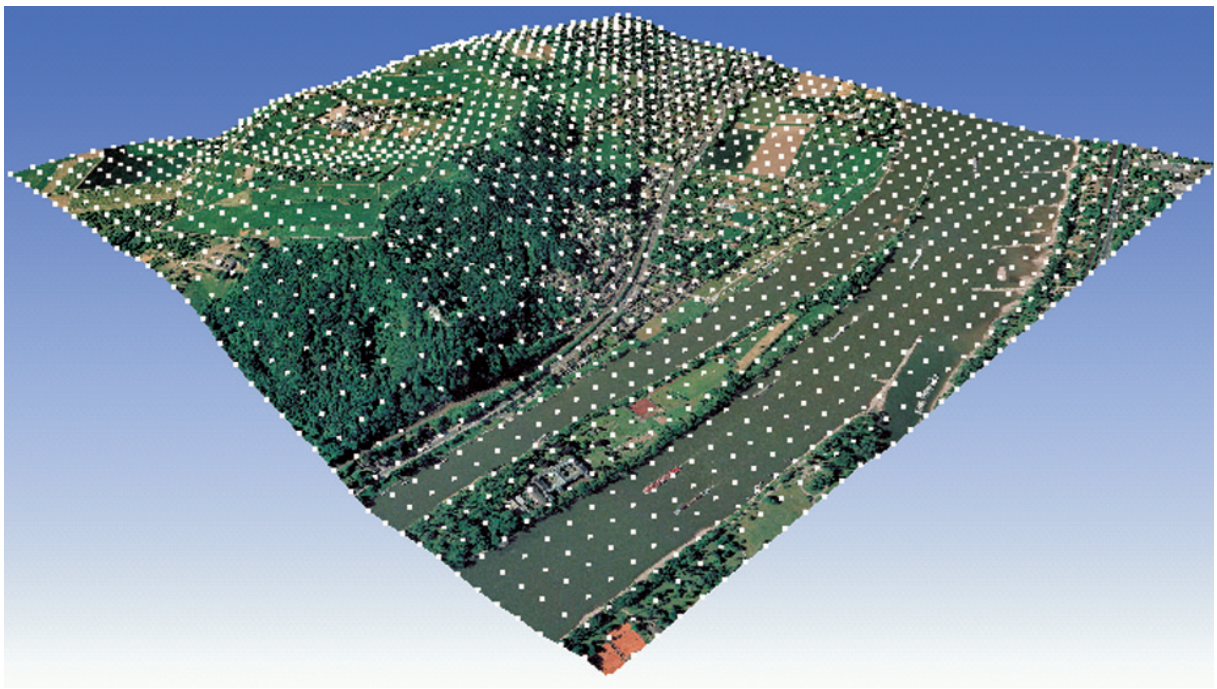
Working Committee of the

Surveying Authorities of the

States of the Federal Republic of Germany (AdV)



Progress Report 2003

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With the depiction of the landscape as performed and realised by spatial reference systems, maps and digital models in state survey and real estate cadastres, the states of the Federal Republic of Germany are working in close collaboration with the federal authorities to make an important contribution to the documentation of the earth's surface. They provide users with their geobasis data as service of general interest and as an infrastructure measure with due consideration for data protection regulations. The increasing number of major damaging events of recent times and risks that cannot be ruled out in the future have incited the AdV to clarify the involvement of official surveying and mapping in the management of critical damaging events, offer its data, products and services and explain how such are to be handled. Products and services of the surveying authorities are already widely used in damage provision.

The member authorities of the AdV continue to pursue the goal of opening and activating the market for geobasis data and related services.

With this in mind, the member authorities have entered into a product and distribution partnership with a private service provider: The central state agency established under the terms of an agreement of the states for the provision of satellite positioning data (central agency for **SA*POS*®**) has concluded an agreement with Ruhrgas AG which regulates the provision and use of the data of the **SA*POS*®** reference stations for the realtime positioning service of Ruhrgas AG. Other partnerships with customers involved in science and research are anticipated.

The marketing of geo-referenced building addresses is a further step towards strengthening the growing geoinformation market. As a first step, some states have merged with a view to providing this data centrally from one agency.

Within the Federal Republic of Germany, activities within the member authorities are focussing on implementing the AFIS®-ALKIS®-ATKIS® concept.

Besides these activities, the AdV is also working in collaboration with the Federal Agency for Cartography and Geodesy in European bodies and projects, such as the Institution of EuroGeographics and the EU Project INSPIRE.

The AdV is also intensively involved in activities of the Working Party on Land Administration (UN-ECE-WPLA) and the Permanent Committee on Cadastre (PCC). While the activities of WPLA extend across the whole of Europe, USA and Canada, the PCC deals exclusively with cadastral issues within the European Union, including the member countries.

The AdV submits its progress report for 2003 with this brochure.

Friedrich Wilhelm Vogel
President of AdV

Wilhelm Zeddies
Secretary General

1 Organisation

Official surveying and mapping in the Federal Republic of Germany belongs to the responsibilities of the 16 states (Länder). Based on authorisation by law or agreements between the administrations, third parties too are involved in the settlement of these tasks. The states are being supported by „Bundesamt für Kartographie und Geodäsie (BKG)“ (Federal Agency of Cartography and Geodesy) as well as by licensed surveyors and other administrative bodies at state or municipal level fulfilling the relevant staff requirements.

Survey and Cadastre Administrations of the States (Länder)

The majority of the survey and cadastre administrations of the states is assigned to the Ministries of the Interior of the states and shows a three-stage organisational structure. Whereas the state survey offices are responsible for supply of medium scale geobasis datasets, the local cadastre offices have to perform the tasks of the real estate cadastre and to provide large scale geobasis information.

