# National Report 2010/2011

Arbeitsgemeinschaft der Vermessungsverwaltungen
der Länder der Bundesrepublik Deutschland

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| The Bundeswehr Geoinformation Service (Geoinformationsdienst der Bundeswehr) | ageobwi21@bundeswehr.org |
| Federal Waterways and Shipping Administration (Wasser- und Schifffahrtsverwaltung des Bundes) | www.wsv.de |
| German Association of Publicly Appointed Surveyors (Bund der Öffentlich bestellten Vermessungsingenieure) | www.bdvi.de |
| Bund and Länder Working Committee for Sustainable Länder Development (Bund-Länder-Arbeitsgemeinschaft Nachhaltige Landentwicklung) | www.landentwicklung.de |
| German Geodetic Commission (Deutsche Geodätische Kommission) | www.dgfi.badw.de |

Produced by: Bavarian Agency for Surveying and Geographic Information (Landesamt für Vermessung und Geoinformation Bayern)

**Dear readers, the purpose of this activity report is to show you the diverse range of tasks covered by surveying and mapping and geoinformation. In Germany, this field is dominated by the federal structure that poses specific challenges for the collaboration between the government and the Länder. The Working Committee of the Surveying and Mapping Authorities of the German Länder (AdV) faces these challenges in order to regulate technical issues of fundamental and national importance in a standardised manner.**

An important success for optimising collaboration has been achieved during the period under review. Upon the decision taken by the state secretaries responsible for geoinformation and surveying and mapping, and also by the Permanent Conference of the Ministers and Senators of the Interior, the AdV picked up on the intention of Federal Commission II to improve nationwide cooperation on geoinformation. The Administrative Agreement for cooperation on official surveying and mapping in Germany came into force on 8 December 2010. This Agreement was signed by all ministers and senators responsible for surveying and mapping and geoinformation. While the strategic alignment of official surveying and mapping and geoinformation in Germany continues to be determined by the AdV, the Administrative Agreement optimises the standardised and effective implementation of these strategies throughout the Länder. Nationwide projects are supposed to achieve synergy effects through the Länder stepping up the implementation of cooperation models (one Land for all, some for all) or cooperation partnerships. The Geobasis Steering Committee was established as a controlling instrument. The implementation of AdV strategies – including those achieved in recent years for the provision of the nationwide satellite position service SA*POS*®, a standardised digital landscape mode and the revised version of the geospatial reference data description in the so-called AAA Project taking account of the requirements ensuing from INSPIRE – must be made much faster and more efficient through the regime set out in the Administrative Agreement.

From a strategic perspective, there are currently considerable needs to further standardise the cost and fee model based on the fee guideline adopted by the AdV, to develop flat rate and lump sum models, as well as online licence models, and to provide standardised, free mapping and download services for official geospatial reference data as the basis for the GDI-DE. A further strategic aim of the AdV is to make official geospatial reference data available via a networked geodata infrastructure, which is supported on the original geospatial reference data managed centrally within the Länder, by means of web-based geoservices (download and mapping services) standardised across Germany. The Working Group for Geotopography of the AdV Plenum was therefore assigned to create a sparser version of the signatures catalogue, based on the existing object type and signatures catalog of ATKIS®, for standardised web presentation across Germany. The idea behind this was to allow high-performance integration of the geospatial reference data into geoportals. This sets the course for one standardised solution across Germany.

I hope you enjoy reading this Annual Report and gaining interesting insights into the AdV‘s complex range of activities.

Wolfgang Draken
President of AdV

# 1. Organisation and Performance of Tasks

*In the Federal Republic of Germany, the Länder are responsible for the performance of official surveying and mapping tasks. Since 1948, the agencies of the Länder and the Federal Ministries of the Interior, Defence as well as for Transport, Building and Urban Development responsible for official surveying and mapping have been cooperating in the Working Committee of the Surveying Authorities of the German Länder (AdV) in order to deal with technical issues of fundamental and national importance. The German Geodetic Commission (DGK) as representative of geodetic teaching and research and the Working Committee for Rural Development (ARGE LANDENTWICKLUNG) have guest status in the AdV.*

## Surveying, mapping and real estate cadastral agencies of the Länder

In most Länder, the agencies responsible for surveying and mapping, real estate cadastre and geoinformation are assigned to the Ministry of the Interior for the Land concerned. They have a two or three-level administrative structure. The responsibility for realising a standardised spatial reference system and managing the topographic geospatial reference data lies with the respective surveying and mapping authorities. At the regional level, the surveying and mapping and real estate cadastral agencies are responsible for collating, managing and provisioning real estate cadastre data. As part of the administration reform, some Länder merged their surveying and mapping authority and their surveying and mapping and real estate cadastral authorities to form one integrated geoinformation authority.

The original range of services provided by the surveying, mapping and cadastral agencies includes:

- The widespread provision of spatial reference data via reference networks in the Official Control Point Information System (AFIS®), comprising terrestrial control points and verification of same and based on the satellite-supported positioning service SA*POS*®,
- The storage of a widespread image of the earth‘s surface via geotopographic products in the Authoritative Topographic Cartographic Information System – (ATKIS® using landscape and terrain models, official topographic cartography and aerial photographs,
- The widespread digital verification of buildings and approx. 64 million land parcels in the official real estate cadastre for ownership rights in the land register, currently managed by applying the procedures for the

automated real estate map – ALK and the automated real estate register – ALB, in the future using the Authoritative Real Estate Cadastre Information System – ALKIS®) and

- The integration of real estate cadastral and surveying and mapping to create the geospatial reference data system.

## Federal Agency for Cartography and Geodesy (Bundesamt für Kartographie und Geodäsie)

The Federal Agency for Cartography and Geodesy (BKG) is a federal authority responsible to the Federal Ministry of the Interior. In cooperation with the Länder, the BKG fulfils the following duties and responsibilities in the field of geoinformation and geodesy:

- Provisioning and mapping current analogue and digital topographic and cartographic information, as well as the advancement of the procedures and methods required for this purpose;
- Provisioning and updating of geodetic reference networks in the Federal Republic of Germany, including the required
    - Services pertaining to surveying and mapping as well as the theoretical services for the acquisition and preparation of measurement data, and involvement in bilateral and multilateral activities for determining and updating global reference systems,
    - Advancement of the measuring and observation technology employed;
- Representation of the interests of the Federal Republic of Germany in the field of geodesy and geoinformation at international level.

## The Bundeswehr Geoinformation Service (Geoinformationsdienst der Bundeswehr)

The task of the Bundeswehr Geoinformation Office (BGIO) is to merge all geosciences relevant to the Bundeswehr (geodesy, geography, geology, remote sensing, cartography, geoinformatics, meteorology, climatology, ecology, biology), so that under the slogan ”Geoinformation from one source“, the geoscientific basis for deployment of the armed forces can be created and the fulfilment of all spatial reference tasks of the Bundeswehr can be guaranteed. The BGIO closely cooperates with the surveying and mapping authorities and other federal authorities.

## Federal Ministry of Transport, Building and Urban Development (BMVBS)

The Federal Ministry of Transport, Building and Urban Development (BMVBS) has been a member of the AdV since 1950. It has assigned the Federal Water and Shipping Administration (WSV), an agency with its own surveyors, to operate and maintain the approx. 7,300 km of Germany‘s inland waterways and approx. 17,800 km² of navigable waters. The surveying, mapping and real estate division has approx. 450 employees Official surveying and mapping

activities that call for close coordination with the AdV are carried out throughout Germany. The WSV maintains its own reference network (position and height control points) and is a permanent user of SA*POS*® services. A digital map system (1:2000), the contents of which are used to continue the ATKIS® basic DLM, is being created and updated for the waterway network. The BMVBS is represented in the AdV by the waterways and shipping division.

## Organisation of the AdV

The graphic below (Fig. 1) shows how the AdV is organised. Its bodies are the President and the Plenum. The AdV is supported by the working groups, the Task Force PRM and the management.

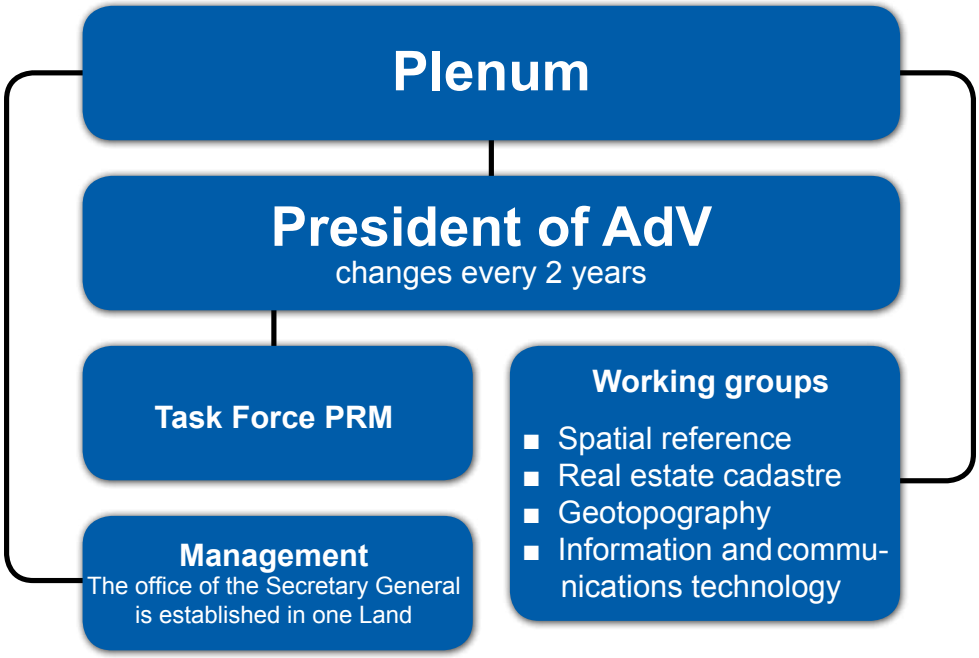


*Fig. 1: Organisation of the AdV*

## Objectives, duties and responsibilities of the AdV

The member authorities collaborate in the AdV

- To regulate technical matters of fundamental and national importance to official surveying and mapping in a standardised manner,
- To create a stock of standardised geospatial reference data geared towards meeting the requirements of the information society and
- To provide the infrastructure for geospatial reference data as an important component, particularly for modern eGovernment architectures.

