60 years AdV

National Report
2007/2008

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

Official German Surveying and Mapping

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Foreword

When the Working Committee of the Surveying Authorities of the States of the Federal Republic of Germany AdV was founded in 1948, Germany was an entity split into zones by the war and in many areas still in ruins. It needed pioneering spirit, courage and forethought to make itself strong in this situation for national cooperation in surveying. This was supported by the understanding that in order to function as a state, it is necessary to have geo-topographical and ownership data available nationwide.

Originally created as the Working Committee of the Federal States, the AdV today consists of the member administrations of the Federal States and the Federal Government in order to cope with the responsibility of the government. In particular, the large change in society with its increasing requirements for the administration has also left its mark in the official German surveying and mapping. The objective of all actions is to improve the state's capacity to act and to increase the quality of the service for the citizens and the companies. In doing so, it was and still is a matter of beneficially integrating the possibilities of modern information and communications technologies in the processes.

The inclusion of automation-supported methods in the tasks of the official German surveying and mapping has tradition; however this has become clearer in recent decades. Keywords such as AFIS®, ALKIS®, ATKIS® standardisation, geospatial data infrastructure and the associated shift in awareness away from regional individual solutions to a standardised geospatial data management dominate the discussion today, to which the European developments and their national implementation are making a significant contribution. With the establishment of central offices and active support by the GDI initiatives in the Federal Government and Federal States, the AdV and its member administrations have accepted these requirements.

This also underlines the necessity to have the AdV coordinate all essential actions of the surveying and cadastral authorities affected. In the past 60 years, the official German surveying and mapping has faced this challenge with visible success. Since the 1990s, the cooperative collaboration has achieved a new quality with the central offices including the rapidly developing information and communications technology. This is the incentive for the AdV to continue following this path.

Hans Gerd Stoffel
President of AdV

60 years AdV

Fig. 1: Stuttgart destroyed 1948

The initial years

The period when AdV was founded is only known to most people from narratives. Germany was largely destroyed, the people were starving after the long war years and thankful for every additional food brand. Deprivations had to endured in all areas; the war also left dramatic marks on surveying and mapping.

At this time, the surveying and mapping as a whole was in doubt: after the war, the most important, if not the only task of the Reichsvermessungsdienst, to provide maps for the warfare, no longer had any meaning. It could not be foreseen whether and how the surveying and mapping should be established in the future, both organisationally as well as with respect to content. The administrative zones of the occupying forces were initially managed separately; standardisation - also in surveying and mapping - was a vision.

With farsightedness and this vision, 60 years ago, three geodesists accepted the challenge for the establishment of a commonly aligned surveying and mapping in technical issues. 60 years later, it can only be

confirmed and established that their idea of collaboration and agreement beyond the Federal State borders has borne fruit in the AdV. It is as current today as then and demonstrates the outstanding role which the AdV played and is playing in the official German surveying and mapping.

The history of how the AdV was established is also still remarkable today and worth being briefly traced:

The German Association of Surveying for the British occupation zone determined its organisation on 29 April 1947 at a general meeting of members in Hanover. The three representatives from South Germany departed the same evening with the night express and sat together in a compartment. There was an air of discontent because there was no decision committee with responsibility for the official surveying and mapping. Landmark resolutions should be made by persons who had the corresponding technical knowledge and at the same time also had to make and implement the decisions. It was agreed to convene a meeting of the surveying and mapping authorities in the American occupied zone (Bavaria, parts of Baden-Württemberg, Hessen) to also continue to pursue these thoughts at an official level. Stuttgart was selected as the meeting location because the founders assumed the Baden-Württemberg Ministry of the Interior would be receptive to such a meeting. The Bavarian Ministry of Finance should officially promote the proposal of the joint meeting.

Fig. 2: Occupation zones (Besatzungszonen)

The joint meeting with the Federal State representatives of the American zone took place in Stuttgart on May 24 and 25, 1948 and was later designated as the founding meeting. The member authorities of the Federal States in the French zone (parts of Baden-Württemberg, Rhineland Palatinate, Saarland) could only participate as guests as their military government had not permitted the official participation. The agenda of the meeting was the agreement of a regular exchange of ideas, discussion of current issues, collaboration and mutual support for the purpose of standardisation in surveying and mapping. The AdV business office was established in Wiesbaden; its primary task should be the preparation and execution of the meetings. The Wiesbaden location was selected in order to conduct discussion also with representatives of the British zone (Hamburg, Lower Saxony, North Rhine-Westphalia, Schleswig-Holstein) from there.

1948

Founding of the AdV by representatives of the Federal States in the American zone and guests from the French zone in Stuttgart

1949

Surveying authorities of the British and French occupied zones join the AdV

Founding of the Real Estate Cadastre Working Group

1950

Other West German Federal States and Federal Minister for Transport join the AdV

Topography Working Group is established

Participation in the formation of the German Geodetic Commission

1951

Proposal for the formation of a German surveying conference is rejected, for reasons, amongst other things, of duplicated work with the AdV

1952

IfAG (remaining parts of the RfL) is transferred to the federal administration and participates in AdV meetings

Administrative agreement about responsibility of the Federal States for the official map books up to 1:100 000 and of the Federal Government for smaller scales