The range of services of the survey and cadastre administrations includes:

- The permanently operating satellite positioning service - SAPOS®
- The geodetic control networks and their proof in the Authoritative Control Point Information System AFIS®
- The Authoritative Topographic-Cartographic Information System ATKIS®
- The task of furnishing proof on ca. 62 millions of land parcels within the official real estate cadastre (e. g. Automated Real Estate Map - ALK, Automated Real Estate Register - ALB and in the future Authoritative Real Cadastre Information System ALKIS®)
- The topographical map series, aerial photography and thematic mapping.

The state survey offices are responsible for establishment and maintenance of the topographical map series.

On behalf of the states, the Federal Agency for Cartography and Geodesy (BKG) is producing the topographical maps at scales smaller than 1:100000.

Federal Agency for Cartography and Geodesy

As a federal authority in the sector of the Federal Ministry of the Interior, the Federal Agency for Cartography and Geodesy (BKG) fulfils tasks in the field of geo-information and geodesy, in order to guarantee the responsibility of the government in this area. This applies specifically with the integration of surveying and geo-information systems within a continental and global framework.

On behalf of the states, it creates maps on a scale of 1:200000 or less and practices the distribution of cross-state geo-information. It also supports the use of high-accuracy satellite-based processes within the state survey authorities.

Geoinformation Service of the Bundeswehr

The Military Geographic Service and therefore the Agency for Military Geoscience and the Topography Corps, which essentially represented the contact partner for the state survey agencies, are being replaced by a new military specialist service. The Geoinformation Service of the Bundeswehr (GeoInfoDBw) and a new specialist area, Geoinformation Science of the Bundeswehr (GeoInfoWBw) are being established through the merger of the Military Geographic Service and the Geophysical Advisory Service of the Bundeswehr. From the forces platform (responsible for all cross-sectional tasks of the forces), the Agency for Military Geo Science, the Agency for Defence Geophysics, the Training Centre for Defence Geophysics and essential components of the Topography Corps facing disbandment are being merged to form the Agency for Geoinformation Science of the Bundeswehr (AgeoBw). The AGeoBw will generally be split between three main locations: Euskirchen (agency management), Traben-Trarbach (largely with the meteorological forecasting headquarters) and Fürstenfeldbruck with its education and training centre.

Overall, the new geoinformation service of the Bundeswehr comprises some 1900 service positions.

The primary objective, by combining the space factor (formerly MilGeo Service) and the environment factor (formerly Geo-physical Advisory Service), is to merge all geosciences significant to the Bundeswehr (geodesy, geography, geology, remote reconnaissance, cartography, geoinformation, 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 space-related tasks of the Bundeswehr can be guaranteed.

E-Mail: **AGeoBwNatInt@Bundeswehr.org**

Contact addresses of the responsible authorities and organisations as well as further information can be retrieved from the following websites:

AdV (Working Committee of the Surveying Authorities of the States of the Federal Repulic of Germany) **www.adv-online.de**

BKG (Federal Agency for Cartography and Geodesy **www.bkg.bund.de**

ÖbVI (Association of Licensed Surveyors of Germany) **www.bdvi.de**

ArgeLandentwicklung (Bund-/Länder Task Force for Rural Development) **www.landentwicklung.de**

Research & Development: DGK (German Geodetic Commission) **www.dgfi.badw.de**

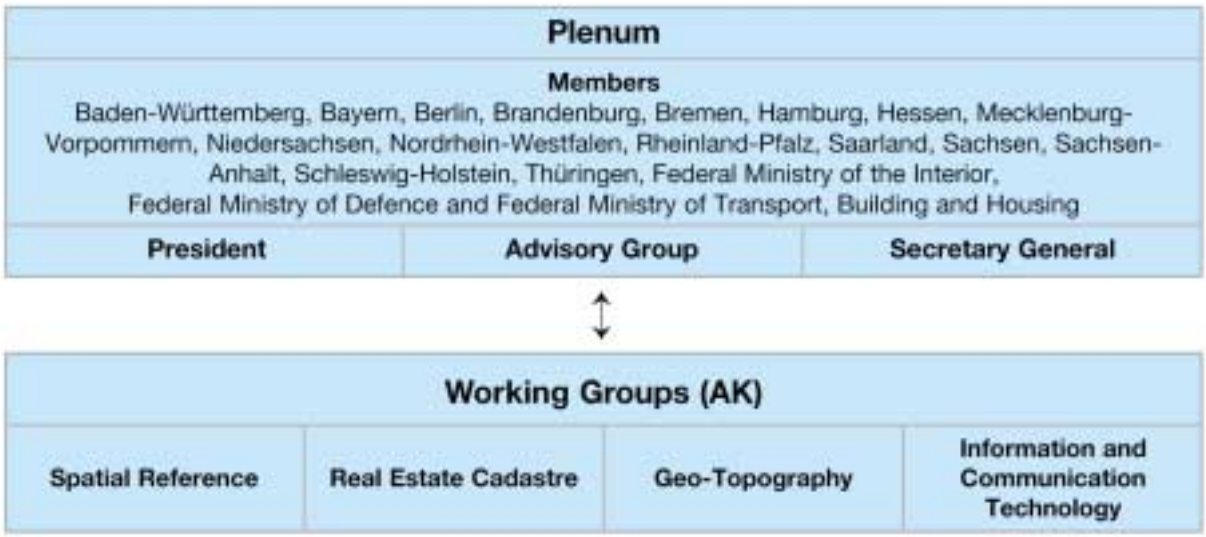
Fig. 1: Homepage of AdV

The relevant administrations of the states of the Federal Republic of Germany responsible for official surveying and mapping, and the Federal Ministries of Defense, of Transport, Building and Housing and of the Interior have joined together in the „Working Committee of the Surveying Authorities of the States of the Federal Republic of Germany (AdV)“ to work on matters of principle or of national importance. Permanent guests of AdV are the German Geodetic Commission (DGK), representing the universities, education and scientific surveying and the Bund/Laender Task Force for Rural Development (ArgeLandentwicklung), responsible for land consolidation and rural development in Germany.