In order to achieve these objectives, the AdV fulfils the following duties and responsibilities:

- Creation and coordination of future-oriented joint concepts for the nationwide standardisation of real estate cadastre, surveying and mapping and the geospatial reference data information system, to meet the needs of politicians, industry and administrative units,
- Assistance with the joint execution of projects of national importance,

- Facilitating and coordinating normalisation and standardisation procedures for the recording and management of geospatial reference data, as well as methods of access and distribution,
- Support for establishing and refining the national and European spatial data infrastructure and the corresponding electronic services,
- Representation and presentation of official surveying and mapping to the outside world,
- Involvement in international technical organisations for encouraging the transfer of expertise,
- Collaboration with dedicated organisations and agencies, as well as geodetic research and teaching institutions and
- Agreement on technical training issues.

# Geobasis Steering Committee

The Geobasis Steering Committee, on which all Länder are represented, was established on 8 December 2010 under the Administrative Agreement for cooperation on official surveying and mapping in Germany. The Administrative Agreement aims to continuously improve the operative implementation of the strategies arranged in the AdV and to further optimise cooperation across Germany. The Geobasis Steering Committee is also supposed to ensure that the geospatial reference data are consistently provided to all users in the quality required.

The Geobasis Steering Committee holds the following authorities and must perform the following tasks to implement the strategic resolutions adopted by the AdV:

- Monitoring and analysis of work and development situations, including compliance with the defined quality benchmarks and standards,
- Analysis of cooperation potentials and devising suggestions as to how they can be realised,
- Facilitation of the collaboration between individual Länder or several Länder,
- Quality review based on AdV standards regarding content and format consistency.

**Official surveying and mapping statistics**

| Land | Inhabitants in thousands | Area in km² | Land parcels in thousands | Number of authorities | | |
|---|---|---|---|---|---|---|
| | | | | Länder authorities (operations) | Regional authorities | Chartered Surveyors ÖbVI |
| Baden-Württemberg | 10.750 | 35.751 | 8.890 | 1 | 44 | 161 |
| Free State of Bavaria | 12.520 | 70.552 | 11.546 | 1 | 51 | - |
| Berlin | 3.416 | 892 | 387 | 1 | 12 | 46 |
| Brandenburg | 2.536 | 29.478 | 3.057 | 1 | 18 | 155 |
| Free Hanseatic City of Bremen | 663 | 405 | 206 | 1 | 1 | 6 |
| Free and Hanseatic City of Hamburg | 1.771 | 755 | 244 | 1 | - | 9 |
| Hessen | 6.073 | 21.115 | 4.964 | 1 | 7 | 90 |
| Mecklenburg-Western Pomerania | 1.680 | 23.186 | 1.889 | 1 | 12 | 71 |
| Lower Saxony | 7.972 | 47.625 | 6.102 | 1 | - | 104 |
| North Rhine-Westphalia | 17.997 | 34.088 | 9.178 | 1 | 53 | 467 |
| Rhineland-Palatinate | 4.046 | 19.853 | 6.382 | 1 | 19 | 86 |
| Saarland | 1.037 | 2.570 | 1.302 | 1 | - | 11 |
| Free State of Saxony | 4.220 | 18.419 | 2.604 | 1 | 15 | 114 |
| Saxony-Anhalt | 2.412 | 20.448 | 2.625 | 1 | - | 55 |
| Schleswig-Holstein | 2.837 | 16.018 | 1.806 | 1 | - | 43 |
| Free State of Thüringen | 2.289 | 16.172 | 3.058 | 1 | - | 70 |
| Total for Germany | 82.218 | 357.327 | 64.540 | 16 | 232 | 1.493 |

*Tab. 1: Statistics – Updated: 1.1.2011*

# 2. Spatial reference

*Global and national reference systems can no longer be considered as separate entities. Reference systems do not recognise boundaries between Länder or states. They are essentially based on functional circumstances. This is especially clear in the developments on the international positioning market, though also in the multi-layered realisation of reference systems. Modern collaborating observatories with high-tech equipment collaborating on an international scale are equally crucial as current realisations of the national spatial reference for all types of surveys, as well as geoinformation applications.*

## Link to global reference systems

The BKG operates, as its contribution to the global networks, three geodetic observatories in Wettzell (Bavarian Forest), in Concepción (Chile) and O'Higgins (Antarctic). Through their daily observations, these observatories make important contributions towards determining the earth's rotational parameters (speed and position of the earth's rotational axis) and are therefore an essential cornerstone of the services provided by the International Association for Geodesy (IAG). This information is required to operate the satellite navigation systems GPS, GLONASS and in future also GALILEO. The BKG's observatories are equipped with the state-of-the-art technology and, in conjunction with international partner stations, permit highly-precise measurements. For almost 40 years now, the Geodetic Observatory (GO) in Wettzell has been jointly operated with the Satellite Geodesy Research Institute at the Technical University of Munich.

To meet the requirements placed by the International VLBI Service (IVS) on a modern radio telescope for geodetic measurements, the BKG initiated a project to replace or retrofit telescopes of 30 or more years old. By the end of 2011, a VLBI twin radio telescope featuring top German technology will have been erected in the

*Fig. 2: The new silhouette of the geodetic observatory in Wettzell, including the twin radio telescope*

Wettzell GO (see Fig. 2). This will ensure that the BKG remains a world leader of positioning technologies over the long-term. The project comprises two fast-rotating radio telescopes fitted with a broadband reception system. Both radio telescopes are designed for continuous operation in 24-hour measurements. The elevation cabins and reflectors were delivered and installed in 2010.

In conjunction with the construction of the new twin radio telescope, a new laboratory for gravitational measurements was also established. Besides permanently-installed systems, this laboratory also enables temporary comparison measurements to be taken between several absolute gravimeters. 2010 saw the first international round of measurements, during which the new gravimeter building was officially opened.

With the data and analysis centres for the IVS and as the analysis centre of the International Laser Ranging Service (ILRS) - and hence for practically all geodetic space techniques - the BKG contributes to the products of the IAG's international services, which in turn guarantee the provisioning of global geodetic reference systems and the earth's rotational parameters. The BKG has run the central office of the International Earth Rotation and Reference System Service (IERS) since 2000. The IERS central office also acts as a data and information centre; all the experience garnered is used to create the Portals for the Global Geodetic Observing System (GGOS).

In carrying out these activities, the BKG is contributing to the global reference systems which provide the basis for both the European and national position, height and gravity reference systems. Furthermore, modern observation and analysis approaches will be implemented at national level as geodetic technology continues to be advanced.

The observational network GREF is being gradually upgraded with new receivers and antenna. Half the 24 stations are already set-up to receive signals from GALILEO, the European satellite navigation system currently being built. The continued reception of GNSS signals from GPS and GLONASS used to date is also guaranteed. The signals are received in realtime and transmitted to the headquarters in Frankfurt am Main. Experience of simultaneously analysing two different global navigation systems therefore already exists, and this will stand the use of GALILEO in good stead. The measurements on the GREF stations are used to calculate precise satellite orbit data and satellite clocks, hence increasing positioning accuracy via satellite measurement. This enables measurements accurate to within just a few millimetres, which are then used in geodetic reference networks to establish a distinct spatial reference. The reference networks form the basis for referencing geoinformation (geo-referencing), as well as for environmental monitoring and researching the earth system. Six GREF stations lie on the North and Baltic Sea coasts in the immediate vicinity of the gauging stations. The long-term measuring concepts enable changes in sea level to be detected, thus providing important information for coastal protection.

A new process for global, highly-precise and three-dimensional positioning anywhere in the world in realtime enjoys pioneering support from the BKG. As part of the International GNSS Service (IGS), it initialises satellite orbit and satellite clock corrections in realtime via mobile Internet connections. Satellite receivers have direct access to the correction data streams via mobile radio for this purpose. After a brief convergence time, an accuracy of one decimeter can be achieved using this technology anywhere on earth. The implementation of the European GALILEO system in 2014 is expected to bring further improvement. The GREF upgrade also includes combining the geometric satellite positioning process with physical methods of height determination or gravitational measurements. GREF is thus consistent with the IAG concept of the Global Geodetic Observing System (GGOS), which provides for the linking of geometric and gravimetric observations.

## Height reference systems

Activities for refining the European Vertical Reference System (EVRS) and for updating and maintaining the database of the United European Levelling Network (UELN) were continued. The description of the new realisation of the European Vertical Reference Frame 2007 (EVRF2007) was published and the transformation parameters for the height reference systems in accordance with EVRF2007 for a number of European countries were provisioned in the information system for Coordinate Reference Systems for Europe, CRS-EU. The system still contains the transformation parameters for EVRF2000.
Additionally, an online height transformation in accordance with the European system realisations EVRF2000 and EVRF2007 was activated for individual points. As a result, heights at a known position can be transformed into these system realisations (www.crs-geo.eu). All changes and additions to the content have been agreed with the Länder concerned.

## Gravitational field determination

Since spring 2009, absolute gravitational measurements have been taken at 100 field stations as part of renewing Germany‘s main height network 1992 (DHHN92). Additional absolute gravitational measurements are taken on behalf of the surveying and mapping authorities in the Länder, in order to construct a network of geodetic reference network points with long-term stability. It is expected that this will allow up to 50 more points to be newly constructed and surveyed. The executed rounds include control measurements at the Bad Homburg reference station at the beginning and end of each round, as well as the regular monitoring of the laser and atomic clock instrument standards. Additional absolute gravitational measurements are also being performed at geodetic reference network points in a number of Länder, which means that new absolute gravity values will be available for over 150 points in total. The results will be provided to the Länder as soon as they have been prepared by the BKG.

Measurements were taken in northern Germany under the terms of a cross-border cooperation with the Danish National Space Center (DTU Space) at the University of Copenhagen. At the same time, absolute gravitational measurements were taken using the Danish absolute gravimeter A10-019 and the BKG‘s absolute gravimeter A10-002. That means, alongside a comparison of the two instruments, a link was forged between the gravity networks of the two countries.