The West Berlin surveying and cadastral authority joins the AdV

1954

Recommendation by the AdV for new map book 1:50 000

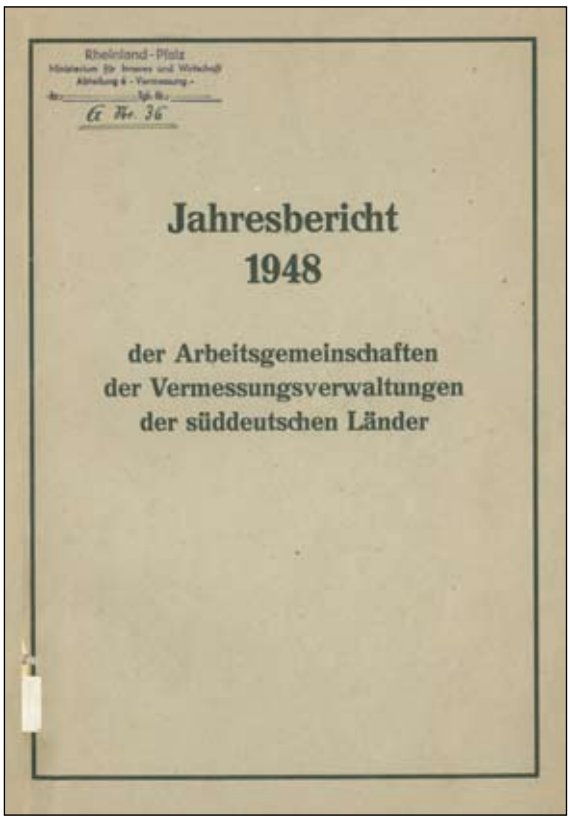

Fig. 3: AdV annual report 1948

The representatives of the surveying authorities in the British and French occupied zones were invited to the next meeting. Under the chairmanship of the senior government surveying adviser Mr. Kurandt, they decided in autumn 1949 on an expanded working committee which has borne the name „Working Committee of the Surveying Authorities of the States of the Federal Republic of Germany (AdV)“ since then.

The other West German Federal States and the Federal Ministry for Transport including the Central Office of the German Federal Railways also joined the AdV in the course of the years 1949 and 1950. Berlin followed in 1952 and Saarland in 1957. In 1953, discussions with the Federal Minister of the Interior were started which resulted in the Institute for Applied Geodesy (IfAG), in Frankfurt being included in the AdV meetings. The Federal Office of the Chancellor and the Federal Ministry of Defence have been participating in the work of the AdV since 1954.

In 1952, the member authorities of the AdV rejected accession to the German surveying conference whereby the position of the AdV as recognised representative of the official German surveying and mapping was significantly strengthened and secured for the future. The problem of such a conference was mainly seen in the danger of the duplication of work and interference. Nevertheless, the member authorities were always interested in exchanges of ideas with other competent persons and bodies.

The work of the AdV in the first ten years was marked by the need for standardised rules and basic specifications; there is hardly any area which the AdV has not been involved in. The AdV has made the members' need for exchange of experiences and collaboration its task.

Against this background, working groups were already formed in 1949 for the analysis of technical special issues, initially the Real Estate Cadastre Working Group, later the Working Group for Cartography, Topography, Triangulation and Precision Levelling.

In 1950, the AdV was involved in the formation of the German Geodetic Commission (DGK) at the Bavarian Academy of Sciences in Munich to which the German Geodetic Research Institute (DGFI) was assigned as its own research facility. Its Department II „Applied Geodesy“ was transferred to the federal administration as IfAG in 1952.

The first administrative agreement between the Federal Government and Federal States for the area of official mapping was made in 1952 in which the Federal States transferred the task for the official map books for the scales 1:200 000 and smaller to the Federal Government. In 1954, the AdV argued in favour of the creation of a new 1:50 000 map book as the Bundeswehr needed this as the main army map.

The AdV was also involved in the draft of the Federal Town Planning law and particularly expressed its opinion about the expert committees and building land apportionment issues.

Career issues were another focus in the initial years. The AdV particularly concerned itself with the training and examination procedures in the various technical surveying and mapping and cartographical career paths, the creation of job descriptions and matters of the licensed surveyors with a resolution about the fees for their services in 1958.

The Sixties

Fig. 4: TK 50 (1962 Edition)

At the beginning of the Sixties, the possibilities of the automation of surveying were increasingly focussed.

This resulted in the fact that a specific working group for dealing with automation issues was required immediately. The Automation Working Group was established in 1961 at a time when other areas of the public administration were still not involved with this new means of working. The focus was initially on testing the new material and the exchange of experiences between the Federal States. The working areas were the suitability of computer systems, the use of programming languages and the automation of individual process steps.

In 1962, the TK 50 became available Germany-wide for the first time and had thus required 8 years from the planning to its publication. During this period, eight state survey offices were assigned to realise a joint plan for the whole of Germany in close collaboration.

In 1963, the second agreement about actions in the area of official mapping between the Federal Republic of Germany (BRD) and the individual Federal States (except Bavaria) was made. It replaced the corresponding agreement of 1952 and continued transferring the task of the small-scale maps to the Federal Government.

1957

Saarland joins the AdV

1958

Resolution about fees regulation for services of the licensed surveyors

1959

Participation in the draft of the Federal Town Planning law

1960

TK 50 covering the whole of Germany is available

1961

Establishment of the Automation Working Group

Draft of a code of conduct for the licensed surveyors

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GEMEINSAMES MINISTERIALBLATT

HERAUSGEGEBEN VOM BUNDESMINISTERIUM DES INNERN

Seite 13 GMBl. 1964 Nr. 2

I. Verfassung, Staatsrecht und Verwaltung

Abkommen über Maßnahmen auf dem Gebiet des amtlichen Landkartenwesens vom 31. März 1963

— Bek. d. BMI v. 20. 12. 1963 — I C 3 — 14 730 C — 1335/63 — 90 1 a —

Zwischen der Bundesrepublik Deutschland und den Ländern Baden-Württemberg, Berlin, Bremen, Hamburg, Hessen, Niedersachsen, Nordrhein-Westfalen, Rheinland-Pfalz, dem Saarland und Schleswig-Holstein ist das nachstehende Abkommen geschlossen worden.

(3) Der Bund ist seinerseits berechtigt, Sonderkarten und Zusammendrucke von den Kartenwerken nach Artikel 2 Abs. 1 herzustellen.

(4) Die im Vollzug des Absatzes 2 bzw. 3 anfallenden Reproduktionsunterlagen werden bei Bedarf dem Bund bzw. dem Land ebenfalls kostenlos überlassen.

(5) Beabsichtigen der Bund oder das Land, Sonderkarten und Zusammendrucke gemäß Absatz 2 und 3 herzustellen, so treffen sie über Art und Umfang der herzustellenden Sonderkarten und Zusammendrucke nähere Vereinbarungen, um Doppelarbeit und eine unwirtschaftliche Handhabung zu vermeiden.

Fig. 5: Administrative agreement 1963

Almost at the same time, an agreement about the collaboration between the state survey offices and the offices for military geography for the update of the topographic map books was made. This should ensure the consistency between the military and civil editions. It was agreed that, if possible, the maps should be revised every 5 years by the state survey offices and also earlier, if needed.

