised for Germany is ready for use. It consist of a more simple structure and a lower amount of data as compared with the basic DLM; therefore it is particularly suitable for computer supported analyses, location based services (LBS), the calculation of routes, and for applications at the federal administrations level. The “**ATKIS®** Generalisation” project will be continued with the objective of creating preconditions so that the DLM50.2 can be derived from the DLM50.1 using automation supported cartographic generalisation as a database for the final production of the DTK50.

The DLM250 and the DLM1000 processed at the [BKG](#) are available in the first realisation phase covering wide areas of Germany and are annually updated. The content is continually extended according to a) the EuroGeographics products “EuroRegion-

alMap” and “EuroGlobalMap” and b) the linking of technical data. Thus, the preconditions for linking hydrological technical data with the water network have been created on the basis of the EU water framework directive in close collaboration with the Federal Environmental Agency, the Federal Agency for Hydrology and the federal state authorities responsible for the waters.

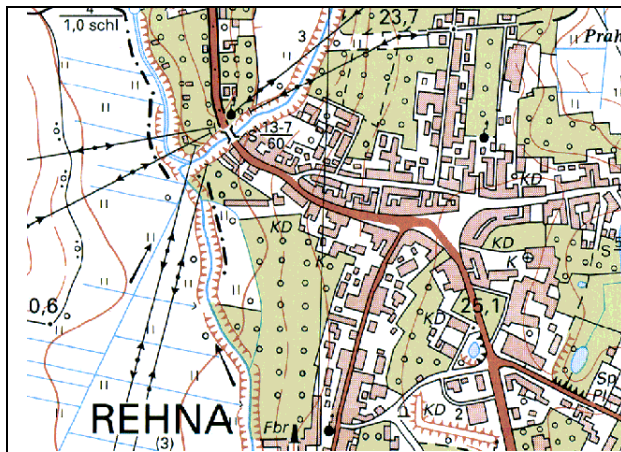
The digital landscape models can only meet the requirements if a high up-to-dateness of information can be ensured. The state survey authorities and the BKG constantly endeavour to improve the currency of the topographic data. In doing so, they are primarily setting up a close co-operation with the parties responsible for the topographical changes and also using photogrammetric and computer-controlled terrestrial reconnaissance systems.

#### Digital terrain model (DTM)

The Federal States are establishing DTMs in parallel with the DLMs and are providing these with different degrees of accuracy and abstraction. As well as regularly distributed geodetic points, the DTMs usually contain vector structure elements in the form of terrain form lines and particular terrain points. As a result of the computerised merger of the currently available DGMs in the Federal States with the BKG, a homogeneous DGM with a terrain-type dependant height accuracy of  $\pm 1$  to  $\pm 3$  m and a grid width of 25 m is available for the Federal Republic of Germany which is provided by the geodata centre. The objective of the Federal States is to improve their DTM databases to a terrain-type dependent height accuracy of  $< 1$  m for a grid width of  $\leq 15$  m, and a terrain-type dependent accuracy of  $< 0.15$  m for a grid width of  $\leq 1$  m for areas which are related to floods.

#### Digital topographic maps (DTK)

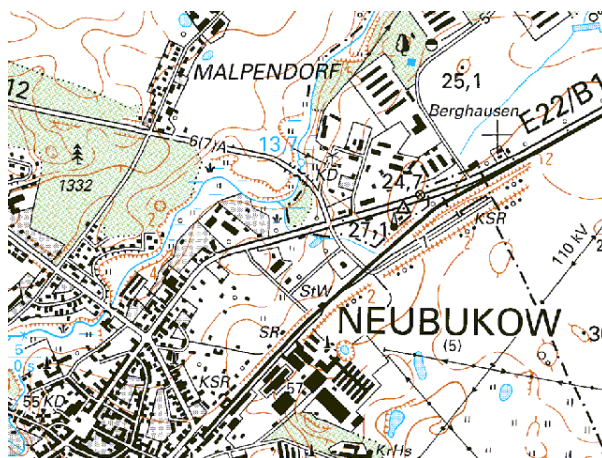
On the basis of the already available digital landscape and terrain models, the State survey authorities have started the derivation of the topographic map books on the basis of new map graphics, documented in the ATKIS<sup>®</sup> portrayal catalogues. Digital topographic maps (DTK) on scales of 1:10 000 and 1:25 000 are already achieving a high profile in the product range of the State surveying authorities. First map sheets of the DTK50, a future joint civil/military map book, are available for the 1:50 000 scale. Processes for an as much as possible automated generalisation of the DTK50 still have to be developed so that a significantly more efficient derivation of DTKs from the digital landscape and terrain models can be achieved in the future.



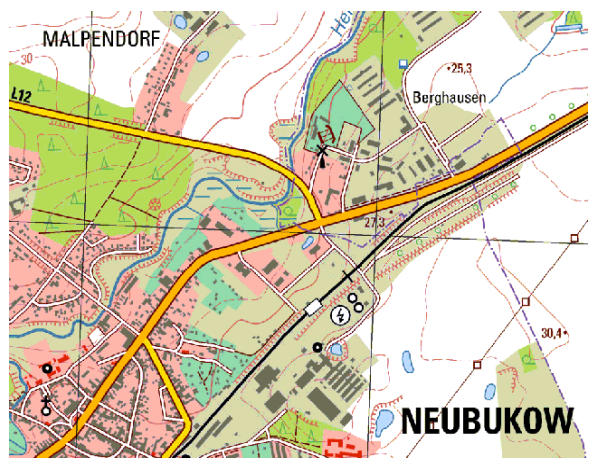
topographic map on scales of 1:10 000



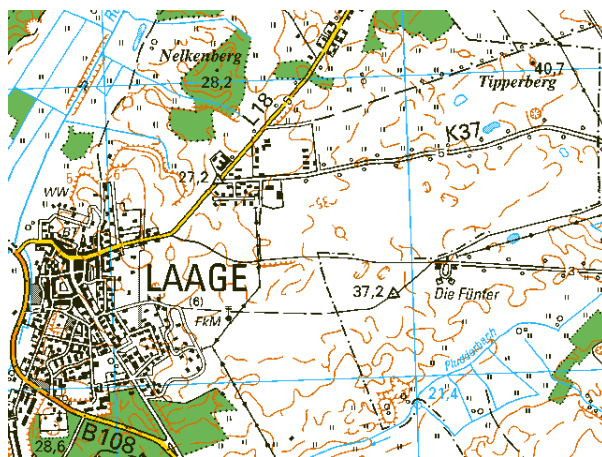
digital topographic map on scales of 1:10 000