Responsibilities od AdV:

- Elaboration of recommendations and binding regulations for a uniform approach to establishment, maintenance and further development of the geodetic basis, of the topographic survey, of ATKIS®, of the topographic map series and of the real estate cadastre,
- Joint carrying out of state-overlapping projects,
- Cooperation in development and application of new technical methods,
- Comments on draft bills,
- Discussion of questions related to organisation, staff, training, examination and discussion of issues concerning costs, licensing and use rights,
- Cooperation with relevant authorities and administrative bodies and institutions of geodetic science and education,
- Representing the interests of the official surveying and mapping in the European Union and in international institutions, and
- International cooperation, also in the field of development aid.

Working Committee of the Surveying Authorities of the States of the Federal Republic of Germany (AdV)



2 Recent Work of the AdV

As part of dealing with special issues and taking a uniform, cross-state approach to problems, the bodies of AdV concentrated essentially on the following key activities during the reporting period.

Spatial Reference

The Satellite Positioning Service SA*POS*® is a modern technology providing Germany with a standardised spatial reference. The traditionally marked control networks are becoming less important for the geo-referencing of object points.
With the current status of the Satellite Positioning Service SA*POS*®, users can work extensively with both realtime corrections as well as with data for a later calculation in post processing. Especially through the nationwide networking of SA*POS*® reference stations, accuracies of better than 2 cm are achieved with realtime position determination.
SA*POS*® enables height determination in the reference system in realtime with an accuracy of around 2 to 3 cm.

Satellite Positioning Service of the German State Survey SA*POS*®

SA*POS*® is operated as a joint project by the Working Committee of the Surveying Authorities of the States of the Federal Republic of Germany (AdV).

The declared objective of SA*POS*® is to provide through modern technology a standardised, homogenous spatial reference system for all tasks of surveying, mapping and cadastral purposes and also for other applications. This should be regarded as part of the legal remit of the surveying authority and serves the infrastructure-based supply for all citizens.

SA*POS*® is based on a network covering the needs of more than 250 GPS reference stations that are intended as control points of the state survey within the standard reference system of the European Terrestrial Reference System 1989 (ETRS89). All planned SA*POS*® reference stations have been in operation since early 2003.

SA*POS*® offers its customers four distinct applications with varying degrees of accuracy. The strongest demand is for SA*POS*®-HEPS, the realtime positioning service with centimetre accuracy. Given its significance, in 2001 the AdV decided on a future-facing, standard regulation of this service; this has now been implemented.

The transfer medium and data format were standardised across Germany.

Realtime networking was introduced to enhance the reliability and accuracy of the realtime service SA*POS*®-HEPS. It solves the problem of residual errors caused by the influences of lonosphere and troposphere and also errors in the orbital data by transferring the measurements from the reference stations to a calculation centre. This centre calculates error models by simultaneous calculation, which are then used to determine distance-independent correction data. Regarding networking, the ruling states that as an obligation the method of the area correction parameters (FKP) and as an option the method of the virtual reference station (VRS) will be introduced. The network was to be realised by 31.12.2002 (Fig. 2).

Because the co-ordinates of the SA*POS*® reference stations did not fulfil the accuracy required for the network, in 2002/2003 the AdV carried out a diagnostic adjustment of the entire SA*POS*® network of the Federal Republic of Germany. This adjustment has provided a homogenous co-ordinate set for all SA*POS*® reference stations.

To improve economic efficiency and acceptance of **SAPOS**®, AdV has also launched two projects, one to set up a central **SAPOS**® agency for data marketing and the other to develop the geodata market through Public Private Partnership (PPP).

The central **SAPOS**® agency was set up in the LGN (State Survey and Geobasisinformation Lower Saxony) in Hannover. Its task was the nationwide merging of **SAPOS**®-data from the state centres, a nationwide provision of **SAPOS**®-data for users and the granting of nationwide rights of use and levying the charges. This central **SAPOS**® agency supports the AdV in the co-ordination of nationwide activities. It is to be the contact and negotiation partner for users throughout Germany and is also used for the exchange of **SAPOS**®-data between the states in line with their requests.

In April 2003, the central **SAPOS**® agency formed an initial PPP co-operation for referencing nationwide **SAPOS**®-data. This will enable mutual use of the existing potentials for operation and marketing.

Deriving Official Heights from GPS-Measurements within the German Height Reference System

There are two useful approaches to deriving official heights from GPS measurements within the German height reference system:

- Use of a quasi geoid or
- Use of a digital finite element height reference interface (DFHBF).

After almost 10 years of joint activity, the BKG in collaboration with the state surveying authorities created a combined satellite-geodetic-levelling quasi geoid, which enables a transformation between GPS heights in ETRS89 and official heights in DHHN92 (NHN) with a 2 cm accuracy. Using an interpolation program, this quasi geoid is able to retrieve official heights throughout Germany and without correction at any point in DHHN92 from GPS heights in the 1-2 cm accuracy range.

The satellite-geodetic-levelling quasi geoid is split into 4 sections and is also offered on CD-ROM as data media. It is presented in the form of a data file with a grid width of 1’ x 1.5’ (approx. 1.8 km x 1.7 km) and covers the whole of the Federal Republic of Germany. Geo-referencing occurs controlled in ETRS89 in relation to reference ellipsoid GRS80 and at level heights in DHHN92. Interfaces with firm software from various hardware manufacturers are planned.

For various reasons, a qualitative distinction must be drawn between the area of the new and the old federal states, because strictly calculated normal heights and surface-related gravity values are not available in some cases.

The digital finite element height reference interface (DFHBF) presents itself as a second calculation option. This is realised in the states of Baden-Württemberg, Hessen, Rheinland-Pfalz and the Saarland. The fundamental concept behind the DFHBF is based on approximation of the height reference interface through a close-meshed, constant Finite Element Model (NFEM(p|B,L)). Bi-variant polynomes provide the carrier function of the individual meshes. The DFHBF is stored surface-related in a database. Measurement and calculation takes place online and without using control points.