After extensive consultation with the German Association of Publicly Appointed Surveyors (BDVI), a model code of conduct for the licensed surveyors was adopted at the beginning of the Sixties.

The commitment of the AdV for the development aid was also particularly high. Civil servants of the Federal States were released from service in order to provide on-site development aid, particularly in Central American states. Since 1967, there has been collaboration with the Federal Minister of the Interior. The AdV sent experts – e.g. the President of AdV was sent as an expert for development programs in Thailand and Central America. Other representatives of the AdV participated in international congresses as experts.

In 1966, the Federal Minister of the Interior was adopted as a permanent guest in the AdV plenum after several discussions and thus abandoned the previous practice that he could only attend the AdV meetings for particular matters - from case to case.

At the end of the Sixties, the need for rules of procedure for the AdV in order to regulate the procedures within the AdV was voiced for the first time. A working committee under the Secretary General of the AdV was commissioned to develop a corresponding draft.

The Seventies

The work of the AdV in the Seventies can be characterised with the change to information and communication technology.

At the beginning of the Seventies, the AdV proposed the AdV target framework concept „Automated real estate cadastre as basis of the plot database“ which was agreed in 1973 and contained the technical requirements for the automated management of the cadastral register. The concept envisioned that the programming could be different based on the target concept in order to cope with the respective different forms

of organisation of the data processing and data processing systems. From 1975 the realisation of the Automated Cadastral Register (ALB) and from 1979 that of the Automated Cadastral Map (ALK) were driven forward in a multistage solution.

The development of a buildings file, which the AdV occupied itself with in the middle of the Seventies, was also innovative and resulted in the establishment of a „Concept for scope and contents of the buildings file“. The decision to set up the buildings file followed three years later. The standardised base for maintaining and providing descriptive data about buildings corresponding to the needs of the law, administration and the economy was thus laid.

Fig. 6: AdV target framework concept „Automated real estate cadastre as basis of the plot database“

In 1979 the AdV developed an administrative agreement about the takeover and maintenance of the specified „Automated real estate cadastre as basis of the plot database“ procedural solution. For cost reasons and for ensuring the standardisation of the procedure, the maintenance of the procedural solution was envisaged jointly for all Federal States at a central office. The agreement was repeatedly revised in the following years and finally carried out in the form of agreements between individual Federal States.

At the beginning of the Seventies, the AdV intensively discussed the restructuring and future position of the DGFI and convened a special meeting in this respect in 1973. The AdV argued for the necessity of a research facility for tasks in all areas of geodesy which are beyond the capability of the university institutes and the state survey offices as well as the participation in the scientific advisory group of the DGK for the DGFI.

A draft model for standardised federal laws about the fees of the cadastral authority and licensed surveyors was decided in the middle of the Seventies.

The AdV also focussed on the professional training of the junior employees. After the „surveying technician“ and „certified surveying technician“ job descriptions had been developed by the AdV in 1974, a regulation about the training for surveying technician was approved with the participation of the AdV in 1976.

1963

Agreement between the Federal Republic of Germany (BRD) and the individual Federal States (except Bavaria) about actions in the area of official mapping

Agreement about the collaboration between the state survey offices and the offices for military geography for the update of the topographic map books

1966

Federal Ministry of the Interior becomes permanent guest of the AdV

1970

Restructuring of the appointment of the President and office

1971

AdV target framework concept „Automated real estate cadastre as basis of the plot database“

1972

Federal Ministers of Defence and of the Interior become members of the AdV

1973

AdV adopts target framework concept „Automated real estate cadastre as basis of the plot database“

1974

Adoption of the „surveying technician“ and „certified surveying technician“ job descriptions

1975

AdV target concept: Automated Cadastral Map (ALK)

In 1975 the AdV decided on two expertises for the situation of the expert committees on the one hand and for apportionment offices on the other hand. These expertises were forwarded to the federal parliament committees as well as the supreme federal authority involved in the revision of the Federal Town Planning law, the responsible state supreme authorities and municipal leading organisations. Thus significant contributions to the new regulations were made.

There were also internal, organisational changes in the AdV in the Seventies. These concerned a restructuring of the appointment of the President and office. Accordingly, as is still basically the practice today, the President should be elected every two years in alphabetical order of the member authorities. The office should be permanently established in the Federal State of Lower Saxony and the Secretary General should belong to the ministry. These changes were used to resume the endeavours for rules of procedure not continued since 1967 - the AdV rules of procedure were decided in 1970.

The AdV „expanded“ in 1972: the Federal Minister of Defence, represented by the Director of Military Geography in the Bundeswehramt, and the Federal Minister of the Interior as supervisory body of the Institute for Applied Geodesy became members of the AdV.

The Eighties

The AdV was assigned to the permanent conference of the Federal Minister of the Interior and the State Ministers of the Interior (IMK) in 1981. The State Premier conference decided to assign bodies with different departmental responsibility in the individual Federal States while ensuring the departmental principle of the conference of the heads of the respective departments. This is where the responsibility is in the majority of the Federal States - these were the Ministries of the Interior. Thus, on the one hand the personal responsibility in the work of the AdV was ensured and on the other hand there was also the possibility to approach the conference of the Ministers of the Interior with matters of paramount importance and particular financial consequences.

The work of the AdV in the Eighties was marked by the rapid technical progress of the time which was also noticeable in surveying and mapping. With the increasing computer performance, the price development in this market and the increased appearance of Geographic Information Systems (GIS), the AdV responded to the changing conditions in the usage of the data of the official surveying and mapping. In the middle of the Eighties the AdV decided to maintain and release topographical maps in digital form. A draft for ATKIS® (Authoritative Topographic-Cartographic Information System) was developed, which envisaged its phased implementation in the responsibility of the state survey authorities. At the same time, an ATKIS® working group was established which concerned itself with the technical implementation. With ATKIS®, the surveying and cadastral authorities could cope with the users' increased technical data processing and information requirements for geo-topographical basic data.