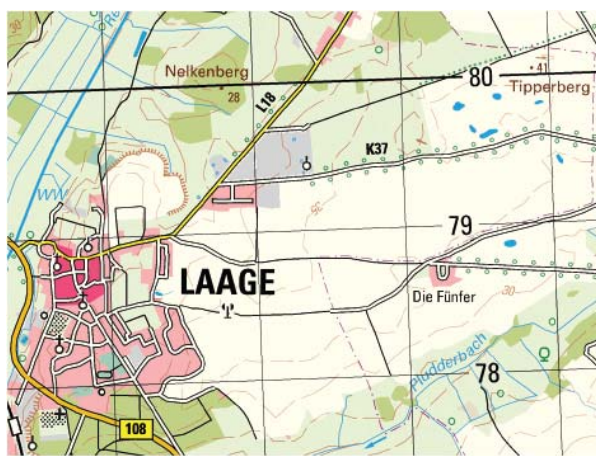
topographic map on scales of 1:25 000



digital topographic map on scales of 1:25 000



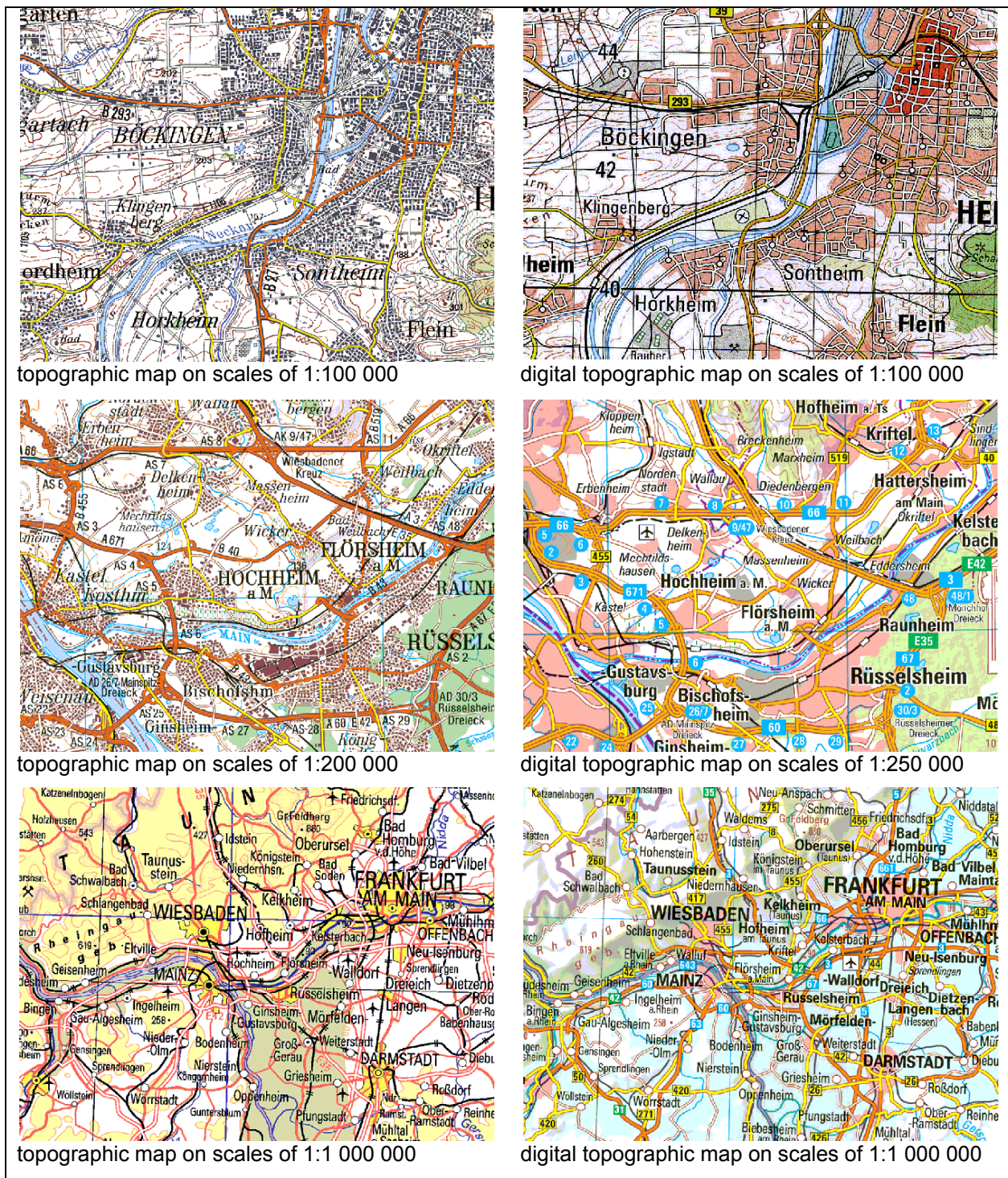
topographic map on scales of 1:50 000



digital topographic map on scales of 1:50 000

**Figure 2a** Map graphics of the previous and future topographic map books





**Figure 2b** Map graphics of the previous and future topographic map books (Figure 2a continued)

The maps' symbology has been developed and published in 2006 in the corresponding ATKIS® portrayal catalogues for the future DTK100, DTK250 and DTK1000. It has been agreed to also produce the DTK100 as a joint civil / military topographic map book and to publish this by the end of 2011 for the entire territory of the Federal Republic of Germany.

Until the topographic map books to be created on the basis of the ATKIS® portrayal catalogues are available, the Federal Government and its states will update the conventional, raster format topographic map books within the required scope, keep them



ready for printing and store them as raster data record for diverse applications. Figure 2 shows a direct comparison of the previous and future topographic map books.

### 2.1.2 AFIS®-ALKIS®-ATKIS® project

Starting from an analysis of the developments on the geodata market and the future requirements for official geodatabases resulting from this, the AdV is endeavouring to standardise the modelling of its real estate cadastres' databases, the geodetic spatial reference and the geotopography. It has developed the common AFIS®-ALKIS®-ATKIS® data model for this. [AFIS®](#) stands for Amtliches Festpunktinformationssystem (Authoritative Fixed Point Information System) and [ALKIS®](#) for Amtliches Liegenschaftskatasterinformationssystem (Authoritative Real Estate Cadastre Information System). The complete project is documented in GeoInfoDok and is available at [www.adv-online.de](http://www.adv-online.de). The migration of the available databases to the AAA data model has been started. This stage is imminent for the migration of the basic DLM data for ATKIS in the year. The implementation of the ETRS89 location reference system in combination with the UTM mapping is intended in direct connection with the implementation of the AAA data model.

### 2.1.3 Interactive topographic maps on CD-ROM

Based on the topographic map books, the AdV has developed a CD ROM series which presents the raster formatted “Top50” 1:50 000 topographic map and “Top200” 1:200 000 topographic overview map for the whole of Germany. This very successful CD ROM series is completely available as version 4.0.

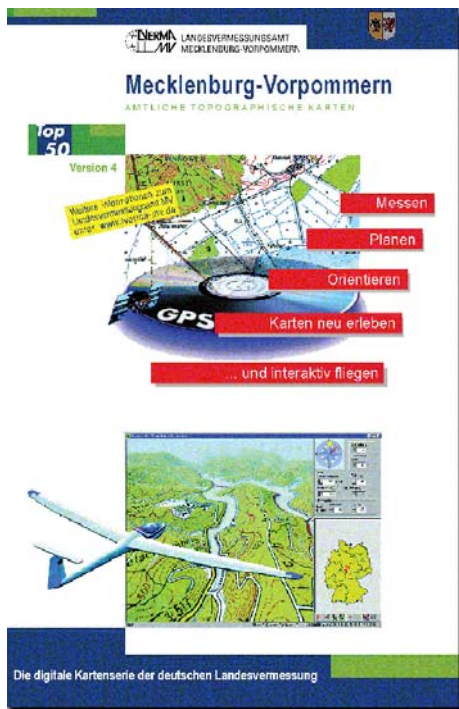


Figure 3 Cover of the Top50 CD-ROM

### 2.1.4 Toponymy

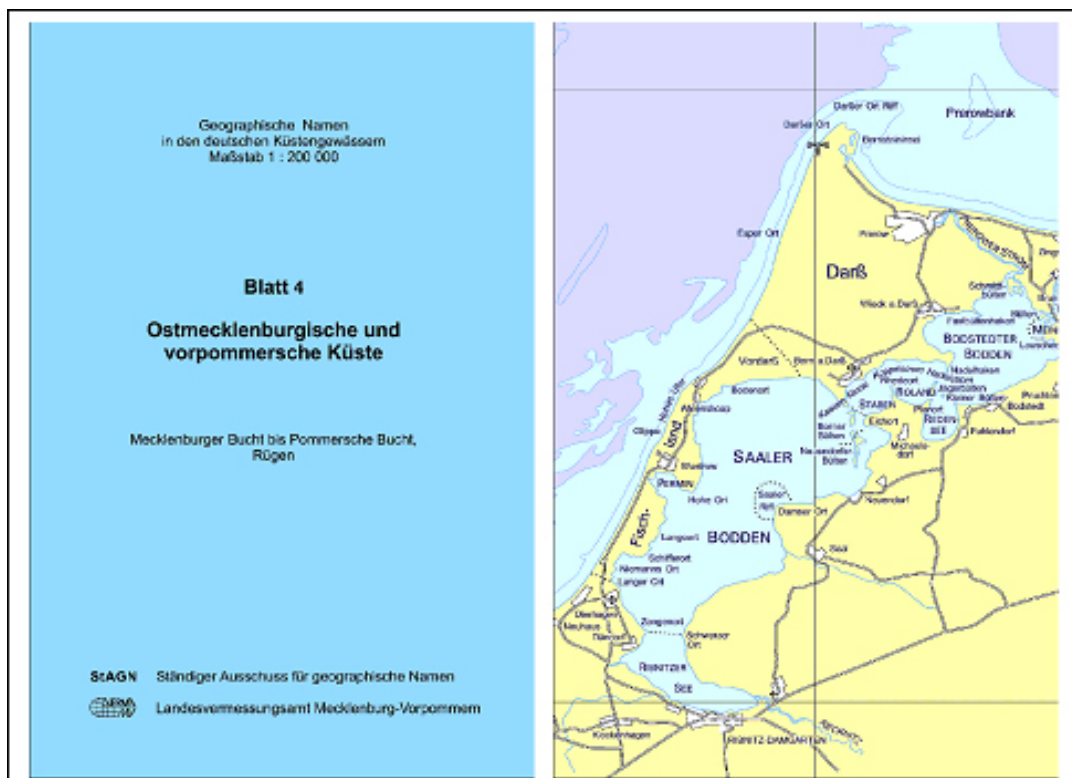
Different enquiries from administrative offices (e.g. WHO, European Commission translation service, Federal Agency for Agriculture and Food) for rough structuring of Europe, regional names for origin of agricultural products according to EU regulations, administration units, landscapes, nature areas and tourism regions often showed uncertainties for names and borders of regions for official purposes. The Permanent Committee for Geographic Names ([StAGN](#)), which has its business office at the Federal Agency for Cartography and Geodesy ([BKG](#)), and which primarily focuses on the standardisation of the official and private use of geographic names in the German-speaking

zone provides the necessary advisory opinions for this. These activities are taking place in close collaboration with the United Nations Expert Group for Geographic

Names (UNGEKN). Information about the StAGN and also an information sheet about the activities and objectives of UNGEKN are available at [www.stagn.de](http://www.stagn.de).