The **SAPOS**® service is particularly economical to use for this application. Most GPS manufacturers offer interfaces from their calculation software to the DFHBF.

The DFHBF production software enables calculation of any kind and size (German-wide to European-wide) DFHBF from ellipsoidal heights h, height base line Δh, official height H, levellings ΔH as well as any geoid models (height N, deflections η, ξ) as least square adjustment. Systematic error proportions in the geoid models are eliminated by splitting up with individual datum. The model is adapted to scale in order to take into consideration errors in the height network with the inconsistencies of geo-referencing.

Fig. 2: Overview of the realtime network

Real Estate Cadastre

The demand for data of the real estate cadastre continues to increase. Users of this data are calling for closer consideration of their requirements in terms of quality and topicality of products and the way in which the data is provided. The market-oriented provision of geobasis data is a key issue for management of the future-oriented real estate cadastre.

Standardising the real estate cadastre

The technical concept behind ALKIS®, the Authoritative Real Estate Cadastre Information System, has been finalised. The data model is maintained in the AFIS®-ALKIS®-ATKIS® revision committee of the AdV. The ALKIS® object catalogue includes the nationally standardised specified master data based on the key tasks of the official surveying and mapping and considers the requirements of the real estate cadastre user.

Fig. 3: ALKIS®-master data

The ALKIS®-object catalogue comprises all the information appearing in the real estate cadastre of all the federal states, thus guaranteeing data standardisation. The state-specific selection of objects stipulates a sub-quantity of the maximum scope. The management of nationally stipulated master data is an compulsory requirement.

The products of the AdV are identical in terms of content and therefore make an essential contribution to a closed appearance of the surveying authorities of the states.

The stipulation of the standard-based exchange interface (NAS) has defined a nationally standardised data provision format on the basis of internationally recognised GIS standards.

Product Potential of the Future-Oriented Real Estate Cadastre

The Real Estate Cadastre Working Group (AK LK) is in the process of defining the data for the real estate cadastre taking as a whole the geobasis data of official surveying and mapping in line with market requirements. Which particular agency within official surveying and mapping holds the data is no longer relevant, data is now distributed efficiently via a central agency (e.g. geodata centres of the states) and of course online.

The information of the real estate cadastre alone, which is offered either in the form of the nationally unified standard output (e.g. real estate maps and register of land parcels) or standardised outputs on state level (e.g. list of buildings and control points), far from exhausts the potential product spectrum. Further outputs, which can be automatically generated by combining or selecting various existing geobasis data, in most cases for little expenditure (e.g. a combination of ALK/ALB and ATKIS®), considerably expand the product spectrum.

In addition, the real estate cadastre must satisfy the requirements of modern statistics both in terms of content and evaluation options. The AK LK works in close collaboration with the Federal Statistical Agency towards optimising systems in this area.

Provision of Standard Real Estate Values and Others for Determining Essential Data Values

Besides the authority, other sectors, e.g. banks, insurance companies, real estate funds and national insurance carriers have a huge demand for central and immediate provision of geo-referenced and affordable basis data with an evaluation relevance. The diverse links to geobasis information suggest that purchase price collation, records of past transactions and other data required for real estate valuation should in the future be managed as thematic data on the basis of ALKIS®.

The considerations of the AK LK can be summarised as follows:

A professionally-managed **purchase price collaction** must – besides the purchase-related factual data – also permanently reflect the legal and actual characteristics and the form and position at the time of acquisition. This is only possible on the basis of a customised, current and spatially referenced register of real estates.

The user of the standard real estate **value map** finds additional information on the parcel structure, the topography and type and dimension of the permitted structural usage of particular importance (Figure 4). To be able to assign records of past transactions clearly and comprehensibly to an area, the map must be geo-referenced and digitally managed. The latter is a crucial precondition for the use of modern distribution channels (Internet) for marketing.

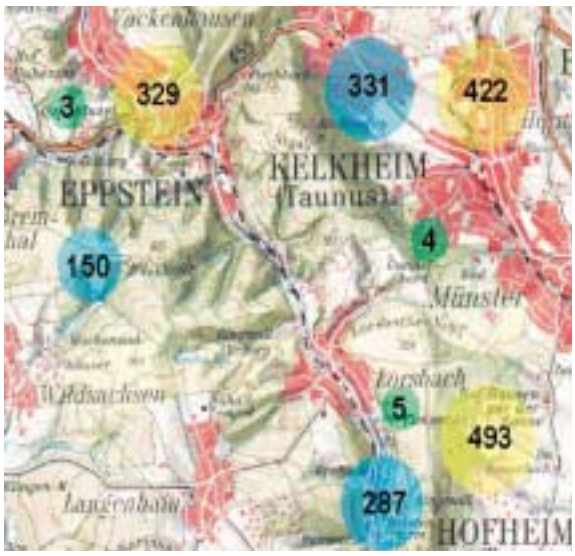


Fig. 4: Example of a possible graphic depiction: Overview of the records of past transactions values
(Scale = 1:100 000)

The digital management of **schedule of purchase prices** and the records of past transactions values is required for further development into a **value determination information system**. This also contains the **other data required for value determination** to be derived in accordance with § 193, subsection 3 of the BauGB (index series, calculation coefficients, real estate interest rates and comparison factors).

Submission of Cross-state data (e.g. „House co-ordinates“)

The user and market orientation of the future-oriented real estate cadastre requires that data of the real estate cadastre extending beyond the limits of a particular state should be obtainable from one source and at low cost. The preconditions are regulations regarding standard data formats (NAS), standard costs and central contact partners.

For the „House co-ordinates“ product (geo-referenced building addresses), an authority agreement is in preparation, which enables cross-state data to be obtained. An agency, e.g. state survey office, distributes data on behalf of the states that have signed this management agreement and concludes contracts with the end customers.