Fig. 7: ATKIS® logo

The use of the Global Positioning System (GPS) in the state survey crystallised as another focus point of the AdV. A new technology, which, as should be apparent, has brought the collection of data for surveying, mapping and cadastral systems into a new age. An initial concept was proposed by the AdV in 1987. However, at that time the recognised benefits, i.e. an increased efficiency and higher accuracy of the measurements could not yet be deve-

loped due to the still developing framework conditions. Thus, the GPS system was still not completely set up in its segments (particularly the spatial segment), the receivers were very expensive and the access to all the required information of the GPS was not ensured.

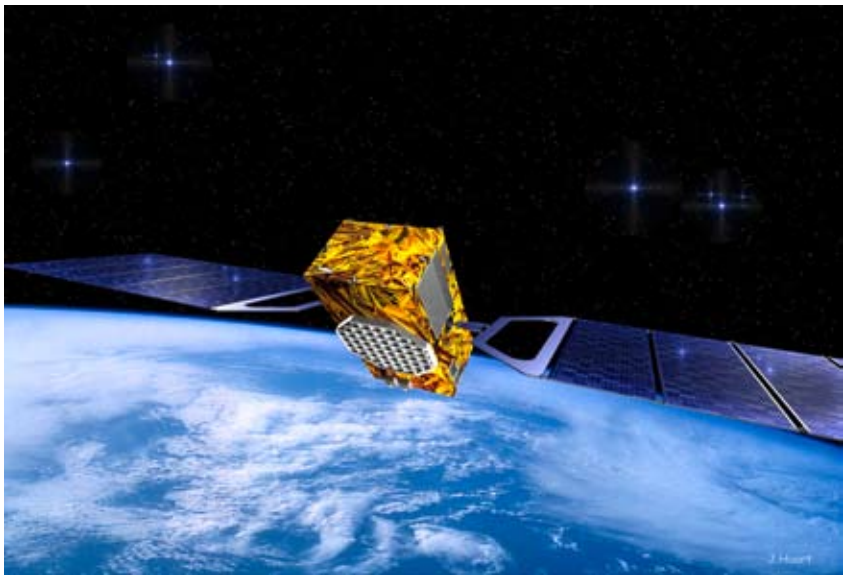


Fig. 8: Satellite above the Earth

The AdV joined CERCO (Comité Européen des Responsables Cartographes Officiels) at the beginning of the Eighties. Before the apparent gradual process of European unity, information should be increasingly exchanged and collaboration promoted at the level of the supreme authorities

The TK 100 was available nation-wide for the first time in 1982; the majority of the Federal States had not started processing this map book until after the TK 50 was finished in the Sixties.

Professional training was also a major topic in this period for the AdV. Deficiencies should be eliminated and the training content improved both for the cartographer and surveying technician training as well as for the practical training period. For this reason, the AdV mainly made recommendations for the practical training and a training regulation for surveying technicians followed a few years later.

AdV studies for the situation of the expert committees and for apportionment

Draft model for standardised federal laws about the fees of the cadastral authority and licensed surveyors

1976

Adoption of a concept for the scope and contents of the buildings file

1979

Decision for setting up a buildings file

Development of an administrative agreement about the takeover and maintenance of the „Automated real estate cadastre“ procedural solution

1980

Decision for participation in CERCO

1981

AdV is assigned to the IMK

1985

TK 100 covering the whole of Germany is available

1986

Establishment of the ATKIS® Working Group

1990

Decision of the IMK for creating surveying and mapping authorities in the new Federal States and collaboration between the old and new Federal States

The Nineties

The AdV also faced a mammoth task with the reunification of Germany. The resolution for creating surveying and mapping authorities in the new Federal States and collaboration between the old and new Federal States in this respect was made during the conference of the Ministers of the Interior and Permanent Secretaries of the Federal States (IMK) in 1991. Experts were dispatched from the Western Federal States in order to support the establishment of effective surveying and mapping.
With the formation of the surveying and cadastral authorities in the new Federal States, their accession to the AdV followed promptly. In the middle of the Nineties, the membership of Deutsche Bahn, now a public limited company, changed to the status of permanent guest of the AdV without voting rights.

Against the background of the constantly increasing European integration, the AdV made the resolution in 1991 for a standardised reference system WGS 84 and ETRS 89 with UTM mapping for all areas of responsibility of the surveying and cadastral authorities in the whole of Germany. This was a decisive step with a view to Europe and being able to provide and process interdisciplinary land-referenced and spatially referenced data beyond the state boundaries in the future.

In 1992, an administrative agreement for ATKIS® content was made, according to which the use of the ATKIS® data, particularly for military purposes and for other federal agencies for ensuring public tasks of the Federal Government, will be made possible. Annual AdV symposia and workshops about the topic of ATKIS® took place since 1994 in which the status of the work in the individual Federal States and the further use of these data were reported and discussed. This happened against the background that the first stage of the ATKIS® Basic DLM (DLM 25/1) was available for increasingly larger areas and was finished in almost all Federal States in 1997.

In 1997, the AdV adopted the „Concept for the modelling of the geoinformation of the official surveying and mapping“. The common ALKIS®/ATKIS® data model forms the conceptual basis for ALKIS® (Authoritative Real Estate Cadastre Information System) and ATKIS®. The merging of ALB and ALK to ALKIS® and the further development of ATKIS® are primary tasks in the following years.

In 1996, the Federal Ministry of the Interior commissioned IfAG (now the Federal Agency for Cartography and Geodesy (BKG)) to set up a geodata centre (GDZ). According to the guidelines developed by the AdV for the requirements of the GDZ, the latter was assigned the task of setting up a metadata information system for analogue and digital data and to pass on the official digital topographical-cartographical data of the surveying and cadastral authorities of the Federal States jointly to third parties for national requirements. The requirement for a contact person for customers in these cases could be accommodated with this collaboration between the Federal Government and the Federal States.

Fig. 9: Emblems of the Federal State Survey Offices and Federal Offices

The information about the AdV and the standardised products of the surveying and cadastral authorities was increasingly promoted. The AdV recognised early the high importance of common Public Relations and Marketing (PRM) and made a resolution in 1996 for the use of an AdV design on business papers, printed matter etc. One year later, the member authorities decided to present the AdV on the World Wide Web under www.adv-online.de.