The integration of geographic name data of the German coastal waters in DLM250 was agreed between the BKG, the StAGN and the Federal Agency for Water Engineering (BAW) in December 2005. The prerequisite for this was the creation of the “Geographic names in the German coastal waters 1:200 000” map book. This map book, published by the Niedersachsen (Lower Saxony), Mecklenburg-Vorpommern and Schleswig-Holstein state survey authorities, documents a total of 1377 geographic names in the German coastal waters and consists of the following sheets:

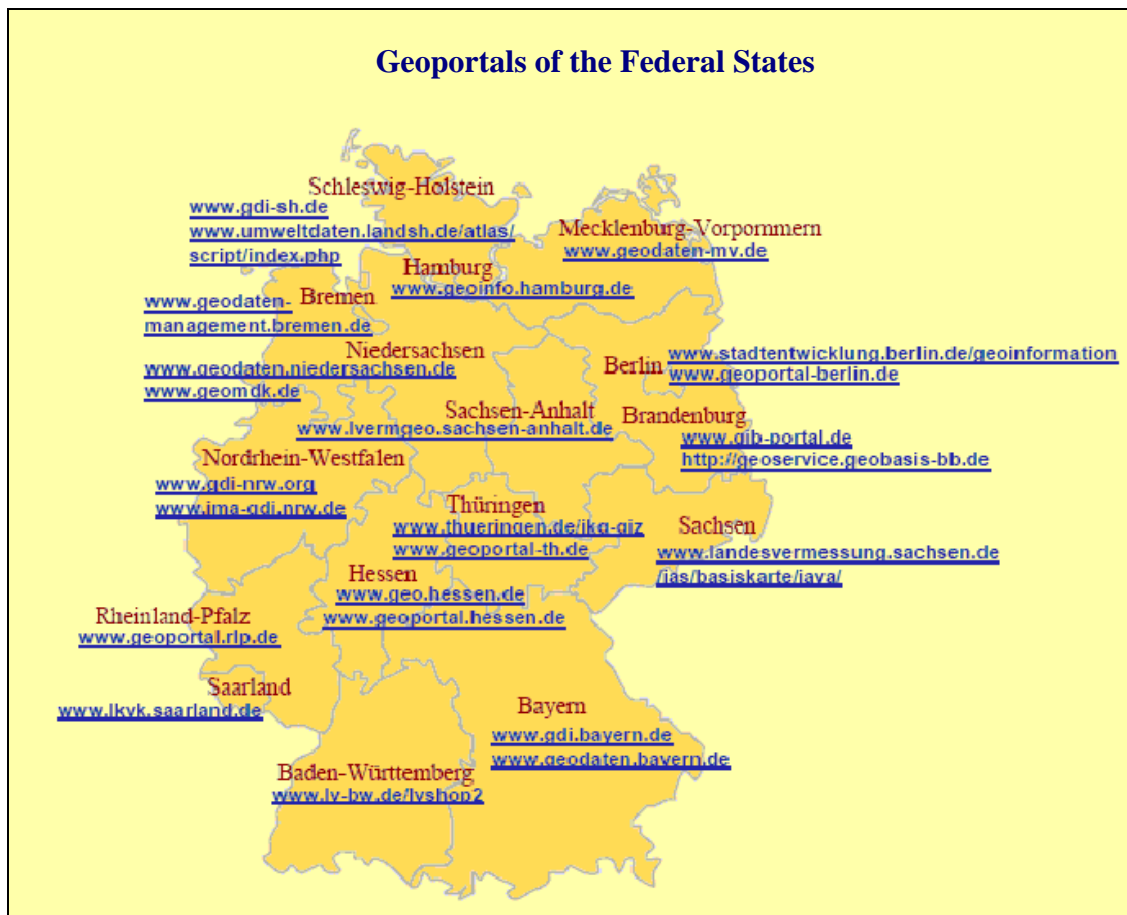
- Sheet 1 – Lower Saxony coast
- Sheet 2 – Schleswig-Holstein West coast
- Sheet 3 – Schleswig-Holstein East coast, West Mecklenburg coast
- Sheet 4 – East Mecklenburg and West Pomerian coast (Figure 4).



**Figure 4** Geographic names in the German coastal waters 1:200 000 map book

### 2.1.5 Data utilisation

Together with the traditional provision of official geotopographical information via printed media, the use of digital topographical data has established itself in administration and the economy. Modification of the data and sales structure in the State surveying authorities has also been set up. Topographical data is provided on data carriers; also Web portals and Web shops of the Federal States make accessible geodata, metadata and geoservices (Figure 5).



**Figure 5** Geoportals of the Federal States

The ATKIS® digital landscape and terrain models and the digital topographic maps are provided throughout Germany in a harmonised form via the geodata centre established in the BKG in collaboration with the States. The Web portal of the Geodata Centre, [www.geodatenzentrum.de](http://www.geodatenzentrum.de), presents interactive maps for direct access to the database, standardised map services, online coordinate transformations, test data for download as well as technical information and aids. Linked with the Web portals and Web shops of the federal states, the meta information system gives information about the availability, features and contact persons of the products. Its conversion to the ISO standard 19115 was completed in the middle of 2005.

## 2.1.6 European collaboration

EuroGeographics ([EG](http://www.eurogeographics.org)), the Association of the national authorities for geodesy, cartography and cadastres has set itself the primary objective of setting up the reference data (geodetic reference networks and geobasis data) for a European geographic data infrastructure and creating its interoperability.

The [Adv](http://www.advis.de) is sustainably supporting this objective, in particular via contributions from the BKG. The BKG has been active in the framework of EuroGraphics for more than 10 years as project co-ordinator for the EuroBoundaryMap (formerly SABE) product, a Europe wide vector data set of administrative boundaries from the States to the local authorities level. For the pan European medium scale (EuroRegionalMap, 1:250 000) and small scale (EuroGlobalMap, 1:1 000 000) topographic reference data sets,



the BKG is contributing the data of the German national territory and is involved in harmonisation of the data.

The EuroGeoNames ([EGN](#)) project was initiated in 2004 by the BKG with support from the Dutch and German speaking Division of the United Nations Group of Experts on Geographical Names ([UNGEEN](#)) and has been integrated into the work programme of EuroGeographics. An infrastructure for official, multilanguage geographic names in Europe is being established by EGN. The access to the decentralised national name databases should be realised via a Web service which supports all official European languages for the first time.

Furthermore, there is active participation in numerous European groups and projects such as, for example, the expert groups of EuroGeographics, the Drafting Teams in INSPIRE, the FP6 Project Reference Information Specifications for Europe ([RISE](#)) and the working groups in GMES. The primary goal for this collaboration of the national authorities in Europe is the creation of harmonised specifications for European geodata.

### **2.1.7 Further information**

[www.adv-online.de](http://www.adv-online.de)

[www.atkis.de](http://www.atkis.de)

[www.bkg.bund.de](http://www.bkg.bund.de)

## **2.2 The Bundeswehr Geoinformation Office, AGeoBW (BGIO) (Federal Armed Forces Geoinformation Office)**

As a modern and service-based military specialist agency, the Bundeswehr Geoinformation Office (BGIO) supplies the requesting activities in the Bundeswehr with current, reliable geospatial and environmental information and contributes personnel for ensuring operational readiness of the Bundeswehr. This kind of support comprises the provision of geoscientific expertise, but also of cartographic products. Unlike the military geospatial services of other nations, the BGIO does not rely on in-house production only. There are also comprehensive civil-military cooperative activities with survey authorities both on the Land and on the national level. Pertinent administrative agreements on the shared production, publication, and use of geospatial and environmental information have been concluded to this end.

May some examples of the production efforts during the past two years illustrate this civil-military cooperation:

- Since 2001, map series M745 (1:50,000), which is also available as the civilian Topographic Map 1:50,000 (TK 50), has been published as a common civil-military series in cooperation with the Survey Authorities of the 16 German Laender. In 2004, production of the 777 map sheets started to be based on the ATKIS vector database. This allows the Bundeswehr as a national consumer more and more to use a map series that is standardized throughout the Federal Republic. The originally purely military requirements, e.g. to have a UTM coordinate grid based on WGS84, also benefit to civilian users, e.g. when working with GPS systems. Consequently, both the military and civilian

relief units can use a standard map series in the event of a disaster. The decision to produce a civil-military map series was obviously also based on the potential reduction of personnel and material costs that is not to be underestimated.

- In cooperation with the Federal Agency for Cartography and Geodesy ([BKG](#)) an interim edition of military map series M648 (1:100,000) will be published in 2006/2007. The sheets covering the eastern part of Germany have already been published. As to the sheets covering the western part, there will be a change in the portrayal of settlements in the course of this year; they will be shown as areas then. Series M648 not only offers the user a simplified, nationwide standardized map face (based on the FACG Digital Topographic Map 1:200,000-V), but – thanks to overlap areas – better than ever provides for the use as a planning/general map. In addition, it can also be used beyond the German borders due to a multi-lingual legend including the Danish, Polish, and Czech languages. Production of a civil-military edition (TK 100) has already been officially agreed and is in its preparatory stages.
- Based on the BKG Digital Topographic Map 1:500,000, the Traffic Map M444 (1:500,000) was published for the Federal Republic of Germany. M444 consists of two sheets, sheet “North” and sheet “South”, and is also used as a base map for other derived map series produced by the BGIO.
- Publication of the Bundeswehr Driver’s Atlas at the scale of 1:250,000 is just another example of civil-military cooperation. This series of road maps is produced by the BGIO in cooperation with a civilian publishing firm and provided to users in the Bundeswehr. This cooperation allows publishing of new editions on an annual basis and thus ensures that the available road information provided to the user is highly up to date.

This approach to work enables the BGIO to efficiently use the national resources for a whole variety of map series, avoid redundancies, reduce the production effort, and to ensure that its products are highly up to date and accurate.

## **2.3 Bundesanstalt für Geowissenschaften und Rohstoffe (BGR) (Federal Institute for Geosciences and Natural Resources)**

### **2.3.1 Activities of BGR and its cartographic responsibilities**

The Federal Institute for Geosciences and Natural Resources ([BGR](#)) is the central geoscientific authority providing advice to the German Federal Government in all geo-relevant questions. It is subordinate to the Federal Ministry of Economics and Technology ([BMWi](#)). BGR publishes official maps subjected to geology, mineral resources, groundwater, and soil sciences. These maps are published in the scales 1 : 200 000 and 1 : 1 000 000. Maps in European and international cooperation are published in different scales. In various projects of technical cooperation for development in partner countries ([TZ](#)), financed by [BMZ](#), [thematic maps](#) in different scales are produced. In geoscientific research projects special maps are elaborated to join specific published and unpublished reports.