## National geodetic spatial reference

Since 2006, the German Länder have been renewing Germany‘s main height network 1992 (DHHN92) in partnership with the BKG. The aim of this AdV project is to cover height changes and stresses in the DHHN92. It includes measurements using various sensors (precision levelling, GNSS and absolute gravity) in the rounds carried out in the same period between 2006 and 2011/2012. As a result of the various measuring procedures, this renewal measurement can also be deemed the integration of the DHNN into a future, integrated spatial reference system in terms of a zero measurement.

Measurements are being taken in the first order levelling network for the first time after the Reich‘s height network was constructed from 1912 to 1938 (DHHN12) as part of a nationwide measuring project. They are being overseen by the Project Group ”Coordination of measurements DHNN“ of the Spatial Reference Working Group for the duration of the project.

The Project Group's work comprises numerous organisational activities (statistics, workshops, overseeing the computer centres, controlling tasks) and technical advancements, e.g. the creation of national field instructions for the surveying and mapping field service. The German Länder perform their regional field measurements independently on this basis. The five computer centres located at the BKG (precision levelling, absolute gravity, GNSS), the district government of Cologne (prevision levelling) the Lower Saxony Agency for Geoinformation and Länder Development (GNSS) hold a central position within the DHHN project. Once the German Länder have reviewed, pre-analysed and promptly submitted the measurement data, it is then prepared, stored and analysed in the computer centres. They create annual performance statistics, which allow statements to be made on the current status of field measurements and on the progress of the analyses. All project information is analysed by the Spatial Reference Working Group.

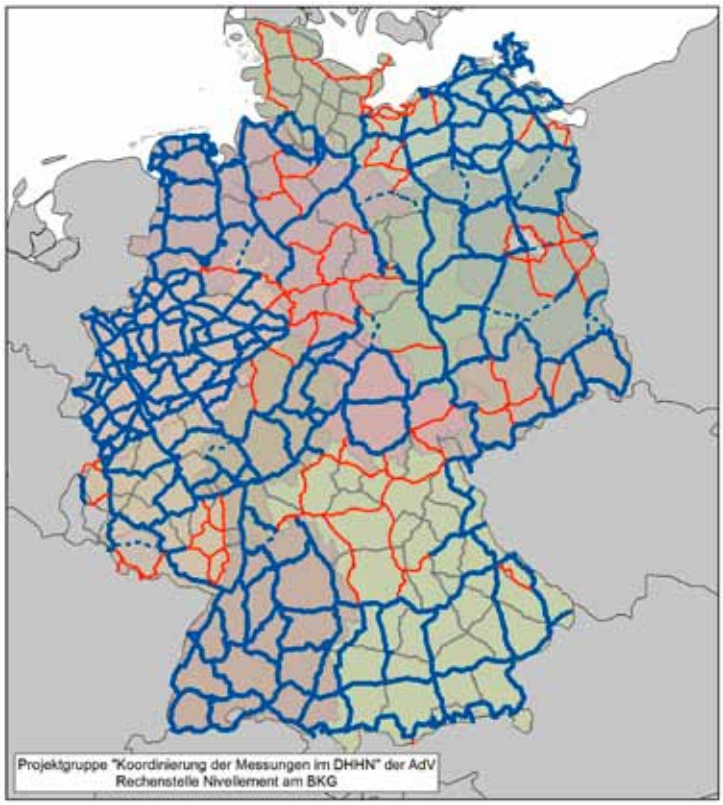


*Fig. 3: Data submission to the computer centres in the DHHN project, Updated January 2011*

Figure 3 shows a summary, prepared from the numerous annual surveys, of the levelling data of the German Länder for January 2011. The blue lines indicate the completely submitted lines, the dotted blue lines the partially submitted lines. Red denotes the lines not yet submitted to the computer centres. The diagram shows a high quota of measured lines with a measurement progress which, at 70% of the planned lines by the end of 2010, is well within the planning framework for the nationwide project.

If we calculate associated loops from the submitted levelling data, some 160 levelling loops were available for analysis at the start of 2011. The first statistical analyses showed that all loop discrepancies are normally distributed and, with a very high quota of approx. 97% in the first and second third, are within the permitted variances. These interim results suggest very good data quality and create high expectations for the analyses (e.g. compared to the previous measuring eras of 1976/1980), which will not however start until the end of 2011 at the earliest.

The analyses of the GNSS round in 2008, during which 250 earth points - some newly marked - along the DHHN lines were measured with considerable effort (see AdV Activity Report 2008/2009), have largely been

completed in the two computer centres by applying coordinated analysis approaches and various software solutions. The aim of the analysis, to achieve the highest possible level of accuracy with point height and height differences in this earth network, was achieved in full. All points have very good GNSS conditions with regard to shadowing and reflections and are located less than two kilometres from the DHHN to which they were linked via precision levelling. The 250 GNSS points exhibit a very high quality and were immediately classified by the Spatial Reference Working Group as geodetic reference network points.

In a first comparison of the evaluation results of the earth network from the two GNSS computer centres (see Table 2), the coordination solutions, including the entire variance/co-variance matrix, were merged via a spatial Helmert-Transformation. The result of this transformation shows a high degree of congruence between the solutions from the two computer centres.

| Dimension | B [mm] | L [mm] | H [mm] |
|---|---|---|---|
| Residual smoothing | -1,8 ... +2,7 | -2,6 ... +1,5 | -5,1 ... +5,2 |
| Standard deviation | 0,7 | 0,7 | 1,8 |

*Tab. 2: First comparison between GNSS solutions in the computer centres at the Federal Agency for Cartography and Geo desy and the Lower Saxony Agency for Geoinformation and Länder Development – Updated 09/2010*

In addition to the earth network, the data from the SA*POS*® reference stations was also recorded and analysed by the computer centres in 2008. The link between the earth and reference station network solutions turns the end of the calculations, scheduled for 2011, into a cohesive result. Comparison calculations and a joint result produced under agreed quality perspectives and standardised technical frameworks (e.g. datum questions) must then conclude the GNSS calculations (in 2011).

During 2009 and 2010, the gravitational acceleration was measured using the BKG's field-capable absolute gravimeters A10 (also see the section on gravitational field determination) at precisely 100 - extensively distributed - of the 250 earth points. The measurements were taken between spring and autumn in 9 measurement rounds each with an average of 11 points. The results were included in the verifications of the Länder.

If an interim balance is produced from all the results available to date from the various measuring sensors, the quality data in Table 3 occur. The table shows that the status of the interim analysis in January 2011 has already reached the target figures for the project defined at the outset and hence meets the high expectations for the analyses and hence for the measurement data quality. The further use of these results will dominate the activities of the Working Group over the next few years.

| Procedure | Objective | Updated 1/2011 |
|---|---|---|
| Precision levelling | $S_s \leq 0{,}4$ mm | $S_s = 0{,}32$ mm (20 742 Dkm) |
| $GNSS_{Earth}$ | $S_h \leq 5$ mm | $S_h = 2{,}4$ mm (250 GGP)* |
| $GNSS_{Reference\ stations}$ | $S_h \leq 5$ mm | $S_h = 3{,}1$ mm (348 RSP)* |
| Absolute gravimetry | $S_g \leq 12$ µGal | $S_g = 11$ µGal (100 GGP) |

*Tab. 3: Tolerance of the various measuring procedures in the DHHN project – Interim balance in January 2011*
** Results from one computer centre*
*Dkm Double kilometres*
*GGP Geodetic reference network points*
*RSP Reference station points*

The agreement concluded at the end of 2010 between the SA*POS*® operator community and a large customer for the construction of their own reference service was a pioneering move. This new positioning service is based on up to 200 SA*POS*® reference stations and provides various accuracy ranges and different tariff models throughout Germany. For the official data provider, the central agency SA*POS*® in Hanover is the experienced partner for all technical and contractual matters.

In the SA*POS*® service range, further reference stations were retrofitted during the period under review so that besides GPS and GLONASS signals, data from the European GALILEO system can also be received and used in the future. By early 2011, some 60 % of all SA*POS*® reference stations had been retrofitted to meet future requirements. The procedures for collecting and managing current, nationally standardised SA*POS*® quality information has also been refined and made available to the operators through internal channels.

As part of the ongoing upgrade to the AFIS®-ALKIS®-ATKIS® (AAA®) world, spatial reference databases are also being transferred to the AFIS® model. The German Länder will migrate their databases to the AdV's new data model once all the data cleansing steps have been successfully completed as part of the requisite pre-migration process. It is also crucial that the spatial reference production processes applied within the Länder are adapted in line with the AAA® world. Only the joint accomplishment of these two partial tasks will ensure a complete transition to the AAA® model and future operative use in spatial reference processes. The introduction of the European position reference system ETRS89, which is essentially running parallel to the AAA® and hence the transition to UTM coordinates, can be followed on the AdV website.

# 3. Real estate cadastre, land valuation

*The standardisation of real estate cadastre is to receive continued support in Germany. One of the key tasks is the gradual implementation of ALKIS® in all German Länder. Matching the data of the real estate cadastre to the Länder boundaries, however, is another priority for the Länder.*

*At the same time, users are coming to expect more and more in terms of nationally-standardised outputs from the real estate cadastre via web-based services.*

*Real estate cadastre and land register continue to be closely integrated, especially in light of the administration of justice's endeavours to establish a nationally standardised land register database.*

*For land valuation, the Real Estate Cadastre Working Group cooperates closely with the Working Group of the Advisory Committees and the Top Advisory Committees in Germany, the main aim being to achieve market transparency.*

## Introduction of ALKIS®

The introduction of ALKIS® is all but complete. From 2013 onwards, ALKIS® will be widely available in all the German Länder.

The current status of AAA® migration to the Länder is recorded in AdV-online.

At INTERGEO 2011 in Nuremberg, an ALKIS® seminar is being offered under the title of "ALKIS® – Vision und Wirklichkeit" [Vision and Reality] within the INTERGEO Academy. Numerous German Länder are actively taking part. A lively exchange of ideas regarding the introduction of ALKIS® is anticipated.

## ALKIS®-geodata services

The demand for a nationally standardised provision of ALKIS® data via web-based geodata services is growing. At AdV level, this requires an expedient definition of standardised ALKIS® geodata services (WMS/WFS) in order to guarantee a standard range across all Länder.