Extensive organisational changes inside the AdV were also made in the Nineties when new rules of procedure were adopted and the working groups were restructured and consolidated in 1994. The working group “Basic concerns” was established; these tasks particularly included the discussion of organisational, personnel, training and certification matters. Among other things, a product catalogue of the surveying and cadastral authority and a draft model for standardised rules concerning geospatial data in the surveying and cadastre laws were developed in the initial years.

The developements of the last 10 years are described in detail in the reports of the working groups and the Public relations and marketing task force.

1991

Decision for a standardised reference system WGS 84 and ETRS 89

1992

Agreement for use of the ATKIS® data for military purposes

1994

Fundamentals Working Group is established

Deutsche Bahn AG becomes permanent guest of the AdV

1996

Decision for use of an AdV design on business papers, printed matter etc.

Establishment of the GDZ for the BKG

1997

Concept for the modelling of the geoinformation from the official surveying and mapping as basis for ALKIS®

Presentation of the AdV on the World Wide Web under adv-online.de

Spatial Reference Working Group

The work in the Spatial Reference Working Group in the past 10 years focussed on the following five work packages:

- conception and initial implementations for nationally standardised spatial reference,
- setting up and operation of the satellite positioning service of the German state survey (**SA*POS*®**),
- conception and first piloting of the Authoritative Control Point Information System (AFIS®),
- the major project for modernisation of the German Height Reference System (DHHN) and
- the integration of nationwide height, gravity and three-dimensional (3D) networks in international reference systems.

The Basic Surveying working group was renamed in this decade by 01/01/2002 to Spatial Reference and reflected the development of a standardised spatial reference based on the integration of the different dimensions (position, height and gravity) within the framework of the principles of the official surveying and mapping. The AdV is thus already actively working on a forward-looking, integrated high quality geodetic control framework.

Conception and initial implementations for nationally standardised spatial reference

Against the background of the changed spatial reference measurement methods which have been marked in the past by the implementation and improved usage of modern, global satellite measurement methods (Global Navigation Satellite System -GNSS-), space-based gravity field missions and an improved user-friendly field measurement method for the absolute gravity measurement, the understanding for the advancement of the geodetic control frameworks has increased significantly. In order to take account of this development, changes in the system, the density as well as the maintenance of the future geodetic control frameworks are essential.

Instead of updating classic guidelines, the working group opened the discussion about the future design of the geodetic control frameworks in the year 2000 and established a corresponding project group in 2001. The primary task consisted of an expanded definition and specification of the geodetic networks used in the future, their up to date marketing and the procedural methods for maintenance and usage. The other work

of the project group was concerned with the notion of developing a long-term overall strategy for the future of all geodetic control frameworks and resulting in a key point paper that meets the requirements for a modern spatial reference system using the standardisation of the geodetic control frameworks in the Federal Republic of Germany. The AdV agreed these key points in 2004 with the strategy for the standardised spatial reference of the official surveying and mapping and specified the associated Guidelines in 2006.

Accordingly, the spatial reference in the future will be realised using a nationally standardised, homogenous geodetic control framework and densified state-specifically if required. Refer to Figure 12 for the structure and establishment of the nationally standardised geodetic reference system.

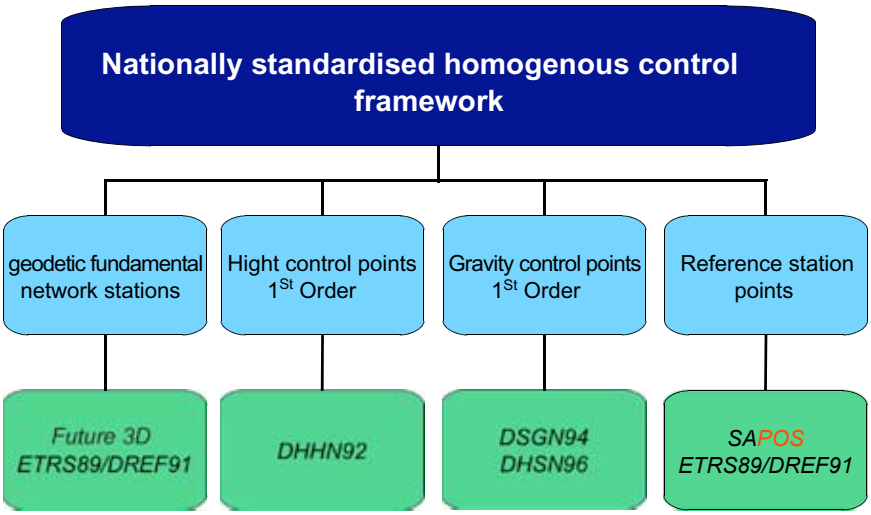


Fig. 10: Structure of the nationally standardised spatial reference

The geodetic fundamental network stations (GGP) provide the physical realisation and assurance of the three-dimensional spatial reference and the linking of the spatial, height and gravity reference systems. With their maximum point spacing of 30 kilometres, they represent the link to the Earth‘s surface and thus form a materialised assurance system for the geospatial data. The GGP positions can be determined with maximum accuracy using satellite geodetic methods. Their physical height and gravity values are determined by connections to the height and gravity geodetic control framework of the respective first order network. The up-to-dateness of the coordinates is always maintained using modern monitoring and checking methods like those developed by the working group.

Somewhat more than half of the future GGPs have been set up in the course of the preparations of the 2008 GNSS measurements for the modernisation of the DHHN. They will be determined nationally in a

1998

First SA*POS*® symposium in Hamburg

1999

Establishment of the Technical Committee SA*POS*®

2000

The independent information system AFIS® is decided

2001

The standardisation of SA*POS*® in Germany is decided

2002

Renaming of the Basic Surveying working group to Spatial Reference

2002

Definition and implementation of the AdV null antenna

2003

Diagnostic equalisation of the SA*POS*® reference stations

2003

The networking of SA*POS*® reference stations is a defined standard

2004

Progress report of the GPS Reference Stations expert group

2004

Decision for the strategy for the standardised spatial reference in Germany

joint measuring campaign. In compliance with specified, qualitative basic conditions, the Federal States can also declare existing points for GGP and integrate these in the nationally standardised spatial reference.