## 2.3.2 Important official national maps

### Maps in scale 1 : 200 000

The geological (GÜK200), groundwater (HÜK200), soil (BÜK200) and mineral resources maps (KOR200) in scale 1 : 200 000 are elaborated in close cooperation with the geological state surveys of Germany and the neighbouring countries (only GÜK200). The maps consist of 55 map sheets covering an area of 357.022 square kilometres.

#### *Geological Overview Map of Germany, Scale 1 : 200 000*

In the last decades, the edition of the “Geological Map of Germany 1 : 200 000” ([GÜK200](#)) was one of the major national map projects. New national standards are developed in cartography (style of representation, coloration, conventional signs) and geology (classification of stratigraphy, petrography and genesis). The “Geological Map of Germany 1 : 200.000” is completely available in printed and digital editions. The digital map database provides more detailed information on the age, petrography or genesis of the geological units, than the printed version of the map ever could. After all, the edition of the “Geological Map of Germany 1 : 200.000”, which includes the compilation of national geological data, as well as the development of new national standards and computer assisted mapping techniques, prepared the base for a national geological information system.

#### *General Hydrogeological Map of Germany, Scale 1 : 200 000*

In order to implement the guidelines of the European Parliament and Council of the European Union for the creation of an administration framework for Community action in the field of water policy (EU – Water Framework Directive/EU-WFD), the German state geological services and the Federal Institute for Geosciences and Natural Resources (BGR) have since the middle of 2001 agreed to produce a digital general hydrogeological map on the scale of 1 : 200 000 ([HÜK200](#)) that spans all the federal states. The aim is to record the hydrogeological characteristics of rocks in the upper aquifers and to provide a modern hydrogeological survey of the groundwater bodies in Germany.

For this it was agreed to capture a series of hydrogeologically relevant characteristics such as consolidation, type of porosity, permeability, type of rock, type of aquifer and geochemical classification. This information is based on the legend-units of the Geological Overview Map (GÜK200) and is derived by assigning hydrogeological attributes to revealed geological units of the SGD<sup>1</sup> offices. In this way the uppermost aquifers are characterised. The data are stored in a geographic information system (GIS) and are being processed with the GIS software ArcInfo. The BGR, in agreement with the German states, has set up a coordination and data centre. At present the data are being homogenised and corrected. Now the first consolidated version of the complete data base should be available. An online visualisation is built; the individual maps will be available to users in digital format.

In order to coordinate the production of a 1 : 200 000 soil map of Germany ([BÜK200](#)) and to receive harmonised soil information for the whole of Germany, BGR and the sixteen state geological surveys have produced a 1 : 200 000 scale mapping manual.

---

<sup>1</sup> SGD State Geological Survey

### *The 1 : 200 000 soil map of Germany*

The manual provides guidelines for the definition and delineation of soil map units, the derivation of soil profile descriptions, and the definition and structure of the data sheets with 42 data fields for data collection. It also provides the rules for amalgamating soil survey maps from other scales, and contains a general legend for the standardised 1 : 200 000 soil map including the Soil Regions Map of Germany at a scale of 1 : 1 000 000. 29 map sheets have been printed until February 2007. In addition to the printed version, a 1 : 200 000 soil database is continuously being extended. Together with the digital edition of the 1 : 200 000 soil map, it represents the most important component of the spatial database, integrated into the Soil Information System of the Federal Institutes for Geosciences and Natural Resources ([FISBo BGR](#)).

### *Map of the Near-Surface Mineral Resources of Germany, Scale 1 : 200 000*

The “Map of the Near-Surface Mineral Resources of the Federal Republic of Germany, Scale 1 : 200 000 ([KOR200](#))” has been published with the objective of the nationwide documentation, presentation and description with standard criteria of deposits and occurrences of mineral resources since 1986. Now 43 map sheets are available in a printed edition (3 in second edition). The work on 9 map sheets is well advanced and 3 map sheets are unworked. The maps show those mineral resources that are predominantly extracted from open-pit mines or from near-surface underground workings. These resources include industrial minerals, construction materials, peat, lignite, oil shale and brine. Each map sheet is accompanied by explanatory notes.

### Maps in scale 1 : 1 000 000

#### *Geological Map of Germany, Scale 1 : 1 000 000*

The Geological Map of Germany in scale 1 : 1 000 000 ([GK1000](#)) presents the geology in detail of Germany and its adjacent countries. The map was published first in 1973; in 1993 the fourth edition was released showing also the area covered by the former German Democratic Republic. A fifth edition as GIS application is under preparation. The data for this map reference to the GÜK200.

#### *General Soil Map of Germany, Scale 1 : 1 000 000*

The national soil map 1 : 1 000 000 ([BÜK1000](#)) has been produced shortly after the reunification of the two German states and thus represents the only national soil map. It was compiled on the basis of published soil maps of the former German Democratic Republic and the pre-1990 federal states of Germany. The map contains 72 soil mapping units in 12 soil regions, described in a detailed legend on the basis of the German and FAO soil classification systems. The legend contains typical soil profiles and selected attribute data for the dominating soils of each mapping unit. The map was published in 1995 and its digital version is part of the spatial database integrated into the FISBo BGR Soil Information. The digital version is also provided through the web mapping service (WMS) of the BGR Soil science map server.

## Maps in other scales

### *Soil map of Germany, Scale 1 : 2 000 000*

The soil map 1 : 2 000 000 of Germany ([BÜK2000](#)) is based on the General Soil Map of the Federal Republic of Germany 1 : 1 000 000 ([BÜK1000](#)). The map contains 61 soil mapping units which are derived based on aggregation principles. This map is published in the Hydrogeological Atlas of Germany (HAD).

### *Map of Mining Industries, Storage and Deposition Sites, Scale 1 : 2 000 000*

Since 1967 BGR in cooperation with the mining authorities of the states of Germany the Map of Mining Industries, Storage and Deposition Sites, Scale 1 : 2 000 000 is released annually. The map contains information to the extracted material, amount, and number of sites in operation. Since 2002 the map is released exclusively via Internet.

### *Maps for the Hydrological Atlas of Germany*

The Hydrological Atlas of Germany ([HAD](#)) is the work of cooperation between the major German institutions in the fields of hydrology, meteorology, geoscience and environmental protection and the German Federal States. BGR is contributing to this project since 1995 and provides geological, hydrogeological and soil maps and expertise. The atlas is published both as a conventional graphic atlas and as a digital version.

The following thematic maps at the scale of 1 : 2 000 000 have already been realised by BGR:

- Soils
- Lithology
- Hydrogeology
- Depth of the Effective Root Zone
- Field Capacity up to 1 m Soil Profile Depth
- Available Water Capacity in the Effective Root Zone
- Air Capacity in the Effective Root Zone
- Mean Annual Rate of Percolation from the Soil
- Hydrogeological Regions
- Groundwater Yields
- Mean Annual Groundwater Recharge
- Geogenic Groundwater Quality
- Mineral Water, Thermal Water and Medical Water

## **2.3.3 Maps in European and international cooperation**

### Maps in scale 1 : 1 500 000

#### *International Geological Map of Europe and the Mediterranean Regions, Scale 1 : 1 500 000*

The International Geological Map of Europe and the Mediterranean Regions, scale 1 : 1 500 000 ([IGK1500](#)) consist of 45 map sheets covering Europe and neighbouring

countries in Africa and Asia. The actual map is published partially as 2nd and 3rd edition and was completed in the period between 1964 and 2000. The map is the product of close cooperation between BGR and the Geological Surveys of the concerned countries with support by [UNESCO](#). The decision to compile this map was done on the occasion of the 2nd International Geological Congress in 1881 in Bologna (Italy).

*International hydrogeological Map of Europe, Scale 1 : 1 500 000*

The International Hydrogeological Map of Europe, scale 1 : 1 500 000 ([IHKE 1500](#)) consists of 27 map sheets including explanatory notes covering the European and parts of the Asian continent. The national contributions are compiled under the aegis of the International Association of Hydrogeologists ([IAH](#)) with the commission for hydrogeological maps ([COHYM](#)). The project is supported by the Commission of the Geological Map of the world ([CGMW](#)). The edition of the map is supported by [BGR](#) and [UNESCO](#).

Maps in scale 1 : 2 500 000

*International Quaternary Map of Europe, Scale 1 : 2 500 000*

The International Quaternary Map of Europe, Scale 1 : 2 500 000 ([IQuK2500](#)) was published in the period 1967 to 1995 by BGR in cooperation with [UNESCO](#), Paris. The map consists of 14 map sheets covering Europe and 1 special legend sheet. The content is explained in German, English, French and Russian language. The map shows the Quaternary units classified according to genesis and age.

*Mineral and Energy resources of Central Europe, Scale 1 : 2 500 000*

Mining in Central Europe has a history of more than two thousand years. Even if many deposits in Central Europe can no longer be classified as deposits by world standards, the huge number and variety of deposits in Central Europe is unique and important for exploration and exploitation elsewhere in the world. The map on scale 1: 2 500 000 created by an international team of experts contains major deposits of non-metallic (excluding construction raw materials), metallic raw materials as well as energy resources (hydrocarbons, coal and oil shale deposits).