Fig. 5: Depiction of the house coordinates combined with the street axes (from ATKIS®) and the digital orthophoto

The submission of house co-ordinates is cited simply as an example of many other data of the real estate cadastre. The creation of simple distribution channels that are transparent for both customer and user enhances the potential for using the data of the real estate cadastre and affords the data the status they deserve from an objective point of view. Online distribution channels already available in many states also make a significant contribution in this regard (Fig. 5).

Geotopography

The necessary increase in topicality and customer-oriented distribution of geobasis data continue to represent additional challenges for the surveying authorities. With the completion of the „Geodatenzentrum“ (geodata centre) at the BKG and the progress in specific state „geodata portals“, data and metadata can be offered to a wider circle of users. Now as ever, an animated exchange of ideas regarding dealing with access conditions and extending usage conditions is pending. The draft concepts and strategies for the increasing topicality of geobasis data are being put into practice.

Digital Landscape Models

The structure of the digital landscape models and their current management continues to be a key task of German state surveying. Due to the high level of public and private interest in a standardised Germanwide ATKIS®-Basis-DLM as an integral component of the national geotopographic database, the state surveying authorities have set the objective of completing the third and final implementation stages by the end of 2006. The database of the ATKIS®-Basis-DLM is the platform from which small-scale digital landscape models ATKIS®-DLM50, 250 and 1000 and digital topographic maps to scales of 1:10000 and 1:25000 are derived.

The ATKIS®-DLM250 created in the BKG is now widely available in the first realisation phase and is updated annually. Its content is continuously expanded for linking thematic data and for preparation of the EuroRegionalMap. ATKIS®-DLM1000, also widely available, is currently being updated and expanded in terms of content, thus satisfying the preconditions for linking hydrological technical data to inshore waters on the basis of the EU water framework directive. ATKIS®-DLM1000 also serves as a basis for the German contribution to the EuroGlobalMap.

The state surveying agencies and the BKG endeavour to safeguard the topicality of crucial topographic data in the sub-year area. They are therefore setting up a close co-operation with the parties responsible for the topographical changes and also using photogrammetric and computer-controlled terrestrial reconnaissance systems.

In connection with developing the object catalogue, the semantic agreement was made as a precondition for creating and maintaining ATKIS®-DLM50 from the ATKIS®-Basis-DLM as part of model generalisation. The purpose of modifying the object map catalogue for ATKIS®-DLM250 and ATKIS®-DLM1000 is to achieve complete semantic consistency of the ATKIS® landscape model and create the opportunity for a continuous model generalisation.

Digital Terrain Model (DTM)

The state surveying agencies use digital terrain models with varying levels of accuracy. As a result of its computerised merging in the BKG, a homogenous DTM with a height accuracy of ± 2 m is currently being developed for the area of the Federal Republic of Germany. This ATKIS®-DGM-Germany will be available in all states by the end of 2003.

Following an evaluation of the high-water catastrophes in the Donau, Elbe and tributaries in August 2002, initiatives have been introduced with a view to avoiding or at least reducing future claims based on flooding in federal territory. One of the initiatives focuses on recording and holding data for reliable high-water simulations, which are provided for use by the responsible federal and state authorities and the „German Emergency Provision Information System“ (deNIS). This requires that highly-accurate, surface-related height data (standard height deviation 0.2 to 0.5 m) are to be created for the potential flood areas of federal territory in close co-operation between the BKG and the responsible state surveying agencies and integrated into ATKIS®-DGM-Germany.

Digital Topographic Maps

The currently available digital landscape and terrain models provide the states and the government with the tools for deriving the topographic map book on the basis of new map graphics documented in the ATKIS® signature catalogues. While new digital topographic maps (DTK) to scales of 1:10000 and 1:25000 already make up a large part of the state surveying agencies' product ranges, the map graphic for the DTK 1:250000 and 1:1000000 is currently under development (Fig. 6). This will consider the prerequisites of the EuroRegionalMap 1:250000 and EuroGlobalMap 1:1000000 jointly designed by EuroGeographics for Europe, as well as military-geographic requirements.

ATKIS® component DTK has not previously provided for the continued holding of the topograpic map book to 1:100000. Given the significance of this map book for the most varied of tasks at government level and as a basis for deriving regional, planning and leisure maps, the federal government and its states agree that in future the states are to derive from ATKIS®-DLM50 also the „Digital Topographic Map 1:100000" (ATKIS®-DTK100) and on this basis, the joint civil/military map book „Topographic Map 1:100000" (TK100) will be published.

Fig. 6: First sample of the new digital topographic map scaled to 1:1000000 (ATKIS®-DTK1000)

Interactive topographic maps on CD-ROM

The CD-ROM series published for the whole of Germany by the federal government and its states, which presents via software the raster data of the topographic map 1:50000 and topographic overview map 1:200000 under the trademarks ***Top50*** and ***Top200***, enjoyed continued success on the market in 2002. Especially the new version 3.0, which is typified by extended functions and the depiction of the third dimension contributed to this success. Version 4.0 for simulating flights over the landscape is under development and will be published in 2003/2004.

Toponymy

The Permanent Committee on Geographic Names (StAGN) contributes to the standardisation of official and private use of geographic names by publishing documentation, recommendations and directives. Besides correct spelling, a clear spatial assignment of geographic names is also of a special significance. The recent BKG publication „Landscapes" of the map book „Federal Republic of Germany 1:1000000" documents the current result for the designation and spatial assignment of geographic names (Fig. 7).

The StAGN also records names in the German coastal waters. It is intended to update and publish this list in co-operation with the state surveying agencies of the coastal states. The publication will standardise the use of geographic names for the products of official surveying and mapping and for privately created cartographic products and thereby encourage the standardisation of geographic names demanded by the United Nations.

Fig. 7: Extract of the „Landscapes“ map of the „Federal Republic of Germany map book scaled to 1:1000000“.