A densification of this very coarse network is made on the basis of state-specific specifications whereby each Federal State regulates the scope, the density and the design according to its own conditions. For example, ground subsidence or mining areas could result in setting up and monitoring more dense control point networks in order to give the users of the **SA*POS*®** service current information about the regionally changed spatial reference at any time. After all, the quality of **SA*POS*®** is always only as good as the degree to which the positioning using this service is integrated in the regional conditions.

In parallel with the work on the new spatial reference in Germany, the Federal States are currently involved in realising the prerequisites for the implementation of the ETRS89 reference system (European Terrestrial Reference System 1989).

Installation and operation of SA*POS*®

With the decision for the establishment of SA*POS*® in the middle of the Nineties, the AdV gave the starting signal for the installation of an active, real-time positioning service which, using modern satellite technologies, caused a significant sea change in the spatial reference and the general geodetic measuring technology. The crucial components of SA*POS*® are the establishment of permanent nationwide GNSS reference stations, their technical and communication networking and the specific multifunctional SA*POS*® services. The latter consist of the provision of correction data with different accuracy requirements, which can be used for every conceivable satellite-based positioning application.

The current services design of **SA*POS*®**, schematically illustrated in Figure 11, is based on a combination of real-time and post-processing components with different accuracy ranges between the metre and millimetre range. Contrary to the original definition of four services, both the post-processing services GPPS and GHPS were combined into one GPPS service in 2005 after 10 years of continued existence.

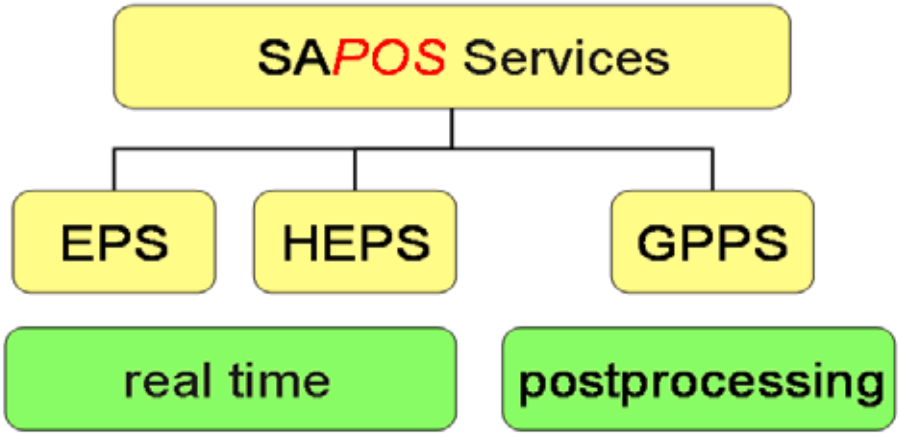


Fig. 11: Schematic diagram of the SAPOS® services

With the GPS reference stations expert group a team of Federal Government and Federal State representatives performed complex organisational and technical procedural work for the AdV over eight years and in doing so made significant contributions to today's quality standard of **SA*POS*®**. During this time, all of the work had the common objective of establishing the satellite positioning service of the German state survey which always had the objective of developing a standardised service for Germany using different developments in separate subareas. Figure 12 shows the overview of the **SA*POS*®** reference stations in Germany in March 2008 and the areal networking and integration of reference stations outside Germany.

With the decisions for the standardisation of **SA*POS*®** Germany, the AdV categorised the multitude of the standardised **SA*POS*®** components and defined nationally mandatory (use of GSM technologies; correction data in the format RTCM 2.3, type 20/21; networking; FKP) and optional (2-metre radio; RTCM-AdV and RTCM 2.3, type 18/19 and VRS) standards (RTCM: Radio Technical Commission for Maritime Services; FKP: Areal correction parameters; VRS: Virtual Reference Station). A specified time schedule obligated the Federal States for implementation of the decisions and introduction of the components on 01/01/2003. This standardisation decision was primarily aimed at the **SA*POS*®** components of the real-time data provision. In addition, there are also specified standards for the GPPS service which are based on the RINEX format (Receiver Independent Exchange Format) for e.g. data exchange and storage. The reference station data are permanently archived in this format by the operators of the stations.

The definition and implementation of the AdV null antenna as idealised, absolute and isotropic reference antenna was a bold and far-reaching step which also received high international attention (the method was finally also applied in IGS (International GBSS Service)). This theoretical satellite reception antenna has no phase centre variations (PCV) of any kind and can be understood as an ideal point source receiver. In order to come as near as possible to this theoretical ideal, the PCV of modern GNSS antennas can be determined with absolute calibration methods in the field or in measuring chambers.

2006

Start of the modernisation work on the DHHN

2006

SA*POS*® will use the GPS systems, GLONASS and Galileo in the future

2007

First area conversion of reference stations to GPS and GLONASS

2008

GNSS and absolute gravity measurements in the course of the modernisation of the DHHN