Maps in scale 1 : 5 000 000

*The 1 : 5 Million International Geological Map of Europe and Adjacent Areas*

The International Geological Map of Europe and Adjacent Areas was published 2006. The map is a result of the [IGME5000](#)-GIS-project of the BGR under patronage of the Commission of the Geological Map of the World (CGMW). Its aims were to build up a Geographic Information System (GIS) on Europe's pre-Quaternary geology, to print a map in consideration of high standards in scientific and cartographical aspects, and to implement a web mapping application.

In this project 48 active European and non-European geological services have been involved. It was supported by a network of academic advisors from European and northern American universities and scientific institutes. Special scientific research



was undertaken to acquire, especially on the off-shore areas, confirmed and provable data and information as well as to review the information's plausibility and currentness. After 12 years of research and compilation, a GIS of the geology of a whole continent, containing information to lithology, age (geochronical), regional names, metamorphosis, tectonical and genetic elements, is the result of this proceeding. The GIS IGME5000 as well as its web map application allows manifold cross-national queries over whole Europe.

*Soil Regions Map of the European Union and Adjacent Countries 1 : 5 000 000 (EU SR5000 Version 2.0)*

The "Soil Regions Map of the European Union and Adjacent Countries" is a joint project of the [European Soil Bureau Network \(ESBN\)](#) and the [Joint Research Centre](#) (Ispra, Italy), coordinated and realized by the Federal Institute for Geosciences and Natural Resources (BGR). As a basic component of the project "Georeferenced Soil Database for Europe" it will be a part of a new Manual of Procedures intended to support better harmonized soil mapping at the scale 1 : 250 000.

Existing maps as well as soil information provided by the European partners were interpreted by using uniform delineation criteria (WRB classification). In the map 285 soil regions and 35 climate areas are distinguished, as well as undifferentiated Fluvisols, Anthrosols and urban soils. The map units are stratified using combinations of about 120 different soil associations and eighteen different parent material associations. Whereas in the map legend only dominant soil and parent material is presented, an explanatory text offers more information also about the co-dominant and associated soils.

To enhance the geomorphographic aspects, e.g. the mountainous climate areas, a shaded relief is drawn in the background of the map. It is based on the [GTOPO30](#) global digital elevation model (DEM) with a horizontal grid spacing of 30 arc seconds (approximately 1 kilometre), provided by the [U.S. Geological Survey \(USGS\)](#).

Additionally to the map and the explanatory text an auxiliary database has been developed which contains information about all relevant parameters (climate, soil type, parent material, elevation, slope, land use, geographical position etc.) in query mode.

Maps in scale 1 : 25 000 000

*Groundwater Resources Map of the World, Scale 1 : 25 000 000*

The World-wide Hydrogeological Mapping and Assessment Programme WHYMAP ([www.whymap.org](http://www.whymap.org)) is a joint programme of the United Nations Educational, Scientific and Cultural Organization ([UNESCO](#)), the Commission for the Geological Map of the World (CGMW), the International Association of Hydrogeologists (IAH), the International Atomic Energy Agency (IAEA) and the German Federal Institute for Geosciences and Natural Resources (BGR). It aims at collecting, collating and visualising hydrogeological information at the global scale, to convey groundwater related information in an appropriate way for global discussion on water issues and to give recognition to invisible underground water resources. WHYMAP brings together the huge efforts in hydrogeological mapping, at regional, national and continental levels. BGR, together with the partners, is gradually building up a geo-information system (WHYMAP GIS) in which the groundwater data are managed and visualised.

An important milestone of the WHYMAP Programme will be the publication of the Groundwater Resources Map of the World at the scale of 1 : 25 000 000 accompa-

nied by an explanatory booklet in 2007/2008. As a first result two special editions of the global map at the scale of 1 : 50 000 000 have been issued in 2004 and 2006.

### **2.3.4 Maps in projects of Technical Cooperation for development in partner countries**

Via the German Ministry of Economic Cooperation and Development ([BMZ](#)) the German government commissions a number of executing agencies for Technical Cooperation projects – including BGR in the geology and mining sector – to plan and implement Technical Cooperation projects and programmes ([TZ](#)) in Latin America, Africa and Asia. In addition, support is also given to transform countries in the former Soviet Union and the reform processes in Eastern European countries (South-East Europe Stability Pact). Key elements are combating poverty and protecting natural resources. BGR supports state institutions, e.g. Geological Surveys and other public sector organisations in developing countries in the following areas:

- management and resource-optimised utilisation of water and soil
- mineral and energy resources (exploration and evaluation of deposits, oil geology, renewable sources: geothermal energy)
- environmental and resource protection / mining environment
- geological principles of regional planning and policy (e.g. for the location of suitable sites for landfills)
- geo-risks, climate and disaster protection.

In order to the mission geological and thematic derivate maps are produced in scale to be used as overview maps or detailed for specific purpose like regional and urban planning and also as base map for further geological research. Most of the maps are based on GIS-techniques and are disseminated as digital maps using the Internet or CD.

## **2.4 Bundesamt für Seeschifffahrt und Hydrographie (BSH) (Federal Maritime and Hydrographic Agency)**

### **2.4.1 Cartographic responsibilities and activities of BSH**

[BSH](#) is responsible for the production and issuing of official nautical charts. It presently produces about 480 charts covering the European waters of main interest to German merchant vessels, Navy and pleasure boating. The production is based on the cooperation of national hydrographic services under the umbrella of the International Hydrographic Organization ([IHO](#)) and takes advantage of the system of International Charts coordinated by IHO.

In addition, BSH is responsible for producing the so called Electronic Navigational Charts (ENCs) for German waters (130 cells), using the IHO Transfer Standard for Digital Hydrographic Data, referred to as S-57. These official ENCs, and their regular electronic updates, are for the onboard use on an Electronic Chart Display and Information System (ECDIS). They are Germany's contribution to the Worldwide ENC Database (WEND) coordinated by IHO and distributed by Service Providers appointed to the International Centre for ENCs (IC-ENC) based in United Kingdom.



Printed nautical charts and ENC's are produced by BSH and other hydrographic services worldwide to satisfy the carriage requirement for ships according to the International Convention "Safety of Life at Sea" (SOLAS) of the International Maritime Organization ([IMO](#)) and are part of a comprehensive nautical information system comprising charts, nautical books and the regular update services "Notice to Mariners".

Furthermore, BSH produces about 800 topographic maps of the sea floor covering the about 57.000 km<sup>2</sup> of the German waters which are to be regularly surveyed by BSH's five own wreck search and survey vessels. These maps present high-resolution topographic sea bottom information as the result of state of technology sea surveys.

BSH licenses its cartographic products for commercial reuse by private companies.

#### **2.4.2 Important cartographic products and projects**

Products (see above):

- Official nautical charts for professional shipping and small craft
- Notice to mariners, a printed weekly bulletin for keeping nautical charts and publications up-to-date
- Official Electronic Navigational Charts (ENCs) including weekly electronic updates
- Vessel Traffic Services Guide North Sea and Baltic Sea
- Topographic maps of the sea floor

Projects:

- Nautical Hydrographic Information System (NAUTHIS)
- Electronic Sailing Directions
- Production of Additional Military Layers (AML) as digital data sets for Naval ECDIS

#### **2.4.3 New developments**

A new cartographic GIS-based software, the "Hydrographic Production Database" (HPD) has been developed by the Canadian company [CARIS](#) in a joint venture project with BSH. HPD is based on the IHO S-57/S-100 standard (see below) and forms the core element of a fully integrated digital work flow from processing of survey data and other relevant sources down to final cartographic products in either printed or digital form. The HPD, which is also commercially available now, is currently being introduced into the BSH production environment.

#### **2.4.4 International cooperation**

All hydrographic services cooperate under the International Hydrographic Organization and its Regional Hydrographic Commissions ([RHCs](#)). Relevant for BSH are the North Sea Hydrographic Commission and the Baltic Sea Hydrographic Commission. BSH has also observer status in other RHCs, depending on varying requirements, such as bilateral projects.

BSH cooperates also, within the framework of IHO, in the development of standards related to hydrography. A particularly important one is the development of the IHO Geospatial Standard for Hydrographic Data, referred to as S-100. S-100 is a generalised follow-up standard to the Transfer Standard S-57 which has been used primarily for ENC's. S-100 is designed to implement the ISO 191xx suite of GIS standards for the GIS requirements of marine spatial data. S-100 will be available presumably by the end of 2008, with a deadline for migrating to S-100 not before 2012.

## **2.5 Bundesamt für Bauwesen und Raumordnung (Federal Office for Building and Regional Planning, BBR)**

The Federal Office for Building and Regional Planning (Bundesamt für Bauwesen und Raumordnung, [BBR](#)) has been founded in 1998, following a merger of the former Federal Building Direction (Bundesbaudirektion, BBD) and the Federal Research Institute for Regional Geography and Regional Planning (Bundesforschungsanstalt für Landeskunde und Raumordnung, BfLR). Continuing the main responsibilities of its predecessors the BBR is in charge of all buildings of the Federal government in Germany and abroad. The BBR conducts research in spatial analysis documented in reports on the quality of life and the economic situation in the regions of Germany. The research is the foundation for political activities of the Federal government to assure equally good conditions of life in all parts of Germany. The long-time tradition of the BfLR in making maps for spatial analysis, demographic and socio-economic atlases and for administrative purposes has been passed on to the new institutional environment.

The necessity for maps to fulfil the duties and objectives of the BBR has more increased than diminished. New media for information exchange, such as the CD-ROM and the World Wide Web, require modifications and enhancements of the graphical and technical methods and procedures developed for printed maps. The graphical presentation has to adapt to changing habits of information retrieval and viewing, especially in the WWW. The possibility to enforce the message in the map by interaction, sound and animation, or the possibility to use the haptic channel in real 3D maps, required new competences and technical capabilities.