The Real Estate Cadastre Working Group has taken up the subject of ”ALKIS® Geodata Services“ and, in a first step, defined an ALKIS® WMS service. A draft in the current Version 1.0 represents a specification with deliberately low requirements in order to open up the initiative to as many Länder as possible.

The specification is generally based on Version 6.0.1 of the GeoInfoDok, the architecture concept GDI-DE, as well as on the current standards OGC and GDI-DE standards for WMS services.

The ALKIS® WMS service is broken down into land parcels, buildings, actual usage and legal stipulations. The ALKIS® core data is used in principle. Alternatively, the Länder can add further layers or an optional WMS service with information on the provisional livery of seisin pursuant to the Land Consolidation Act.

To ensure versatility of the ALKIS® WMS, provisioning in greyscales and yellow, as well as colour representation, is envisaged (Figure 4).

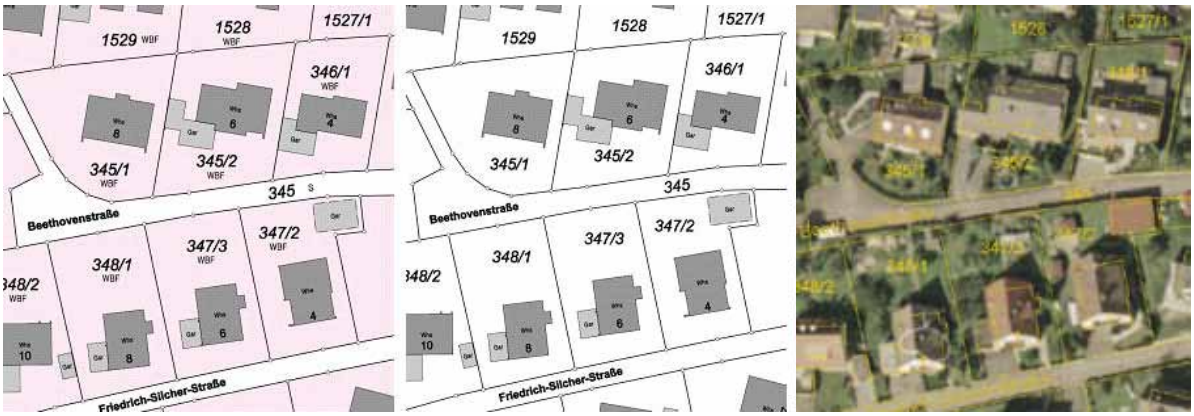


*Fig. 4: Left and centre: ALK shown in colour and greyscales*
*Right: ALK superimposed with an orthophoto (boundaries shown in yellow)*

Once the specification is confirmed by the AdV committees, the ALKIS® WMS will be made available to the Länder with a recommendation for implementation.

A further specification for an ALKIS® WFS service will follow.

## Matching the data to the Länder boundaries

The increasing cross-border use of geodata is calling for a consistent, seamless representation of spatial objects in the real estate cadastre along the Länder boundaries.

While the matching of data in the ATKIS® Basic DLM along the Länder borders has been standard practice since data capture began, the medium-term objectives now include a seamless matching of data in the real estate cadastre and the matching of databases in real estate cadastre and geotopography.

The Real Estate Cadastre and Geotopography Working Groups have raised the status and scope of the required matching. Throughout Germany, 29 boundary lines covering a total of 6500 km have to be matched. The length of the boundary lines to be processed is between around 30 km and almost 800 km. The Länder estimate an average processing time of five to eight years until the coordinates of the Länder boundary are completely matched in the real estate cadastre.

The AdV is recommending the Länder to conclude the reconciliation of real estate cadastre data by 2015 at the latest. By then, the status and the perspectives will be evaluated on an annual basis.

## Interaction between ALKIS®, LEFIS and EDV land register

The concept for the interaction between and the technical requirements for the data transfer between ALKIS®, LEFIS and the IT land register has been drafted. The contents and further procedure are currently being coordinated.

In connection with the efforts to establish a nationally standardised land register database, the justice administration is also considering potential changes to land register legislation.
One of the discussion points is recording the commercial type in the land register. The current position under land register rules stipulates an opening clause for the Länder, which will allow the recording the commercial type in the land register to be waived. There are indications that this opening clause will be abolished, the consequence being the commercial type will have to be recorded in the land register in all German Länder.

The justice administration for the semantics of land parcel and land plot is also considering that a land plot exists, in the legal sense, only from a land parcel. Given the fundamental importance for the management of the real estate cadastre, the subject is being explored in detail within the Working Group. The focus is on sustaining the real estate cadastre‘s capacity to act, which is independent of land register law.

## Real estate market report, Germany

Based on purchase price determinations, the Advisory Committees determine publicly registered land values and other land market data. The Real Estate Market Report Germany 2009 was published for the first time in April 2010 by the Working Groups fro the Advisory Committees and the Top Advisory Committees in the Federal Republic of Germany. Containing cross-border evaluations and data, the Real Estate Market Report is a further step towards improving real estate market transparency throughout Germany.

The purpose of concluding an agreement between the Länder on a collaboration for land valuation is to establish a regulation on the sustained provisioning of cross-border land market data.

The activities continue to be overseen and supported by the Real Estate Cadastre Working Group.

# 4. Geotopography

*Using the Authoritative Topographic Cartographic Information System (ATKIS®), the surveying and mapping authorities of the Länder are managing landscape-describing geospatial reference data in the Digital Landscape Models, Digital Terrain Models, Digital Topographic Maps and Digital Orthophotos product groups. The individual products in these product groups are kept current with regular updates. For key topographic objects in the digital landscape models, the updates take no more than a few months. Other main tasks currently include considering the requirements ensuing from INSPIRE and the migration of ATKIS® to the AFIS®-ALKIS®-ATKIS® data model.*

## Digital Landscape Models

One core task of the surveying and mapping authorities is current management of the Digital Basic Landscape Model (Basic DLM) as geotopographic database for establishing and managing different types of technical information systems in administrative units and in industry. The ATKIS® Basic DLM database also provides the foundation for deriving small scale ATKIS® DLM50, DLM250 and DLM1000 digital landscape models and for producing official digital topographic maps. A national database containing more than 120 topographic objects is available for the ATKIS® Basic DLM.

The need to be able to derive the DLM50.1 from the Basic DLM via a fully-automatic model generalisation process has been met in the form of the ”ATKIS® Generalisation“ joint project. The DLM50.1 exhibits a simpler form of structuring and a lower data volume than the Basic DLM. The DLM50.2 can be derived from this landscape model via automatic cartographic generalisation. The automation-supported interactive procedures required to derive the DTK from the DLM50.2 are currently being developed to produce digital topographic maps 1:50,000 (DTK50) and 1:100,000 (DTK100). The series of Figures (Figures 5, 6, and 7) shows a DLM50 section (without building and relief) before and after the automatic cartographic generalisation and also an interactive revision, rounded out by additional presentation objects, e.g. fonts.

The DLM250 and the DLM1000 processed in the BKG are widely available and updated on an annual basis. The content is continuously updated to make the EuroGeographics products EuroRegionalMap (1:250,000) and EuroGlobalMap (1:1,000,000), as well as to link technical data and for reporting at European level (main user: European Commission).

The digital landscape models of the ATKIS® class diagram must be continuously adapted to the changing requirements for a geotopographic database. The current alignment of the core data for official surveying and

*Fig. 5: The DLM50 before automatic cartographic generalisation without presentation objects*

*Fig. 6: The DLM50 after automatic cartographic generalisation with presentation objects*

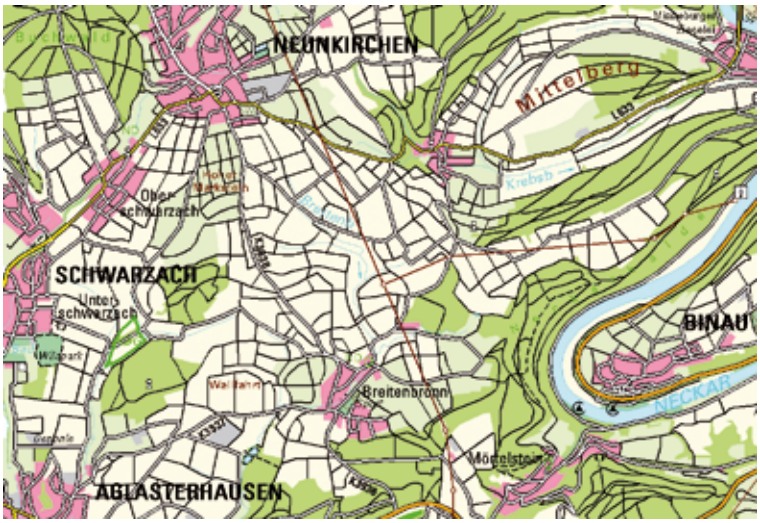


*Fig. 7: Interactive revision with fonts added*

mapping to the common AFIS®-ALKIS®-ATKIS® data model is effectively implementing a largely continuous object structuring of real estate cadastre and geotopography data. Requirements ensuing from European projects GMES and CORINE Land Cover (CLC), as well as INSPIRE, for Germany‘s geotopographic database have been discussed and will be considered in the next version of GeoInfoDok.

The migration to the AFIS®-ALKIS®-ATKIS® data model is well advanced in the Länder. A first national database of the Basic DLM in this data model is expected to be available by the end of 2011.

## Digital Terrain Models

Parallel to the digital landscape models, the surveying and mapping authorities are carrying digital terrain models (ATKIS® DGM) with various levels of precision. These are available to administrative units and to industry as part of the geotopographic database for setting up and managing the most diverse technical information systems. Digital terrain models describe the terrain surface as the area between the fixed terrestrial body and water on the one hand and air on the other hand. The terrain surface is modelled using a typical three-dimensional number of points. As well as regularly distributed geodetic points (DGM grids), DGM can contain structural elements in the form of terrain lines and specific terrain points. The feature catalogue DGM in GeoInfoDok is available for the ATKIS® technical concept as part of the AFIS®-ALKIS®-ATKIS® concept.