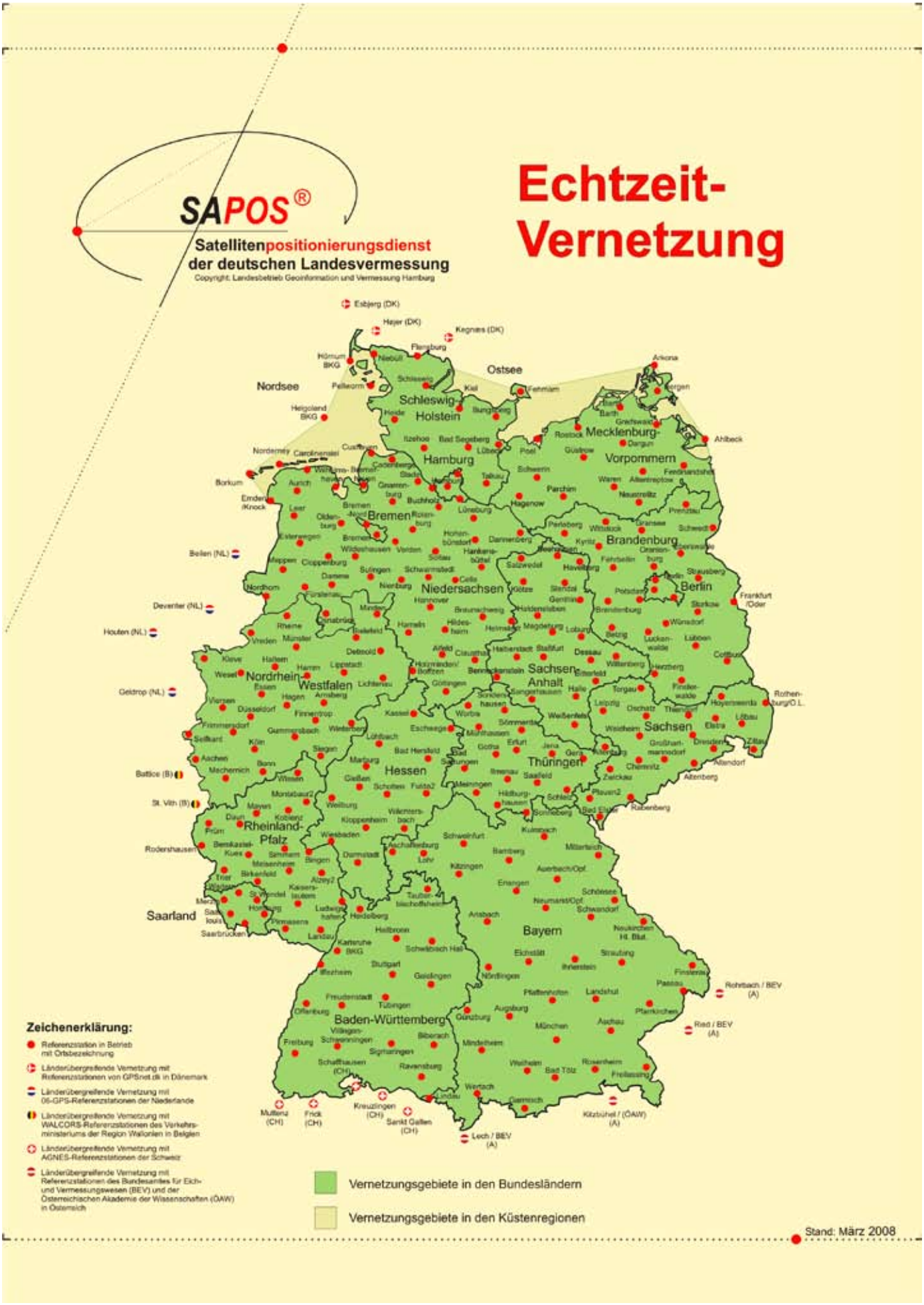


Fig. 12: Overview of the SAPOS® reference stations in Germany in March 2008.

The obligation for the operation of the networking of **SA*POS*®** data requires that the coordinates of the reference stations have high internal accuracy (1-2 cm) and also that there is homogeneity across the state borders. Standardised, high-precision coordinates are also essential for some tasks and the provision of **SA*POS*®** throughout Germany to users outside surveying. In order to meet these conditions, the AdV arranged a diagnostic adjustment by the Federal Agency for Cartography and Geodesy (BKG). The results were determined in 2003/2004 and resulted in an increase of the inner geometry of the **SA*POS*®** coordinates.

Under the aspect of standardisation, the **SA*POS*®** Technical Committee was established in 1999 to coordinate technical developments in **SA*POS*®** between the AdV, representatives of the manufacturers of GNSS hardware and software and the communications technology. Among other things, technical developments in the interface area (RTCM, RTCM-AdV), for the GNSS receivers (reference stations and rovers) and the data transmission media (2-metre radio receiver, **SA*POS*®** decoder, GSM) were discussed objectively, partially also controversially and usually resolved jointly. The technical committee continued to exist to date in its proven form.

In the marketing area, the AdV has organised a series of effective public relations exercises in the course of setting up **SA*POS*®**. Thereby, five **SA*POS*®** symposia were carried out with great success between 1998 and 2003 where far more than 1,000 interested experts from the economy, science and administration informed themselves about the concepts, the installation and the design as well as extensive possible uses of the new real-time and post-processing services of the AdV. This information has been completed by setting up the website „http://www.sapos.de“ which can be reached by all state surveys and whose individual services (for example RINEX data services) can be used.

Comprehensive written information and publications have been created as „handouts“ for different occasions. The **SA*POS*®** flyer in Figure 13 has been translated into at least 10 different languages in this context whereby the **SA*POS*®** basic idea could be exported to many countries.

Fig. 13: SAPOS® flyer in different languages

In 2006, the AdV passed the landmark resolution for the implementation of GLONASS and Galileo in the **SA*POS*®** services. Since then, the Federal States have been involved with converting the reference stations to GPS-GLONASS receivers whose respective current status can be seen on the World Wide Web.

Conception and first pilots of AFIS®

The spatial reference is also affected by the conversion of the ALK and ALB digital documents of the surveying and mapping authorities as the geodetic control point information of the state surveys in many Federal States is managed in the ALK point file. With the conception and the first implementations of the AFIS®-ALKIS®-ATKIS® technical schemas (AAA), it was also clear for the data of the former basic surveying that they will be transferred to the new AAA world. In 1999, the AdV decided to set up AFIS® (Authoritative Control Point Information System) for the geodetic control points as a separate information system and commissioned the AFIS® expert group to develop the essential documents for this. The geodetic control points data are described in the AFIS® feature and portrayal catalogue. The AAA application schema regulates contents, structures and manufacturing instructions of the AFIS® geographic data in primary database and the digital and analogue AFIS® standard presentations.

The features with their attributes and relationships are specified in the AFIS® feature catalogue based on international standards. AFIS® contains a total of seven feature types, of which the position, height and gravity geodetic control points and the reference station points are still today covered by the generic term “geodetic control point”. Due to their temporal development, the GGP are not managed in AFIS® as an independent

feature type but as position geodetic control point with the GGP attribute.

Currently, numerous Federal States are installing initial pilots of AFIS® components. Thus, they process the complexly enlarged databases in the course of the premigrations so that they can be transferred automatically as a whole into the new databases. Not only will the wealth of experience in handling ALKIS® and ATKIS® grow in the coming years but the data and documents of the spatial reference will also be included.