The maps created and used in the Federal Office for Building and Regional Planning are in most cases no solitary documents. Different from topographical maps, for example, the maps for spatial analysis and reports are usually published as components of compound documents, together with explanatory text, tables, diagrams and images. The maps serve not only as the documentation of the final result, but also as an analytical tool during the research process, revealing the specific spatial patterns and correlations which are imperceptible, for example, in a large table.

The use as a research tool resulted in the fact that the maps are designed and produced by the researchers or the technical staff in the research divisions, not by a specialized mapping department at the end of the production line. The decentralized map production required provisions to ensure an overall high visual and graphical quality, and to enforce the compliance to the corporate design of the Federal Office for Building and Regional Planning as well. Each map should be recognized at first sight as an original product of the BBR.

To fulfil these goals the BfLR, one of the two predecessors of the BBR, was an early adopter of information technology applied for mapping in Germany. The first maps ready for printing were made with the help of computers and plotters at the beginning of the seventies. The necessary software had to be programmed by staff members

because at that time no commercial packages for GIS and high-quality map production were available. In recent years the transition to standard GIS packages and graphic programs took place. The development of own software is still a prerequisite for innovative visualization of spatial phenomena to keep the BBR at the leading edge of research and application in a small but not unimportant sector of cartography.

## **2.6 Deutscher Wetterdienst (DWD) (German Weather Service)**

### **2.6.1 Cartographic responsibilities and activities of DWD**

[DWD](#) is the national weather service of Germany. Its responsibilities include also the publication of meteorological and climatological information in the form of weather charts and climatological maps. The publication of printed weather charts has been ceased since year 2000. Issuing and production of climatological maps is going on. Climatological maps show the spatial distribution of climatological or hydrological variables.

### **2.6.2 Important cartographic products and projects**

#### Atlases:

Klimaatlas von Deutschland ( Climatic atlas of Germany), the first comprehensive climatic atlas of Germany since 1920, Volume I – IV, published in the years 1999-2005; further issues are planned. For its production a cartographic GIS-based software is used. Scale 1:2.500.000.

#### Other maps:

Several maps for the distribution of other meteorological parameters and maps for special purposes are distributed via internet. See [www.dwd.de](http://www.dwd.de)!

## **3. Cartographic Activities of Private Enterprises**

### **Verband Kartographischer Verlage in Deutschland VKViD (Association of the Cartography Publishers of Germany)**

The [VKViD](#) is the leading interest organisation in Germany for all publishers and producers of cartographic products excluding the public sector. Its members represent merely 90 percent of the current cartographic companies in Germany. Amongst others the following companies are valued members for a long time:

- ADAC Publishing, the publishing house of Europes largest travel club with more than 15 Mio. members,
- [MairDumont](#), Europes largest privately owend cartography company with strong brands such as FALK or MARCO POLO.
- [Polyglott](#), the travel publishing house of Langenscheidt Publishing, a world wide multi brand publisher with brands like INSIGHT GUIDE, APA GUIDE, BERLITZ, LANGENSCHIEDT

- a wide variety of smaller companies, that are primarily focused on either producing and/or publishing for the local need of good maps and cartography.

The range of products is wide spread. It goes from

- world atlases to country maps to regional maps to city maps,
- single output maps to complete map series covering whole continents or countries,
- electronically distributed maps to only printed maps sold in bookstores,
- large scale to small scale maps,
- thematic to topographic maps,
- complex routing software to easy-to-use paper maps.

All companies are undergoing great effort to redigitize their formerly engraved database either by rasterizing each folio building a raster database. Also all new projects are going through a new work process.

More information is available on the homepage that can be reached by the URL <http://www.kartografie-verband.de>.

## **4. Cartographic Training and Research at Institutions of Higher Education**

### **4.1 Technische Fachhochschule Berlin ([TFH Berlin](#)) (Berlin University of Applied Sciences)**

#### **Research**

Research activities mainly focus on applied tasks like the use of GIS in development projects, the analysis of remote sensing data and the compilation of cartographic products including internet cartography, health mapping and atlas research. One main study area is the “Management of natural resources with application of GIS and remote sensing”, whereas the methodology is increasingly based on analysis of high-resolution remote sensing data. The development of GIS and visualization techniques to research spatial disparities of health infrastructure is another major field of work. Furthermore, one topic that emerged in the last years is the use of GIS in archaeological research and documentation. Regions of special interest are located mainly in Sudan, Ethiopia, Tanzania, Rwanda and Mongolia. All research activities are bundled within the Institute for Geo-Research (geo3) at the University of Applied Sciences. This is to ensure that actual scientific findings are introduced into teaching, e.g. master study programmes.

#### **Education**

With fall term 2005/2006, the University of Applied Sciences Berlin transformed all study programmes into consecutive two-stage study programmes with bachelor and master degrees. The expiring diploma programme of 8 semesters was changed into the 6 semester bachelors (BE) and 4 semester master's degree (MSc). The master's programme – geodesy and cartography – proposes to focus on “Cartography and GIS”. Besides, the university also offers an interdisciplinary consecutive study programme “Geoinformation” since fall 2005/2006. This programme is based on cartography, surveying, informatics and geography and is completed with a bachelor degree. A following-up master's programme (MSc) is being prepared.

## **4.2 Hochschule für Technik und Wirtschaft Dresden ([HTW Dresden](#)) (Dresden University of Applied Science)**

### **Research**

Actual Researches and Projects:

- Atlas of History and regional Geography of Saxony (Atlas zur Geschichte und Landeskunde von Sachsen) in Cooperation with Saxon Academy of Sciences ([Sächsische Akademie der Wissenschaften](#)).
- Archaeological Maps in Cooperation with Saxon Department of Archaeology ([Sächsisches Landesamt für Archäologie](#)).
- Education Portal of Saxony ([Bildungsportal Sachsen](#)), e-learning Course in Cartography.
- Regional Geographic Information system of Saxony. (Landeskundliches Informationssystem Freistaat Sachsen).
- Maps of Via Regia in cooperation with the European Culture- and Information Center ([Europäisches Kultur- und Informationszentrum Via Regia e.V.](#)).

### **Education**

Reorganizing the study program into

- The Bachelor of Geoinformation and Cartography in autumn 2007.
- Master of Geoinformation and Management in autumn 2008.

## **4.3 Hochschule Karlsruhe – Technik und Wirtschaft ([University of Applied Sciences Karlsruhe](#))**

### **Cartography and Geomatics, Bachelor of Science (B.Sc.)**

From the winter term 2006/07, students will only be accepted for the new seven-semester bachelor course. The course comprises a total of 2200 study periods, practical training in the basic course and a practical semester in the main course. 210 credit points (ECTS) will be awarded.

The practical training in the basic course lasts 8 weeks (40 days of attendance). It will give an insight into Cartography and Geomatics, particularly with practical work in the fields of map design and map production, media design and media integration as well as online cartography.

During the practical semester (5th semester, 95 days of attendance), knowledge that has already been acquired through the course will be deepened in areas such as geo information systems, photogrammetry and remote sensing, information systems and databases and online cartography. The aim is to become acquainted with the working conditions and work methods for the visualization of spatial data in a practical environment.

The basic course covers 3 semesters and ends with the bachelor intermediate examination. Lectures will be offered in the areas of

- cartography (fundamentals, visualization, map design and media design, thematic cartography, map compilation and map redaction),

- geoinformatics (informatics, algorithms and data structures, data communication, operating systems, programming languages, digital picture processing) and
- related sciences (mathematics, geology and geomorphology, physical geography and human geography, spatial planning and environmental protection, surveying and topography, statistics).

The goal to organize a wide spread and interdisciplinary oriented education is reflected in the range of subjects that are being offered.

The main course comprises 4 semesters (including the practical semester). It aims to widen and deepen basic knowledge in the areas of cartography and geomatics. Areas of specialization are

- thematical cartography,
- media integration and media communication
- geo-information systems.

At the end of the course the student must present a bachelor thesis on a self-chosen approved topic and defend it in a colloquium.

Successful graduates will receive a certificate and a "Bachelor of Science" (B.Sc.) degree from the University of Applied Sciences, Karlsruhe.

#### **International Master's Degree Programme in Geomatics (M.Sc.)**

The internationally oriented programme is unique in combining the study of cartography and geodesy with a focus on the following core areas:

- Computer-aided visualisation, communication and use of geospatial information
- Spatial analysis within the context of information and communication technology
- Acquisition, statistical modelling and georeferencing of hybrid data.

The aim of the master's programme is to provide students with an extensive, detailed knowledge of the theory and methods of geomatics on a high scientific level. The Master Thesis is directly related to research and development activities carried out by professors. Small working groups, continual communication with the professors and intensive support guarantee efficient learning and success in the degree program.

#### **4.4 Dresden University of Technology ([TU Dresden](#))**

##### **Research**

During the report period our research projects focused on the key topics of theoretical cartography, atlas cartography, geo-information systems, digital cartography, web mapping, 3D cartography, mountain cartography, and applied (practice-oriented) projects. Special mention should be made of the research projects "Development and application of methods for the three-dimensional visualization of the Mars surface from HRSC data" and "High-mountain maps (Alpenvereinskarten) for the Andes (Chile/Argentina) and Tien Shan (Kyrgysztan)" (headed by Prof. Dr. Buchroithner), "Generation of a Geo-Information System from multi-source data for the Russian Altai" (Dr. Prechtel), and "Cartographic design of the National Atlas of Germany (Prof. Dr. Koch in cooperation with Leibniz Institute for Regional Geography, Leipzig).