Copyright and Sales

The geodata centre, from which the digital ATKIS® landscape and terrain models and the digital topographic maps will be distributed both cross-state and throughout Germany, has been established in the BKG. The download area of the geodata centre's Internet portal **www.geodatenzentrum.de** offers test data and a web-mapping server for direct access to data inventories and their spatial structuring. A link to the Internet portals and online shops of the states is guaranteed. An ISO standard meta-information system has also been set up. This will be supplied with metadata directly from the states and will also be networked with its own meta-information systems.

Public Relations Work, Trade Fairs and Exhibitions

The German state survey, represented by the AdV, regularly attends important trade fairs and congresses. The AdV is bringing together all states and the BKG and proactively involved in organising presentations and panel discussions. Most successful are especially the annual events INTER**GEO**® as central trade fair for surveying and mapping held in a different city each year and at the Frankfurt Book Fair (Fig. 8).

In line with the responsibility of the states for the official mapping and geospatial data, the state survey agencies are running their own media for public relations and advertising work. This includes primarily printed matter and webpages. In addition, AdV has its own webpage **www.adv-online.de**, which is linked to the homepages of all state survey agencies in Germany.

Fig. 8: Joint stand of AdV at INTER**GEO**® 2002 in Frankfurt

„Knowledge-based Photogrammetric-cartographic Workstation“ Development Project

As part of the „Knowledge-based photogrammetric-cartographic workstation“ (WIPKA) development project, various institutes of the University of Hanover collaborate with the BKG to define the concept of a Multiple Representation/Resolution Data Base (MRDB). The objective is the integrated hosting of all digital landscape models defined in ATKIS® and the automated maintenance of the digital models of medium and small resolution stages from the Basis DLM.

A further WIPKA sub-project is examining the integration of geobasis data and technical data to establish whether such technical data previously recorded from topographical maps can be related to changed geometries and object structures and therefore be rendered useful for the ATKIS® landscape models.

The development work for a quality control system of the Basis DLM from knowledge-based aerial photograph interpretation has progressed.

Information- and Communication Technology

Information and communication technology forms the technical interface between operations in the field of spatial reference, real estate cadastre and geotopography. For the period covered by this report, the activities of the AdV working group have focussed on information technology work as part of further developing the AFIS®-ALKIS®-ATKIS®-concept for the modelling of geoinformation of official surveying and mapping activities focussed on developing the AFIS®-ALKIS®-ATKIS® basic schemes (AAA-basic scheme), the further development of the standard-based data exchange interface (NAS) and the conception and implementation of the AdV quality assurance system.

Version 2.0 of „Documentation on modelling the geoinformation of official surveying and mapping – GeoInfoDok“, the result of a comprehensive revision management with GIS manufacturers and users, has been published on the Internet under www.adv-online/neues.

Further Development of the AAA-Basic Scheme

The AAA basic scheme is the platform for the technical application scheme for modelling the AFIS®, ALKIS® and ATKIS® objects and for the process of data exchange. Being a neutral entity, other technical information systems can also use the classes defined in the basic scheme for modelling (e.g. land register, state development).

The AFIS®-ALKIS®-ATKIS® application scheme (AAA application scheme) is one of the first specialist information systems based entirely on ISO standards. The ISO-compliant modelling of the AdV has been presented and recognised during the reporting period internationally at various ISO workshops (e.g. „Standards in Action“) and as part of European standardisation projects (e.g. „EuroSpec“ of EuroGeographics).

Further Development of NAS

The AdV contributed to the consultations of ISO/TC 211 and OGC, the technical expansions required by the AAA Application Scheme to harmonise the ISO 19118 XML Encoding-Rules and OGC GML (Geography Markup Language). The objective is for the scheme definition to achieve GML conformity with ISO 19118 Level 2 for NAS.

Version GML 3.0 approved by the OGC in January 2003 has served to upgrade the encoding specifications for standard parts, most importantly for the geometry scheme, to such an extent that all NAS-relevant requirements are now included in GML. A project is currently being started within ISO, the objective of which is to transfer GML 3.0 into the ISO standards. The AdV will actively participate in this project, in order to achieve conformity between ISO and OGC standards.

Conception and Implementation of the AdV Quality Assurance System

Through national regulation, designation and descriptive, qualitative quality features, AdV identifies and guarantees the quality of the products of official surveying and mapping. National topicality, uniformity, completeness and availability of the products are essential characteristics in this regard. The surveying authorities guarantee compliance with AdV product quality by standardised test procedures and declare conformity with the AdV standards. The objective is a comprehensive quality assurance for the geodata of official surveying and mapping.

The quality test aspects for the AAA application scheme, consisting of AAA basic scheme and AAA specialist scheme are shown in the following quality assurance model:

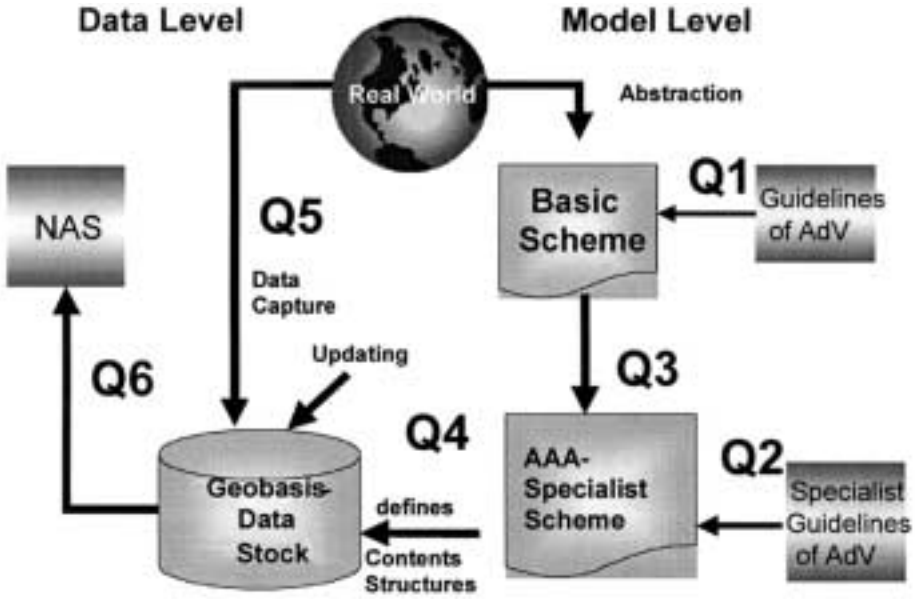


Fig. 9: Quality assurance model for the AAA application scheme

Q1 measures the AAA basic scheme against the strategic and specialist stipulations of the AdV, Q2 measures the AAA specialist scheme against the specialist stipulations of the AdV. Q3 determines whether the AAA specialist scheme corresponds to the regulations of the AAA basic scheme. Q1, Q2 and Q3 verify the conceptional, internal quality.