Currently, national DGM databases with a grid width of 10 m (DGM10), 25 m (DGM25), 50 m (DGM50), 200 m (DGM200) and 1000 m (DGM1000) can be provided. The data quality is documented in the ATKIS® product standard for digital terrain models. For the high-precision DGM10, this envisages a terrain type-dependent height accuracy of the grid points of $\pm$ 0.5 m to 2 m with a confidence level of 95%. This data quality will be achieved by the surveying and mapping authorities by the end of 2012. The DGM10 is now available with a terrain type-dependent height accuracy of the grid points of $\pm$ 2 m. DGMs with larger grid widths are derived from the DGM with the smallest grid width upon request. Furthermore, high precision DGMs with grid widths of 1 m (DGM1), 2 m (DGM2) and 5 m (DGM5) are already available in a number of Länder.

The specification for the product standard and the technical rules and regulations for DGM data exchange effectively meet the requirements for pooling the data of the Länder at the geodata centre of the BKG to create one national database. The geodata centre offers the DGM jointly with the Länder.

## Digital Topographic Maps

Based on the digital landscape and terrain models, the surveying and mapping authorities have started to derive topographic map series from new map graphics, documented in the ATKIS® signatures catalogue and published in the GeoInfoDok of the AFIS®-ALKIS®-ATKIS® project. Digital Topographic Maps (ATKIS® DTK) are already widely available in several Länder. The DTK1000, published by the BKG, is also available. The initial versions of procedures for a largely automation-supported cartographic generalisation of various map series are available and in use in some German Länder. These procedures enable a much more efficient derivation from digital landscape and terrain models. For the DTK50 and DTK100, the surveying and mapping authorities have agreed with the Federal Ministry of Defence that these topographic map series will be managed and published as joint civil/military map series.

As DTK are not yet being created from the ATKIS® signatures catalogues, the government and the Länder will continue the conventional topographic map series to the extent required scope and hold them for printing and as grid data records for diverse applications. The CD ROM series Top50 and Top200 are widely available for

the whole of Germany. However, there are no plans for a new edition for the time being, as increased use is to be made of the potentials of web-based presentations for meeting customer requirements.

## Digital Orthophotos

The surveying and mapping authorities of the German Länder periodically commission aerial photography flights in order to provide the latest aerial photographs to external customers, and also for internal use for updating digital landscape models and digital topographic maps. These aerial photos are oriented and orthophotos are calculated from them.

The Digital Orthophotos product group (ATKIS® DOP) therefore rounds out the ATKIS® concept. Due to the image-based documentation of the landscape, DOPs are suitable for observation-based applications. Through the realisation of aerial survey projects during 2010, DOPs with a ground resolution of 20 cm (DOP20) have been made widely available across Germany. Because the results of aerial photography flight are crucial to the prompt updating of the geotopographical core data from ATKIS®, it is assumed the high resolution DOP20 will be subject to an updating cycle of no more than three years. The specification for the product standard and the technical rules and regulations for DOP data exchange effectively meet the requirements for pooling the data of the Länder at the geodata centre of the BKG. The BKG offers DOP with the Länder and visualises it jointly in a DOP viewer available online. The DOP20 is now a standard product for practically all technical applications with a spatial reference inside and outside the surveying and mapping authorities.

The introduction of digital aerial photograph camera systems places new requirements on the surveying and mapping authorities, but also creates new potentials. The high efficiency of multichannel acquisition permits the simultaneous use of black/white, colour and infrared aerial photograph data. The addition of the infrared channel meets the criterion for pooling the requirements ensuing from the surveying and mapping, forestry and environmental authorities into the aerial photography flight projects of the Länder. Furthermore, the combination of digital aerial photography flight camera and laser scanner creates new options for the three-dimensional acquisition of landscape-describing geospatial reference data in the form of digital surface models.

In additional to issues regarding the quality requirements for digital aerial photography flights and data transfer and analysis, the surveying and mapping authorities are looking at the problems of long-term security and history management. The time series of aerial photographs represent an indispensable aid for the work of an increasing number of users  (Figures 8, 9, 10 and 11).

The surveying and mapping authorities are providing digital aerial photographs to specialist users as the basis for deriving ATKIS®-DOP with increasing regularity. Oriented aerial photographs are aerial photographs that contain all the parameters required for stereoscopic analysis. Rapid IT developments and the cost-efficient provision of user software is making stereoscopic aerial photograph analysis and presentation an affordable option for users.

## Toponymy

In collaboration with the Standing Committee for Geographic Names (StAGN), the BKG offers a standardised (gazetteer) service, which prepares toponymy (GN-DE) from the vector data from the products DLM250, VG250 and GN250. The GN-DE database is available as a standardised Web Feature Service (WFS) according to the specification of the Open Geospatial Consortium (OGC) at the geodata centre of the BKG.

*Fig. 8: Nordhausen (Thüringen), University Area 1945*

*Fig. 9: Nordhausen (Thüringen), University Area 1953*

*Fig. 10: Nordhausen (Thüringen), University Area 1980*

*Fig. 11: Nordhausen (Thüringen), University Area 2008*

# 5. Information and Communications Technology

*Information and communications technology forms the technical interface between activities in the fields of spatial reference, real estate cadastre and geotopography. It helps to establish the spatial data infrastructure (GDI) based on official geospatial reference data using networks and geoservices. Activities focus on the maintenance and advancement of the AFIS®-ALKIS®-ATKIS® (AAA®) concept for modelling the geoinformation of the official surveying and mapping and information technology coordination of the GDI activities for the AdV at national level.*

## AAA®-Model

The AAA® basic schema forms the basis for the technical application diagram for modelling the AFIS®, ALKIS® and ATKIS® objects and for data exchange via the standard-based data exchange interface NAS. The observance and application of the international norms and standards consistently implemented in the AAA® project should be emphasised. The completely neutral modelling of the AAA® basic schema enables other technical information to use the classes defined in the AAA® basic schema for their own modelling. To support an extensive use of the AAA® model in geographic information systems, the software scripts forming the modelling basis are available to third parties free of charge.

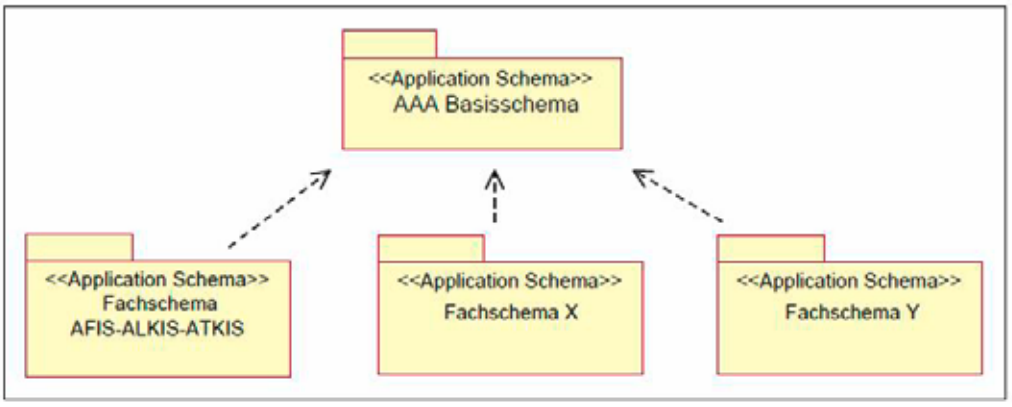


*Fig. 12: The neutral AAA® basic schema used for modelling application-specific technical systems (e.g. AFIS®, ALKIS® and ATKIS®)*

All the documentation on AAA® modelling is published in "Documentation on modelling the geoinformation of official surveying and mapping (GeoInfoDok)". Version 6.0, declared by the AdV as the reference version, is also available in English.

The AAA® data model's compliance with the requirements ensuing from the INSPIRE Directive and the implementation of these requirements in the geospatial data access laws and spatial data infrastructure laws of the federal government and of the Länder is of central importance. Accordingly, the AdV's newly constructed INSPIRE technical network is taking a close look at INSPIRE data specifications and their effects on the AAA® model. AdV experts continue to be represented on the European committees. The AdV's interests and involvement are represented in the European geodata infrastructure process of INSPIRE in this way.

## AdV metadata catalogue and AdV metadata information system

The AdV has implemented and published the AdV metadata catalogue. The standardisation of metadata for geodata is specified in ISO 19115. This also forms the basis for the AdV metadata catalogue, from which product-specific metadata are created and the AdV metadata information system is advanced. The latter has been improved in terms of performance and expanded by a harvesting component for the integration of external metadata information systems and also by new INSPIRE-compliant Catalogue Web Service (CWS).

## AdV-WFS-G-Profile

In 2009, the AdV decided on the "Germany Online Gazetteer Profile House Coordinates" [Deutschland Online Gazetteer-Profil Hauskoordinaten] as its WFS-G profile for the provisioning of house coordinates via web services. The AdV has now updated and expanded this profile. The need for expansion occurred because, in addition to the geo-referenced building addresses (house coordinates), the navigation and geo-coding using geo-referenced real estate data (land parcel coordinates) for use in Internet applications were in higher demand at the surveying, mapping and cadastre authorities, in particular for superordinate tasks (INSPIRE).
This updated WFS-G profile will be applied within the AdV in a standardised manner. This will secure in particular the investments in implementations among the German Länder. This meets the requirements for the urgently needed cascading structures, especially for provisioning under INSPIRE.

## Authentication and rights management

There is a need among the member authorities of the AdV to provision web-based geoservices relating to geospatial reference data over the Internet in a protected format (content and spatial access protection, data communication protection). The criterion for sustainable and reliable use of geodata in a distributed architecture is a security consideration in itself. Access within a service-oriented architecture (SOA) is to be granted via authentication (evidence/verification of an asserted attribute/identity) and authorisation (access right following verified identity). The use of encryption, certificate management and signatures is also being reviewed.

The AdV's aim was to offer, in the absence of international standards or adopted specifications for rights management, a recommendation for the surveying and mapping authorities of the German Länder for applying a nationally standardised procedure for the protection of web-based geoservices.

In collaboration with the GDI-DE coordination agency, the AdV arranged for appropriate, short-term solutions for authentication and rights management to be examined as part of a test bed based on existing standards and taking into account various security levels and architectures. The short-term solutions focus on the use of existing technologies established over the long term that can be realised for low outlay. No consideration was given to the use of single-sign-on in this regard.