The results of these and other research projects were presented at the *Deutsche Kartographentage* 2004, 2005 and 2006 and at the ICA International Cartographic Congress in Durban (2003) and A Coruna (2005). In Istanbul (ISPRS-Conference 2006) the presentation "Three-dimensional visualization of the Mars surface from HRSCdata" (Prof. Buchoithner, Th. Gründemann, K. Habermann) received the "Best Poster Award".

In the years 2004 to 2006 six volumes of the institute journal "Kartographische Bausteine" were published.

#### Further Research Projects

- Theoretical Cartography and Map Semiotics
- Tourism promotion by development based on new concepts for print products and InterNet
- Data analyses and automated derivation of new forest maps from the Saxon forest information system (FGIS)
- True-3D cartographic hardcopies by means of lenticular foil technology
- Maps for blind and visually impaired people

#### Organized Symposia:

- International Symposium on Cartographic Cutting-Edge Technology for Natural Hazard Management, 20-22 October 2004, Dresden, Germany (= 8<sup>th</sup> Dresden Summer School of Cartography) in cooperation with the ICA,
- 13th Colloquium for History of Cartography (13. Kartographiehistorisches Colloquium = 9th Dresden Summer School of Cartography), 20-23 September 2006, Dresden, Germany (in cooperation with German Society for Cartography)

#### **Education**

The Institute for Cartography offers degree courses, continuing education, postgraduate studies and research in the field of Cartography and GIS.

During the report period, things have remained fairly constant: about 150 students per academic year are in the Cartography degree programme, about ten to fifteen qualify as *Dipl.-Ing. für Kartographie* each year. Cartography is taught to students of the degree programmes in Geography, in Computer Science as well as in Media and Computer Science, in Geodesy, and in Meteorology.

It is planned to change the academic education in cartography and GIS to the international "Bachelor and Master" (B.Sc. / M.Sc.) system in 2008

In addition, two postgraduate seminars are being held each year. In the report period an average of fifteen candidates were working on their doctoral dissertations. Between 2004 and 2006 four PhD students completed their doctorates (Dr.-Ing.).

#### **4.5 University Bonn**

In Winter Semester 2004/2005, the chair of cartography of [Bonn University](#) (Prof. Dr. Morgenstern, who has retired) has been moved from the Institute of Cartography and Geoinformation to the Institute of Geography. The chair has been represented by PD

Dr. Jochen Schiewe (Winter Semester 2004/2005 to Summer Semester 2005), Dr. Dirk Burghardt (Winter Semester 2005/2006) and Dr. Matthias Möller (Summer Semester 2006 to Summer Semester 2007). The call for the new appointment to the professorship will be presumably made for Winter Semester 2007/2008.

The teachings are now including the studies of Geodesy, Geography and the Master Studies of GIS.

In Winter Semester 2006/2007, studies of Geodesy have been reorganized from Diploma to Bachelor and Master.

The Master Studies Geoinformation has been newly installed in Winter Semester 2004/2005. Teachings are offered over all the disciplines Geodesy, Geography and Informatics in a multidisciplinary way.

#### Research Activities 2003 – 2007:

- Mobile Acquisition and Processing of Geo Data with Handheld PDA computers
- Object-oriented Images interpretation and Cartographic Presentation
- WebGIS
- Colour Theory and Colour Management for Cartography and Presentation
- Methodical Aspects of Generalizing Geo Data
- Generalization of Building Models and Visual Correctness
- Methods of efficient Information communication with Screen Maps
- Integration of Image and Altitude Data to Street Data for Car Navigation

#### **4.6 Leibniz University Hannover ([www.uni-hannover.de](http://www.uni-hannover.de))**

##### **Research**

The research projects at the Institute of Cartography and Geoinformatics (ikg), generally deal with questions of automation of spatial data processing. Major focus lies on the automation of generalization, nowadays also in 3D, data integration, interpretation of landscape models, visualization of data in the internet, 3D-visualization, Augmented Reality, as well as location based services.

3D-data acquisition and interpretation is investigated with respect to laserscanning and 3D-city modelling. Since 2003 Prof. Volker Paelke initiated a research group at the ikg dealing with Mixed Reality, thus extending classical cartographic methods using techniques from Computer Graphics. Current research projects are funded by German Science Foundation, VolkswagenStiftung, German Ministry of Science, as well as cooperations with federal authorities in Germany.

##### **Teaching**

The ikg is responsible for the education in *Geoinformatics and Cartography* at Leibniz University Hannover. Basic courses, as well as advanced courses in GIS are communicated to students both from Geodesy and Geoinformatics, and to students from Geography and Computer Science. In 2005 we introduced a consecutive Bachelor / Master course.



## 4.7 TU Munich

### Research

Research fields of the [institute of cartography](#) are generalization of routing information, 3D visualization, mobile cartography, geospatial data integration, exploratory visualization and data mining

#### On-going research projects:

- (1) Enrichment and multi-purpose visualization of building models with emphasis on thermal infrared data (DFG)  
It deals with the automatic texturing of 3D building models using infrared image sequences, semi-automatic recognition of façade elements from thermal infrared textures and their interactive visualization based on CityGML, Aristoteles viewer and LandXplorer.
- (2) Rendering and usability of non-photorealistic 3D virtual environments for mobile devices (DFG)  
It deals with the illustrative and abstract visualization of 3D urban environments and the investigation of usability issues for mobile devices with small displays.
- (3) Integration and visualization of time-dependent information with 3D city models (DFG)  
It concerns the extensions of CityGML and the newest release of GoogleEarth KML. Data structures and compression methods for the purposes of efficient retrieval and fast rendering of spatio-temporal city objects are conceptualized and tested in a prototypical visualization environment.
- (4) Geodata integration based on GoogleEarth (Helmholtzgemeinschaft)  
A concept of semantic data integration with GoogleEarth has been developed. The simultaneous visualization of georeferenced demographic data, the traffic noise and virtual navigation has been prototypically realized. Further steps include the homogenous integration of high resolution image and thematic data.
- (5) Development of explorative geovisualization methods (Helmholtzgemeinschaft)  
The focus is to detect spatio-temporal coherences in visualized data on the basis of salience theory. Neuropsychological findings from the cortical processing of visual stimuli are applied.
- (6) Construction of a routing capable road database in the middle scale range (Federal Agency of Cartography and Geodesy)  
It has the objective to integrate routing-relevant information with the large-scale digital landscape model, and then automatically derive the routing network at middle scale range. A generic matching algorithm has been developed and implemented in ArcGIS as an operable tool kit for the integration of point and line networks.
- (7) Data integration based on generic matching (PhD scholarship)  
With the aim to develop a prototype for generic data matching, existing matching algorithms are analyzed and elaborated. The matching procedures are not

confined to linear data of similar scale ranges, rather spatial data of different sources, geometry types and scale ranges.

(8) Quality of probe vehicle data on travel time (PhD scholarship)

It concerns the cartographic visualization as a support for real-time traffic measurements, monitoring and quality assurance. Approaches of geo-collaborative visualization are conceptualized and will be tested.

(9) Visual Cartographic Icons in Cross-Cultural Geocommunication (PhD scholarship)

It involves an in-depth comparative study of cartographic icons used in German-speaking countries and East Asian countries. Using a semiotic approach to geocommunication, the icons collected in a database are analyzed and structured. The outcome serves as evidence for the adaptive cartographic visualization.

### **Education**

Cartography is a branch in the bachelor / master program of “Geodesy and Geoinformation”. The program started in 2005.

Our team is also involved in two international master courses: (1) Land tenure and land management, (2) Earth-oriented space science and technology.

## **4.8 University Trier**

### **Research**

The research projects of the [institute of cartography](#) deals with following topics:

- map conception and map use based on system and model theories,
- analysis of information processes in electronic media use based on perception and communication theories,
- principles and application of cartographic informatics, including animation techniques, geodatabases, mapserver and three dimensional geometric modelling,
- formalization and conception of rule-based cartographic systems,
- cartographic communication and project management,
- utilization and evaluation of Virtual Reality Techniques,
- perception and cognition of map users

### Equipment:

- Laboratory of Virtual Reality: including two stereoscopic presentation systems;
- Laboratory of experimental cartography: including two eye-movement-recording systems;
- GIS- and VR-Pool: 45 workstations

### Selected research and projects (2004 – 2007):

#### *Virtual Petrisberg*

In cooperation with the “State Horticultural Exhibition Trier 2004” a virtual model of the exhibition site “Petrisberg” had been developed and a virtual landscape show had been presented to the visitors during the exhibition period. In part, virtual landscapes show perspectives and angles to the visitors

which are not directly accessible to them, in part, VR-visualizations give an idea of the development of the Petrisberg area through history.

*Modelling and empiric evaluation of virtual landscapes*

Development of modelling methods for urban landscapes as well as development of tools for navigation, interaction, and representation; empiric exploration on effectiveness and functions in different application areas.

*Integration of modern visualization methods in operations of urban land use planning. Example: Master plan of the city of Neckarsulm*

Development of methods, processing, and systems of 3D and virtual reality application in urban planning and civil participation

*GIS and Spatial Data Mining as decision support tools in geostatistical analysis. Demonstration by data from social planning and geo business.*

The aim of the project is to show that GIS and methods of spatial data mining enable planners and decision makers to take more qualified decisions and to get a better overview of the spatial structure of the data.