Q4 verifies the geobasis database inventory internally as a product for logical agreement with the AAA application scheme and compliance with the defined quality specifications, while Q5 compares the geodatabase external with the real world. Q6 relates the quality of the NAS to the user.

The quality assurance principles for Q6 assumes that when data is submitted from AFIS®, ALKIS® and ATKIS®, the created NAS files do not have to be checked against the model. The model-compliant implementation must guarantee this using the valid XML scheme file; interoperability must be guaranteed. Data acceptance is part of the qualification process. For this purpose, appropriate test tools, which using the valid XML scheme files, guarantee the quality of the accepted data in terms of correct form and validity must be available.

3 National and International Organisations

Setting up a European Spatial Data Infrastructure (ESDI)

The project entitled Infrastructure for Spatial Information in Europe (INSPIRE) of the DG Environment & Eurostat is on behalf of the European Commission preparing a legal initiative, which is to obligate EU Member States from 2005/2006, to provide national geodatabases for the purposes of creating a geodata infrastructure for Europe. The Federal Republic of Germany has actively participated in the technical discussions within a group of experts through Dr. Bilo – BfN (Federal Agency for Environmental protection), Prof. Grünreich (BKG) and Dr. Riecken (LvermA NRW). The BKG actively participates in several INSPIRE expert groups. A total of 5 position papers are being prepared. These can be viewed on the Internet at www.ec-gis.org/inspire.
Specifically, 17 subject areas (object areas) and approx. 60 subject groups (object groups) are proposed, which are to be made available across Europe on the basis of national geodata inventories.

EuroGeographics

EuroGeographics, the Association of the national authorities for Geodesy and cartography has set itself the objective of setting up the reference data (geobasis data) for a European geodata infrastructure and creating interoperability.

Within the context of EuroGeographics, the BKG co-operated mainly on the products **SABE** (Seamless Administrative Boundaries of Europe) as project co-ordinator, **EuroGlobalMap** as Regional Co-ordinator and **EuroRegionalMap** as partner.

During the reporting period, BKG created a new version of the SABE product (SABE2001/Census), which contains the harmonised administration records from 35 European countries, this data relating to the census datum in the respective country. Over and above the provision of data, the BKG offers existing and potential customers technical support, as well as a current user handbook and specimen data record on the website **www.eurogeographics.org/projects/sabe**.

In the BKG, the German contribution for EuroRegionalMap was derived from the DLM250 and several additional data sources. An initial version of this topographical, cross-border harmonised reference database comprises 7 countries.

Within the project EuroGlobalMap, the BKG as regional co-ordinator assumed responsibility for the integration, harmonisation and quality control for the contributions to the Netherlands, Belgium, Germany, Austria, the Czech Republic, Slovenia and Croatia. These activities were completed within the reporting period. The BKG also took on the task of developing an adaptation for the national online ordering and distribution system for the European data records.

The objective of the Research and Development Forum (R&D Forum) is to bring transparency to the Research & Development Projects of the individual national surveying authorities and to co-ordinate the process developments required to setup, update and prepare the ESDI. National project information can be collated and research can be carried out in the database setup for this purpose – ERDIN (EuroGeographics Research & Development Information Network).

The 2nd General Meeting of EuroGeographics took place in Frankfurt am Main in autumn 2002. The BKG was responsible for the organisation and implementation and was supported by the Hessian surveying authority and the AdV office.

Online Harmonisation of Topograpic Basis Data

The research project „Geospatial Info-Mobility Service by Real-Time Data Integration and Generalisation (GiMoDig)“ focuses on developing processing for harmonising, generalising, providing and visualising topographic data for mobile users in real-time. Partners in the project sponsored by the EU are the Finnish Geodetic Institute (project co-ordinator), the Institute for Cartography and Geoinformation of Hanover University, the BKG and the national cartographic authorities from Denmark, Sweden and Finland. The aims of the project include defining a common model for the topographic basisdata of the participating countries. As in initial step, the project partners examine the existing national databases and present the variances in availability and modelling. The processes required for harmonising the national data are integrated into the architecture of an Internet service and tested using a prototype.

Inter-ministerial Committee on Geoinformation (IMAGI)

IMAGI the Inter-ministerial Committee on Geoinformation was setup as early as 1998, with a view to improving the co-ordination of geoinformation within the Federal administration under the overall control of the Federal Ministry of the Interior. In accordance with the resolution passed by the German Bundestag of 14.02.01 **www.dip.bundestag.de/btd/14/053/1405323.pdf**, IMAGI continues its successful co-ordination and conceptual work towards achieving an efficient management of geodata by the government and developing a strategy to create the national geodata infrastructure.

In accordance with IMAGI's resolution of 17.4.2002, the geodata records of the national geodata base (NGDB), the services required for solving specialist tasks and the resources required to establish the GDI-DE are to be defined in pilot projects in relation to department and model.

To examine the complex issues on geometric and semantic interoperability, pilot projects have commenced and include specialist authorities of the state pilot projects.

The aim of pilot project „Conservation area information“ is the merging and harmonisation of redundant and extremely diverse databases on the subject of „conservation areas“ in public administration. Various federal agencies and specialist state authorities are involved in the „Conservation Area Information“ project group.