The AdV‘s examinations show that in principle, HTTP protocol-based authentication and secure communication is possible, as long as HTTPS is used for encryption and certificate management and HTTP Basic Authentication for user identification. In the interests of practicality for the user, a single-sign-on for an organisation-wide authentication and rights management system is the preferred long-term solution. The examinations performed in this regard are realised using prototypes on test bed at the GDI-DE.

# 6. Public Relations and Marketing Task Force

*All spatial planning and decision processes require geospatial reference data to link the relevant technical information to the corresponding location on the earth's surface. This geospatial reference data come in the form of descriptions, which are not specific to any particular interest or application, of the topography of the earth's surface (surveying and mapping) and of real estate (real estate cadastre). In order to ensure the availability of geospatial reference data and services for the government, for business, for science and society, the surveying and mapping authorities of all the German Länder are under a legal obligation to collect, manage and provision geospatial reference data.*

## Requirements

The constitutional and legal responsibility for official surveying and mapping lies with the German Länder. However, because the need for many spatial applications goes beyond the provisioning of geospatial reference data within a German Land, a nationally standardised, current and high-quality database must be stored and made accessible to the "geomarket" and to the interested public. The use of digital geospatial reference data continues to spread in administrative units and in industry. The surveying and mapping authorities are taking account of this development with application-based changes in the way data is provisioned: In addition to output on data carriers, web-based data provision has become standard. The surveying and mapping authorities provide digital databases with different characteristics for searching, viewing and for downloading, as well as technical aids, via geoportals, geoservices and geoviewers. The metainformation system provides data on availability, characteristics and points of contact for the products.

To enable a nationally standardised product range, the distribution points are networked and provision is standardised. Certain product groups are currently provided throughout the country in a harmonised manner at in three central distribution agencies: the central agency for house coordinates and house surroundings, the central agency SA*POS*® and the Federal Agency for Cartography and Geodesy (BKG), which also supplies government institutes with geospatial reference data.

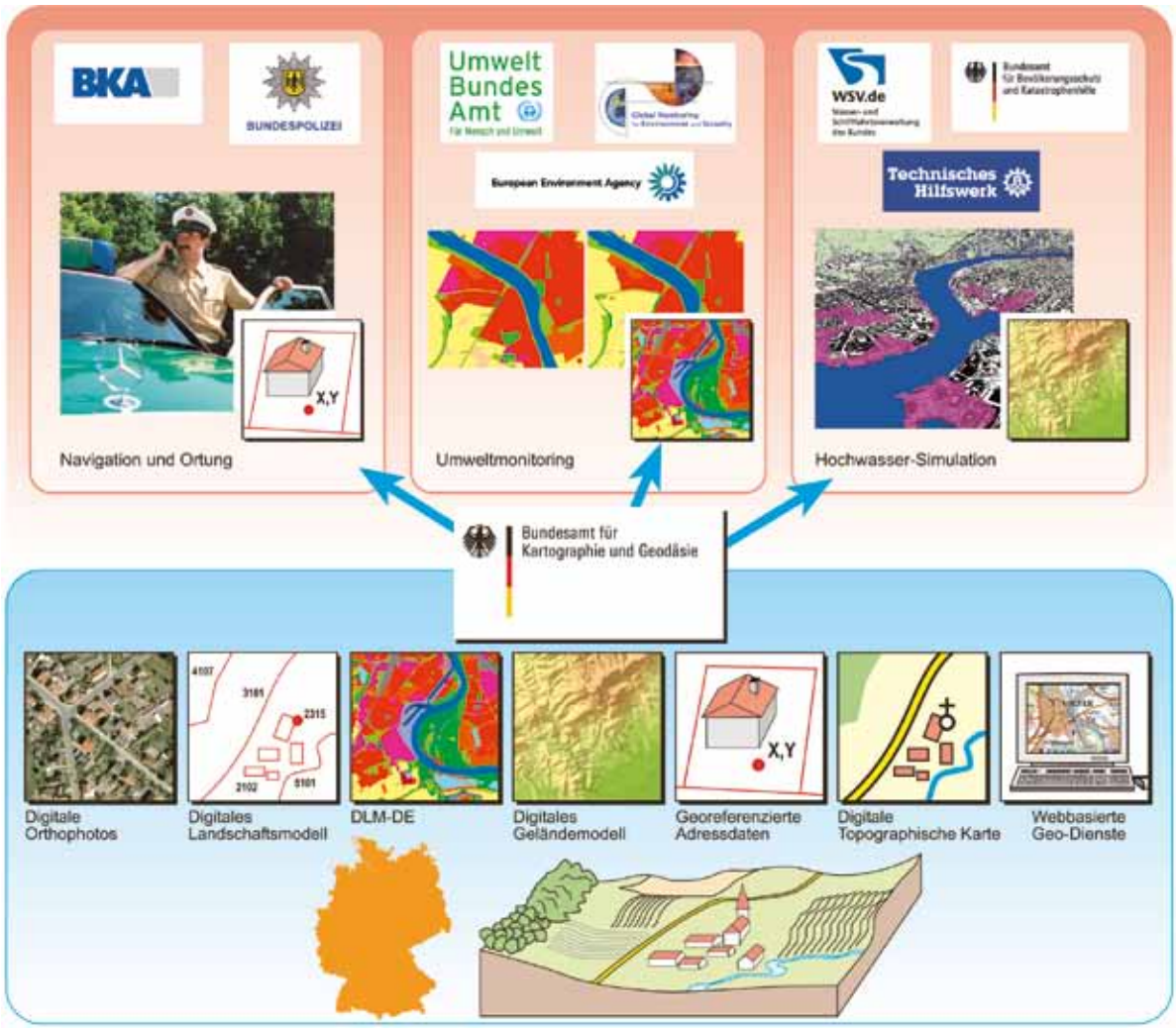


*Fig. 13: Central supply of government institutions with geospatial reference data by the BKG geodata centre*

To achieve the goals of optimally satisfying the national requirement over the long term and standardising the provisioning of products for Germany‘s official surveying and mapping, the Public Relations and Marketing Task Force (TF PRM) of the AdV performs, with the involvement of the member authorities and the task forces of the AdV, the operative PRM tasks to ensure that geospatial reference data is available throughout the country. In doing so, the following subject areas must be covered:

- Surveying and recording government and social requirements for the collaboration and matching these requirements to the geospatial reference data product range (needs survey and needs analysis),
- Maintenance of the licence and fees models and model licence agreements, as well as execution of model-based licencing for the use of the geospatial reference data and services (conditions and distribution policy),
- Supporting activities for achieving a strategic and technical infrastructure for the provision and use of geospatial reference data and services,
- Implementing measures for information on the availability and usability of the geospatial reference data and services (product information) and
- Implementing measures for the (positive) perception of the Germany‘s official surveying and mapping and its national geospatial reference data product range (image maintenance).

# Services

*Needs survey and needs analysis*

To achieve optimum distribution of the geospatial reference data products, user and purpose oriented geospatial reference data products must be produced and provisioned as part of the official activities of the surveying and mapping authorities. In order to obtain the requisite information about users‘ needs and requirements for the geospatial reference data (product, intended use, product satisfaction), for the provisioning conditions and product information (information and contact channels to the surveying and mapping authorities), the central distribution agencies conducted a user survey based on a standardised questionnaire during 2009 and 2010 and analysed the results jointly with the TF PRM. The needs survey is being redesigned in 2011. It will then be conducted only online and not using questionnaires as part of user discussions.

*Licence and Fee Model*

To regulate rights of use in connection with the provision of the geospatial reference data and services, there is a need for a clear and simple, nationally standardised licence and fee model that satisfies current requirements and regulates the use of all currently offered geospatial reference data products. Germany‘s official surveying and mapping authority has approved the guideline for fees for the provision and usage of geospatial reference data of the surveying and mapping authorities of the German Länder (AdV fees guideline) that meets these requirements, and published it at www.adv-online.de. It is used by the central distribution agencies and implemented in the individual German Länder. To guarantee a standardised and proper design of the AdV fees guideline, the TF PRM has developed a series of recommended actions. The TF PRM updates the licence and fee model according to AdV‘s requirements and in consultation with the task forces, if the AdV fee guideline has to be adapted to keep abreast of technical advancements and in line with user requirements. The TF PRM is currently investigating the extent to which the fee tariffs can be simplified for external use by applying transparent and flat rate regulations, and also how area and time-based flat rate models for download services can be developed. Furthermore, the TF PRM sees itself as communications platform for the distribution agencies of all surveying and mapping authorities and for the joint distribution agencies. It also supports the sharing of knowledge regarding the application of the AdV fee guideline.

*Model Licence Agreements*

Given that the nationwide provision of geospatial reference data and services continues to be standardised and that the surveying and mapping authority community, with its nationwide provision of geospatial reference data, is being increasingly perceived as a supplier community, the TF PRM has updated the standardised model licence agreements for complex applications and the General Terms and Conditions of Business and Use (AGNB). A small sample agreement with reduced content, intended for simple cases of geoproduct licencing, has also been developed. These sample agreements are used in the central distribution agencies and are recommended for licencing within the Länder. The interested public can view and download them from www.adv-online.de and use them for its own purposes. Currently, the TF PRM is developing simple, click-on model texts for the licencing of geospatial reference services.

*Information Documents and Corporate Design*

To ensure that Germany‘s official surveying and mapping authority has a standardised appearance in both words and image, the AdV adopted a Corporate Design (AdV-CD) in 2009 and made it available to all member authorities. The AdV CD was optimised in accordance with practical requirements and released for use by the AdV President in March 2011. The updated version introduces the three new logos for AFIS®, ALKIS® and ATKIS®.


*Fig. 14: Logos for AFIS®, ALKIS® and ATKIS®*

AdV's information documents are created according to the design rules defined by Corporate Design. The purpose of the materials is to provide the interested public with information on the applicability and availability of the geospatial reference data products in the language of the geomarket concerned.