*Efficiency analysis of navigation aids in virtual 3D environments)*

Empiric investigation on the effectiveness of significant navigation tools like compass, map, and direction arrows in digital 3D environments. Online questioning about preferences for the use of navigation tools; interactive online research about effectiveness of significant navigation tools

*Empiric investigations about the electronic use of type of maps*

Investigation serial about function and visual-mental achievement potential of the most important special-subject maps; by means of different empiric methods, processes of information processing in static and interactive maps are analyzed and compared.

*Cartographic representation of an urban investment household as decision support tool for local politicians*

The cartographic representation of the investments is to demonstrate their spatial structure and to make them comparable with socio-demographic factors. Correlations can be computed and new knowledge can be taken into account when discussing future investment decisions.

## **Education**

Until summer 2007, the cartographic lessons at the University of Trier are carried out by means of minor and major subjects in the frame of diploma study courses: Geography, Environmental Sciences, Informatics, and Applied Mathematics.

Starting in winter 2007/2008, a graded education will be implemented leading to the degree of BSc Applied Geoinformatics (6 semesters) and MSc Geoinformatics (4 semesters). The core subjects of the new study courses are set up by the fields of cartography and remote sensing. Scientific principles are offered by the fields of mathematics, informatics, and economical informatics. Basic and recommended courses are obtainable by the fields of geography as well as of environmental and biological sciences.

By means of obligatory and recommended courses, the department of cartography is involved in seven further new Bachelor/Master study courses at the University of Trier.

#### **4.9 Ruhr University Bochum**

Cartography is part of the geomatics group within the [Institute of Geography](#) at the Ruhr-University Bochum. Besides cartography the group focuses on remote sensing and GIS topics. The last three years were characterized by fundamental staff changes. In 2004 Prof. Dr. Jürgen Dodt (Vice President of DGfK) retired and Prof. Dr. Carsten Jürgens became new professor of remote sensing. In 2007 Prof. Dr. Jean-Claude Müller retired and Prof. Dr. Frank Dickmann became new Professor of cartography.

##### **Research**

During the report period the research topics included digital cartography, geo-information systems, web mapping, 3D cartography, satellite cartography and user oriented cartography. Besides research topics also relevant aspects of practical cartography were considered.

The main topics in cartographic research are summarized as follows:

- Photorealistic 3D-modelling of buildings (inside and outside)
- Multimedia representation and communication of urban noise; audiovisual maps
- Multitemporal multimedia documentation of former coal-mines and other industrial sites
- Mapping and visualization of contaminated sites
- Mobile cartography
- 3D-data capture from aerial photos and 3D-visualisation
- 3D-Geovisualisation (e.g. development of 3D-MapView software)

##### **Education**

The geomatics group teach in the various geography study programmes (more than 1100 students) available in Bochum. Bochum was the first German university that offered the new consecutive studies (since 2001). One can study B.A, B.Sc., M.Ed. and M.Sc. in geography. In all those programmes cartography, remote sensing, GIS and modelling are an integral part for the students. Within the M.Sc. programme 15 students per year can specialize in geomatics. This programme started in 2004

##### **Further education**

In addition to the regular teaching the geomatics group offers courses for professionals to update and supplement their professional skills. These courses focus on the following topics:

- Introduction to geographic information systems
- 3D-data capture from aerial photographs
- map updating techniques from aerial photographs
- cartographic presentation with GIS
- 3D-presentation in Google Earth

#### 4.10 GeoForschungsZentrum ([GFZ](#)) Potsdam

The [GFZ Potsdam](#) is Part of the [Helmholtz Association](#) and the German national research centre for Geo-sciences. It has no study program; however, it is involved in academic education at several universities.

##### Research

Research fields of the working group Geoinformation Management and Visualization are:

Maps and information systems for risk management, community-made maps, collaborative visualization, visual analytics, spatial GUIs, Service Oriented Architecture (SOA), Workflow.

Research projects:

- Natural Disasters Networking Platform "[NaDiNe](#)" - A platform for user-oriented provision and presentation of scientific products and knowledge for various actors in risk management.
- A distributed dike-breach information system based on Service-oriented Architecture and workflow management
- Community-made earthquake intensity maps using Google's API
- Integration and assessment of information from affected people into disaster management
- Spatial GUIs (Graphical User Interfaces) for complex decision support in time critical situations
- A cross-community collaborative visualization platform for comprehensive system understanding in Geosciences
- Model driven software engineering (MDE) for geo-scientific modelling and simulation

## 5. Map Collections in Libraries

### 5.1 The Map Department of the Berlin State Library

With the support of the Deutsche Forschungsgemeinschaft ([German Research Foundation](#)), the Map Department of the Berlin State Library takes care of two special subject fields: topographical maps and cartographic literature. New titles of both special subject fields are shown automatically in the "Neuerwerbungsliste" (new acquisitions) which is available [online](#).

For the special subject field topographical maps numerous additions and new map series could be acquired:

Additions:

- TK 50 Commonwealth of Independent States (CIS) (up to Ural mountains) (now complete)

NEW:

- TK 25 Bulgaria (complete)
- TK 25 Denmark (Raster data, DVD) (complete)
- TK 50 Vietnam (complete)
- TK 50 Iran (Islamic Republic of Iran) (complete)
- TK 50 Armenia (complete)
- TK 50 Azerbaijan (complete)
- TK 50 Kazakhstan (started)
- TK 50 Uzbekistan (started)
- TK 50 Turkmenistan (started)
- TK 50 Kyrgyzstan (started)
- TK 50 Tajikistan (started)
- TK 50 Great Britain (Raster data, DVD) (complete)
- TK 200 French Guiana (complete)

All current map series of the map department are fed into a clearly arranged list which is available [online](#).

The list comprises more than 1000 map series. Additionally some entries have been linked with further information (index sheets).

Cartographic literature is indexed mainly in the Bibliographia Cartographica. Hereby, the map department profits from its function as deposit library of the [Deutsche Gesellschaft für Kartographie](#). The map department organizes on behalf of the Deutsche Gesellschaft für Kartographie the journal exchange of the "Kartographische Nachrichten" with similar institutions. On the other hand the exchanged journals are evaluated for the Bibliographia Cartographica. The Bibliographia Cartographica which comprises and indexes the international cartographic literature shall be made available free of charge via an online database in future. At this stage a new database is on a trial run. An internet version is in preparation.

Meanwhile, all titles (maps, atlases, cartographic literature) which have been published from 1940 onwards have been transferred into an electronic form. The conversion has been realised during a project between August 2005 and July 2006. The bibliographical data are now included in the electronic catalogue of the [Berlin State Library](#) where they may be used by other libraries as well.

The Berlin State Library has received the complete estate of the historian Arno Peters. The Map Department has been entrusted with the segment of the work on "Peters Atlas" and "Peters-Map" basing on "Peters-Projection".

The free-of-charge access to the [IKAR database](#) has established itself by now. The access numbers to the database which holds by now more than 270.000 bibliographic dates of old printed maps have risen by approx. 26,3% in 2005 compared with the previous year. The database itself is growing due to the integration of further collections. Meanwhile the map holdings of the Staats- und Universitätsbibliothek Hamburg, the Herder-Institute Marburg and the Herzog-August-Bibliothek Wolfenbüttel have begun to enter their historical collections. The "Perthes" collection (Petermanns Geographische Mitteilungen) will participate in the database from 2007, too.

## 5.2 State and University Library Goettingen, Map Collection

### Areas of activity:

Permanent development of collection of Thematic Maps over all regions and all topics in paper and digitized form (more than 5000 items per year)

The map collection of [Goettingen State and University Library](#) offers more than 300.000 maps, of which 65.000 are antique maps and more than 5.000 atlases. This collection is continuously extended with support of the DFG ([German Research Foundation](#)). It has become recognized as a leading institution in the field of digital libraries and online information services through its work on a number of research projects.

### Important Projects:

Development of a portal which combines subject-specific holdings, information and services of the main libraries for the nationwide supply of literature in Geology, Mineralogy, Petrology, Soil Science, Mining, Geophysics, Geography and Thematic Maps [www.geo-leo.org](http://www.geo-leo.org) in cooperation with a lot of institutions in Earth Sciences and Cartography.

The Library of Congress and the SUB Goettingen concluded an agreement concerning digitization of the Asch Collection for inclusion in the American-Russian digital library 'Meeting of Frontiers' <http://frontiers.loc.gov>. State and University Library Goettingen hold a highly comprehensive collection of Russian and Asian maps, record of Russian expeditions to Siberia in the second half of the eighteenth century. With the financial support of the DFG the source materials which have never been published or are extremely rare were digitized and classified.

Cooperation with 'Opal-Niedersachsen – Das Online-Portal digitalisierter Kulturgüter Niedersachsens' [www.opal-niedersachsen.de](http://www.opal-niedersachsen.de) where digitized maps of Lower Saxonia are offered. The collection is permanently being expanded.

### Development:

The portal Geo-Leo [www.geo-leo.org](http://www.geo-leo.org) is being expanded by a lot of new functions and contents particular in the range of electronical documents.

[Geotool](#) allows searches for individual sheets in map series. Individual sheet maps with various scales, with various index sheets, and covering various topics worldwide can be searched. Currently, 65,000 maps from the State and University Library Goettingen collection are covered. The system is constantly being expanded and supplemented by further index sheets and maps. A cooperation with State Library Berlin to develop with Geotool an integrative graphical cataloguing instrument is prepared.

### International Cooperation:

Library of congress. <http://frontiers.loc.gov>