The pilot project „Emissions Inventory (Em-In)“ covers the balancing of CO2 sources / reduction and is necessary to avoid sanctions under the terms of international agreements (Kyoto, climatic framework agreement).

Following the successful development of the prototype GeoMIS.Bund **(www.geomis.bund.de)**, the GeoMIS.Bund end product is now being developed with basic functions of the GeoPortal.Bund. The effective operation is to commence in Summer 2003. It is envisaged that all government geo-metadata information systems will be incorporated by the end of 2003.

The government has acquired the rights to the authorship and use of the broker solution „GeoMIS.Bund“. On this basis, all interested states will be offered use of the software in return for the provision of metadata. In the AdV pilot project „Networking Meta-information Systems“, the responsible state of Hessen has proposed that networking be implemented on the basis of GeoMIS.Bund.

The IMAGI information leaflet, „Geo information and the modern state“, which has received wide acclaim from both the national and international public, has been re-published and is now accompanied by an interactive Demo-CD, which contains written information and interactive GIS examples, which clarifies the functionality of the GIS systems for the user. The brochure and CD can be obtained from the co-ordinating office of IMAGI at the BKG **(www.imagi.de)**.

8th UN Conference for the Standardisation of Geographic Names

In 2003, the Permanent Committee for Geographic Names (StAGN), whose principal task is to achieve standardisation of official and private use of geographic names in the German-speaking zone, was involved primarily in the technical preparation and staging of the 8th UN Conference.

This was held at the invitation of the Federal Government between 27th August and 5th September 2002 in the Conference Centre of the Foreign Office in Berlin. The Federal Ministry of the Interior transferred the organisation and financial responsibility for the preparation and staging of the conference to the BKG.

The Conference was attended by 282 delegates from 88 states, representing the highest ever number of delegates.

The Conference Agenda included the following topics:

- Toponymic directives and education
- Geographic name databases
- State names
- Exonymes
- Pronunciation
- Transcription
- Economic and social uses of standardisation.

A total of 205 conference papers were distributed and discussed. Germany contributed 14 conference papers, including 6 technical publications of the BKG and StAGN as appendices.

The conference resulted in 17 resolutions, two of which will also influence the creation of a national geodata infrastructure:

- Integration of Geographical Names Data into National and Regional Spatial Data Infrastructures;
- Assistance to the United Nations Geographic Information Working Group (UNGIWG).

The conference was accompanied by a three-part technical exhibition (topical, country and commercial exhibition), a training course in geographic onomastics and several specialist excursions. The exhibition was open to the public on two visitor days.

a) Technical Exhibition

The topical exhibition was staged under the motto „Standardisation of geographic names: Preserving the past – connecting with the future“. It focussed on six selected subject areas: The origin and change of geographic names, multi-lingual areas, transcription systems, exonymes, pronunciation, curios. The content of the exhibition is available on CD-ROM from the BKG on request.

As part of the country exhibition, 34 of 88 participating states exhibited their products with reference to geographic names or presented them in the form of short lectures during the conference breaks. Through its involvement in the state exhibitions, the AdV was offered a forum to present prototypes for projects ALK, ALKIS® and ATKIS® in connection with geographic names.

Solutions and options for a Geographic Information System (GIS) and digital cartography in the commercial sector were presented at the commercial exhibition for the following problem areas:

- Management and handling of geographic names in databases
- searching and finding geographic names in databases and on the Internet
- generalisation and selection of geographic names
- script positioning and consideration of multi-lingual data records (various fonts / text encryption).

b) Training Course on Toponymy

A 14-day training course toponymy was held in connection with the exhibition. 20 delegates from 17 developing countries attended the training course. A document on the content and order of the training course will soon be available.

Further Information:
www.bkg.bund.de/un-conference2002/geonames.htm

Working Party on Land Administration

Even during the previous reporting period, the AdV was making an active contribution to the activities of the Working Party on Land Administration of United Nations Economic Commission for Europe (WPLA). A representative of the AdV is a member of the steering committee (Bureau) of WPLA for the official period up to November 2003 and looks after the interests of the AdV within this body.

As well as the WPLA workshops held twice a year, a number of other activities will be carried out and supported by the AdV. These activities will focus during the reporting period on a number of studies regarding fundamental and current specialist subjects of land registration and the real estate cadastre, which will be handled by the relevant Working Groups (Task Forces). Specific examples include the „Legal and cadastral objects and their identifiers" study and the definition of „Guidelines on Public-Private Partnership". The activities of the Task Force for the latter are been co-ordinated from Germany.

The General Assembly of WPLA will be held in Geneva in November 2003. The AdV is prepared to continue its activities in this body, which is crucial to the European and international co-operation in the fields of land registration and real estate cadastre.

Permanent Committee on Cadaster

In May 2002, the Spanish General Directorate for Cadastres had invited to Granada for the 1st European Cadaster Congress. One of the main aims of the Congress was to establish the Permanent Committee on Cadastre (PCC). The PCC was in fact established at a follow-up conference in October 2002 in Ispra (Italy). Spain will hold the Chair of the PCC until mid-2003, when it will then be transferred to Italy. The objective of the PCC is to be the point of contact for the General Directorates of the EU for all issues concerning real estate cadastre. Because EuroGeographics and WPLA are also concerned with the subject of „Real estate cadastre", a partnership has been agreed with both organisations. Furthermore, only EU Member States and the new Member States from 2004 onwards will be able to co-operate in the PCC. Other countries and organisations may participate as and when required.
The AdV has declared its willingness to assume a co-ordination function for the German-speaking states in the EU and have the English-speaking documents translated into German as necessary.

Besides defining a European cadastre declaration, other projects are concerned with compiling a general directorate and its sub-organisations of the EU, which require data on the real estate cadastre and the pan-European definition of the term „Land Parcel".

Official Surveying and Mapping

Part of a high class geodata infrastructure and a must for a modern state