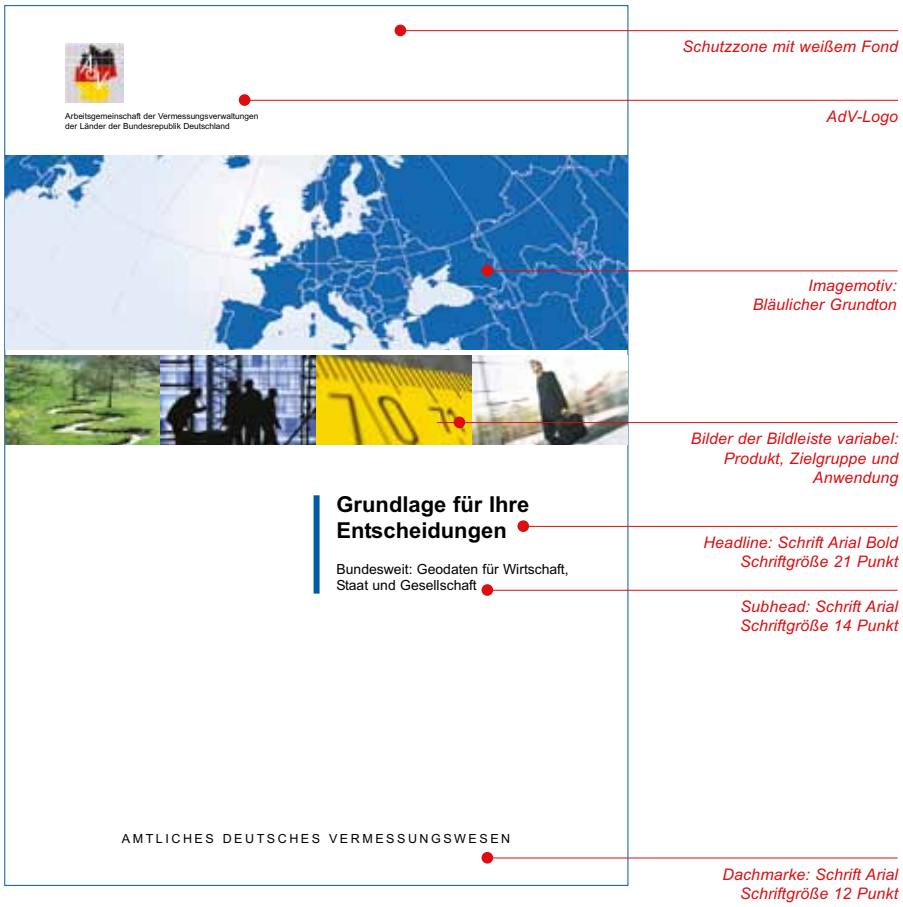


*Fig. 15: Design requirements for information documents*

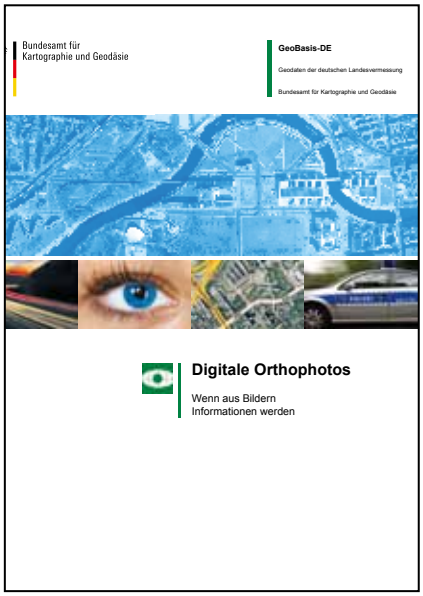


*Fig. 16: Product brochure for DOP*

Further product brochures and leaflets containing detailed information on the nationally available products are published in consultation with the AdV's task forces on this basis.

*Web portals and works of reference*

The AdV website provides information on its activities, product ranges and developments via a user-friendly interface. In a further step, the various product-related websites will be merged and adapted accordingly. AdV's presence in online works of reference is important because its role, tasks and product range can be widely communicated via this medium. The TF PRM is currently developing a procedure for linking www.adv-online.de with appropriate online works of reference.

*Public relations and trade fair appearances*

For the surveying and mapping authorities to be perceived in a positive light, public relations activities must be actively pursued, with appropriate media and effective public images being created for this purpose. The TF PRM has produced a geofilm describing the organisation, role and product range of Germany's official surveying and mapping authorities in a form suitable for a wide audience. To ensure it reaches this wide audience, it is published on the AdV website.

*Fig. 17: Joint stand of AdV at INTERGEO® 2010 in Cologne*

As part of establishing geospatial data infrastructures in the Federal Republic of Germany, the AdV endeavours to increase the awareness of the products (geospatial reference data) of the surveying and mapping authorities in the Länder. As in previous years, the official surveying and mapping authority - represented by the AdV - took stands at INTERGEO® 2010 in Cologne, the world's leading fair for surveying and mapping, and also at other trade fairs. In addition to the presentation of the products and services of the Germany's official surveying and mapping authority, supporting talks and discussion forums were also held.

# 7. Involvement in national and international organisations

## EuroGeographics

EuroGeographics is the non-profit association of the national authorities that are responsible for performing geodesy, cartography and cadastre tasks. The collaboration for EuroGraphics comprises the development of cross-border products, as well as joint task forces and projects. A key goal of EuroGeographics and its members is to promote the establishment of a European geospatial reference data structure under INSPIRE by developing joint specifications for spatial reference data.

Under EuroGeographics, the BKG is involved primarily in creating the products EuroBoundaryMap and EuroDEM in the capacity as project manager, for EuroGlobalMap as regional coordinator and for EuroRegionalMap as partner. The BKG is also represented on the projects State Boundaries of Europe and ESDIN.

EuroBoundaryMap (EBM), a pan-European reference database for administrative units from Länder to local authority level, was first published in 1993 on the basis of a specification developed by the BKG and since then, has been advanced and continued by the BKG for and on behalf of EuroGeographics on the basis of data supplied by the participating European countries.

EBM is offered in the application scale 1:100,000, as well as in various GIS formats. For the local administrative units of all EU countries, EBM also contains a reference to both the key figures of the national statistical agencies and also to the current NUTS classification (Nomenclature des Unités Territoriales Statistiques), which is published by Eurostat. These links guarantee interoperability between these pan-European geographic database of the administrative units and statistical information. In addition to the submission by the countries, a so-called ”Full Europe“ version (all countries in one object type class) is also available. The two versions contain in addition the administrative regions at each national administrative level, and for the EU countries, also the LAU (Local Administrative Unit) and NUTS regions.

Under the Service Agreement between the European Commission or Eurostat and EuroGeographics, concluded at the end of 2005 and extended by one year in 2009, the BKG provided - in the form of annual EBM updates through to the end of 2010 - five products versions that complied with the contractual requirements of Eurostat and which were transferred to both the GISCO database and also to the Geoportal of the European Commission. During the period under review, the database was completed, with a closing date of 01.01.10 and

taking account of the current LAU and/or NUTS key figures, as EBM Version 5.0 and was submitted on time to Eurostat together with the updated metadata and documents.

In December 2010, EuroGeographics signed, following a new invitation to tender issued by the European Commission and/or Eurostat, a new four-year contract for the supply of a geographic database to all European administrative regions and statistical regional units. The BKG is responsible, on behalf of EuroGeographics, for the contractual provision of this pan-European reference database. This database is due to be updated this year to fall in line with the date for the national census.

EuroGeographics product websites offer for download to all interested parties, an example database and the product description, as well as the licencing conditions.

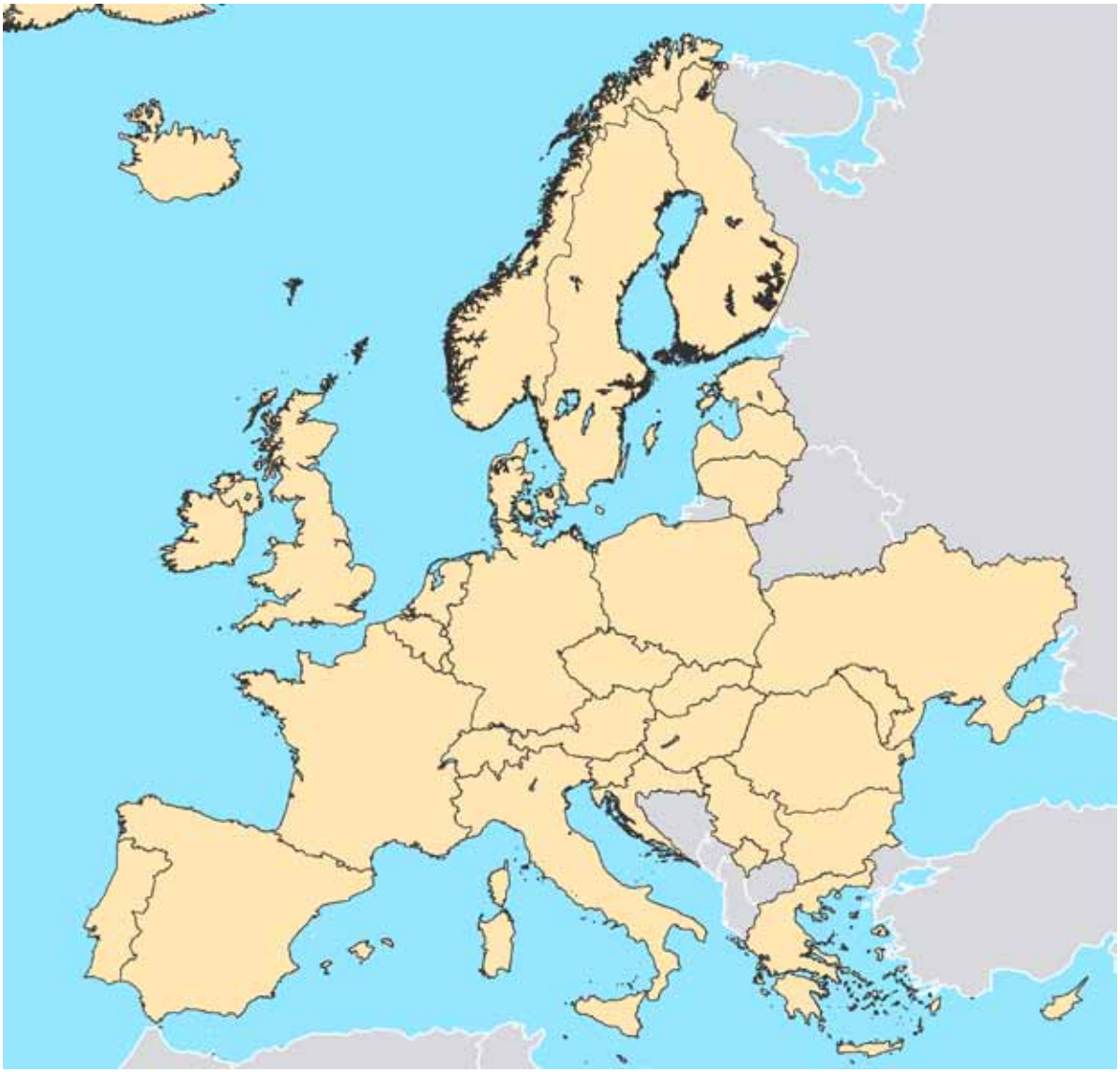

*Fig. 18: Countries covered by EBM v5.0*

The products EuroRegionalMap (ERM) and EuroGlobalMap (EGM), two pan-European, multifunctional, topographic reference databases in scales 1:250,000 and 1:1,000,000, have also been significantly improved in recent years with considerable support from the BKG (harmonisation of the specifications, conversion to the Geodatabase database format).

For 2009/2010, an update to the ERM database over two stages has been agreed with Eurostat. in 2009, the focus was very much on administrative boundaries, transport and settlements. The revised database was completed and delivered to Eurostat in April 2010. During the period under review, work concentrated on the topic of hydrography. The priority was to better harmonise and integrate the waterway network in Europe. This second partial update also comprises an additional European street classification for visualisation purposes. This database was delivered to Eurostat in December 2010. The two versions are to appear as a new edition of EuroRegionalMap in early 2011.

The BKG is involved in the State Boundaries of Europe project (SBE, formerly EuroBoundaries). The aim of this long-term project is the precise position capture of the state boundaries in ETRS89 coordinates. Development work on the data model is largely complete. The focus is now on data capture. The importance of the SBE database for other activities of EuroGeographics, e.g. for the products EBM, ERM and EGM, is undisputed. Although a number of EuroGeographics members have now signed the project agreement, the SBE database still contains only a few boundary sections. The BKG is endeavouring to make the corresponding German data available for the SBE project. This is achieved through the relationships with the border commissions concerned and with the relevant authorities of the German Länder.

EuroDEM is a digital terrain model of Europe designed for the scale range of 1:50,000 to 1:100,000. Since May 2008, this terrain model has been distributed by EuroGeographics after having been merged and harmonised by the BKG. It covers the territory of the EU27 states and a few bordering countries. The terrain model EuroDEM was merged from the databases of Europe‘s national cartographic authority, enabling a general height accuracy of 8-10 metres to be achieved. The database also exhibits a homogenous grid width of 2 arc seconds (~ 60 metres). Although no product updates are currently planned, an improvement of the resolution and height accuracy will be pursued in the long term.

ESDIN (European Spatial Data Infrastructure with a Best Practice Network) is a project being supported by the EU as part of its eContentplus programme. It was started in September 2008 on a term of 30 months. This project aims to improve the way in which national topographic reference data is merged to create European databases and to simplify access to this pan-European geodata via web-based services. The ESDIN Consortium comprises eleven national surveying and mapping institutes, four commercial partners and five partners from the academic sector. The BKG is applying itself to many of the twelve work packages, heads the work package ”ExM Data Specification (medium/small scale)“, is involved as a data supplier in specification testing and in implementing web-based access services. A specification for geodata with various levels of resolution was developed from the data specifications for the topics of INSPIRE Annex I and also for the existing EuroGeographics products EBM, ERM and EGM. This is the basis for transforming the existing EuroGeographics products into the new INSPIRE-compliant data model (Figure 19). During the period under review, activities also focused on developing a quality model for reference data and metadata guidelines. A web-based, semi-automatic evaluation system was developed to enable more cost-efficient reviews of national contributions to the pan-European databases. Boundary adjustment and generalisation rules were also devised. In future, these rules will permit a more effective pooling of national contributions at the borders and enable a small-scale reference database to be derived from higher-resolution data through a largely automated process.

The 10th General Assembly of EuroGeographics was held in September 2010 in Brussels. Herman van Rompuy, President of the European Commission, kicked off the Conference with an opening address. The General Assembly ended with a European Parliament visit. The primary focus of the Conference was the refinement of EuroGeographics and its projects against the backdrop of various initiatives such as INSPIRE, GMES and GEOSS. The medium-term schedule plan of EuroGeographics was discussed. This includes establishing a European Location Framework (ELF), the aim of which is to group EuroGeographics activities. ELF is based on the experience garnered from the ESDIN project. The working result of the various

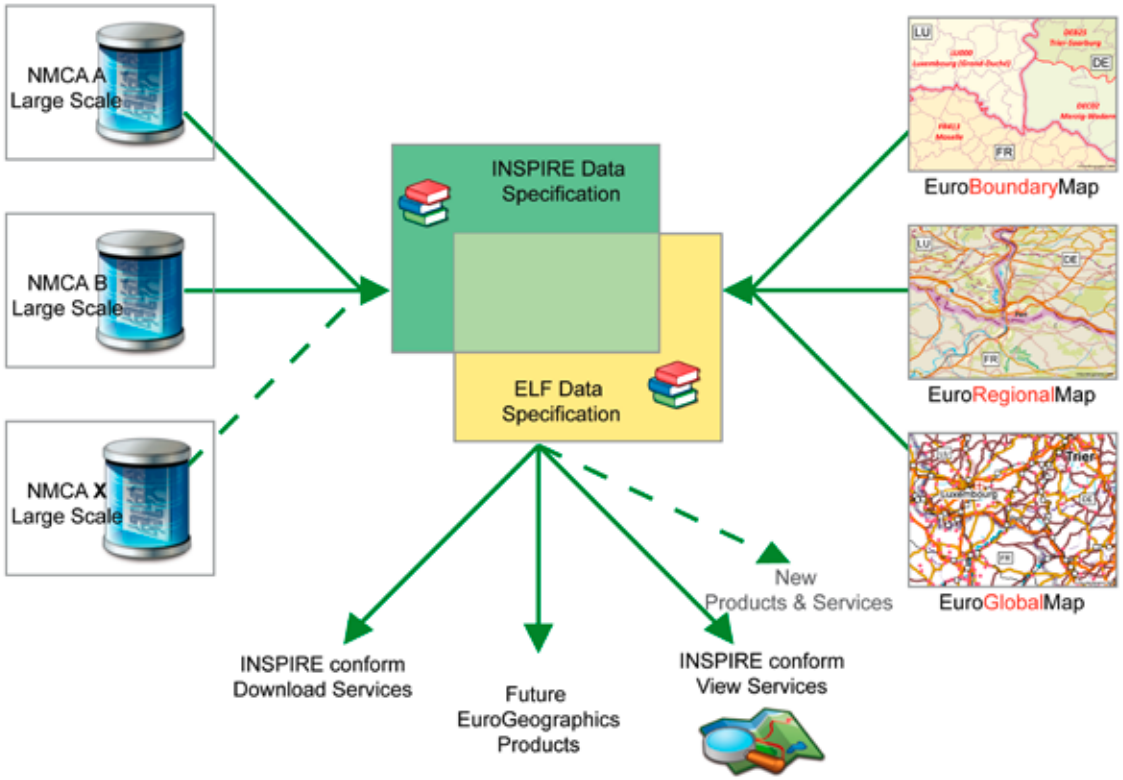


*Fig. 19: ESDIN: Migration of EuroGeographics specifications in accordance with INSPIRE*

projects were presented in a new form, with the BKG overseeing two tables at which EBM and/or EuroDEM were presented. The relocation of the EuroGeographics Head Office to Brussels called for a change in the legal structure. The General Assembly agreed a conversion to a non-profit organisation operated under Belgian law.

## European Infrastructure for Geographic Toponymy – EuroGeoNames

Since 2009, EuroGeographics and the BKG, in collaboration with the European surveying and mapping institutes, have been pushing ahead with the web-based infrastructure for official geographic toponymy in Europe as the "EuroGeoNames" project. The BKG acts as a "Service Center", maintaining the software components as part of this function. The BKG also continues to offer the national surveying and mapping agencies technical support and is also the point of contact for pilot customers on technical issues.

The main goal for 2011 is EU27 coverage. In addition, a business model for sustainability is being developed, support potentials are being investigated and a test platform for pilot customers has already been established.

The end user is already able to call-up information, either via the Gazetteer Service Interface (Web Feature Service - WFS) (http://www.eurogeonames.com:8080/gateway/gateto/anonymous-public) or via special web applications (e.g. via the "Reference application" http://www.eurogeonames.com/RefAppl/ or via the EGN ArcGIS expansion developed by ESRI: http://arcscripts.esri.com/). Other applications developed by private suppliers are expected and will be supported.

*General information on the EuroGeoNames project can be found at:* **www.eurogeonames.com**

## Open Geospatial Consortium (OGC)

The AdV is overseeing the ongoing development of the specification and description language GML – Geography Markup Language – (as ISO 19136-2, GML 3.3 is a new part of the existing standard), in order to guarantee the compatibility of this language for AAA® modelling (AFIS®-ALKIS®-ATKIS®). The medium-term aim is to refine the quality of GML 4.0.

## ISO/TC 211

The AdV is supporting the revision of Standard 19135 – *Procedures for item registration* in order to

- Guarantee the conformity of the XML encoding section (ISO 19135-2 – XML Schema Implementation – RegML – Registry Markup Language) and
- Contribute the experiences from the registry activities for coordinate reference systems.

## Permanent Committee on Cadastre in the European Union (PCC)

Belgium took over the presidency in the PCC for the second half year of 2010 on 1 July 2010. The General Assembly to conclude the presidency was held in Brussels. The contribution for the implementation guidelines from INSPIRE on the land parcel for "land use, land cover, buildings, orthoimages" data from Annex II and III, which relate to cadastre, was presented. The Secretary General represents the AdV in the expert group.

On 1 January 2011, Hungary took over the presidency for the first half year of 2011. The General Assembly to conclude the presidency which will take place in Budapest at the beginning of June. On 1 July, the presidency of the PCC will relocate to Poland for the 2nd half of 2011.


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