Modernisation of the German Height Reference System 2006-2011

Since the decision of the AdV plenum for modernisation of the DHHN in 2005, this project is on a good course to become a successful project of the official German surveying and mapping. With a modernisation of 80 per cent of the Height Reference System, both the increasing loss of quality and the heterogeneous and extremely outdated data will be counteracted. Using modern digital levelling instrument, possible height changes in Germany should be detect using digital geometric precision levelling.

This modernisation work also provides the chance to determine the geometric and physical components on identical ground marked points using simultaneous GNSS, absolute gravity and levelling measurements. All Federal States have committed themselves to observe at least 14,130 kilometres of levelling lines. If technically needed (assu-

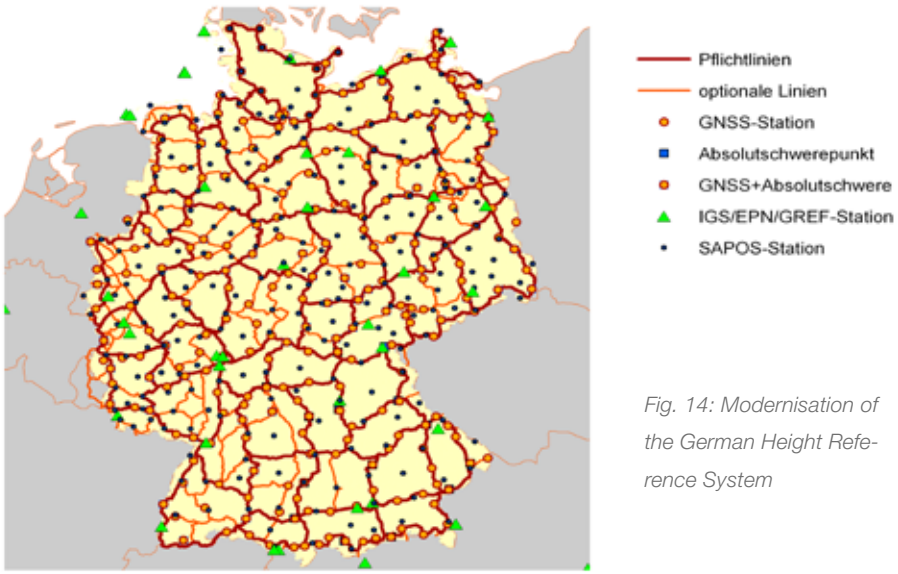


Fig. 14: Modernisation of the German Height Reference System

med height changes), the Federal States will observe other optional lines so that currently a total network of approx. 20,000 kilometres in length should be measured. Figure 14 shows the modernisation of the German Height Reference System with the components: precision levelling 2006-2011, GNSS measurements 2008 and absolute gravity measurements 2008-2009 (date 11-2007).

In detail, this means:
- ➤ high uniform standard of the measuring equipment and in the station design,
- ➤ optimum agreement between the surveying teams,
- ➤ high quality preliminary data analysis and storage,
- ➤ the evaluations in different analysis centres and
- ➤ prompt linking of the levelling GNSS points.

The GNSS field measurements will be carried out by 34 surveying teams with two types of GNSS receivers which will be contributed by all Federal States and the Federal Agency for Cartography and Geodesy. The measurements will be made between May 26 and July 3, 2008. In order not to rule out many possible analyses in advance, the data will be registered with the high interval rate of 1 Hz, transferred afterwards directly from the field to the preliminary analysis centres via cellular telephone networks and submitted for a quality examination already during the campaign.

The evaluations of all different databases are made in five different computer centres of which three are located at the Federal Agency for Cartography and Geodesy and two in the Federal States (Lower Saxony and North Rhine-Westphalia). The computing centres collaborate very closely to exchange information, report annually to the working group for reporting and controlling purposes and can thus point out deficiencies at an early stage, which will be resolved jointly. The DHHN network will also be connected to the European UELN (United European Levelling Network) in the future.

Gravity field determination

The German Gravity Reference Network 1994 (DSGN94) will be inherited and maintained by the Federal Agency for Cartography and Geodesy and the German Primary Gravity Network (DHSN96) by the Federal States. The repeat measurements at the gravity network points have been completed using FG-5 absolute gravimeters. The absolute gravity measurements at the GREF stations will be repeated approx. every two to three years. The successful testing of the new A10 field absolute gravimeter at outdoor stations showed the possibilities of this method for the gravimetric densification of reference networks.

The AdV quasi geoid will be processed jointly with the data of the Federal States by the Leibniz University, Hanover and the Federal Agency for Cartography and Geodesy. The database has been extended for the expansion of the AdV quasi geoid in the North Sea and Baltic Sea region. The results of a joint project with the Dresden Technical University for derivation of precise height data from altimetric measurements in the model construction have also been incorporated. An aerial survey of the south-western Baltic Sea and the bordering Danish and German land areas and German North Sea coast was carried out in cooperation with the Danish Space Centre (DNSC) using a LaCoste & Romberg gravimeter (S-38) for closing gaps in the gravity data in the coastal area. In addition, examinations were made for the combination of data from terrestrial, aerial and satellite measurement methods for the derivation of geoid / gravity field models.

Connection to the global reference systems

The geodetic reference systems ensure that each object can be determined for its position and height in a world-wide standardised way.
The global geodetic reference systems adopt a key function for the tasks of the Group on Earth Observations (GEO) established in 2002. The International Association of Geodesy (IAG) as an international organisation also represented in GEO has designed the Global Geodetic Observing System (GGOS) as a new independent component. GGOS collaborates with the IAG components, particularly the IAG services, in order to promote the combination of the observations, the further development and the organisation of the global geodetic measuring systems and evaluation methods. There is a close connection between the objectives of GEO and GGOS for the global coordination of Earth observation, the design and operation of a global geospatial data infrastructure (GDI) as well as the corresponding national endeavours.

The Federal Agency for Cartography and Geodesy is integrated in the international IAG services and GGOS activities in many ways with geodetic spatial observation systems and analysis and information centres, and has been making the Federal Republic of Germany‘s contribution to the global reference systems for decades.
An essential cornerstone for the IAG services and for the global as well as the national reference systems is the Wettzell geodetic observatory which the Federal Agency for Cartography and Geodesy has been operating jointly with the Satellite Geodesy Research Facility of the Munich Technical University for more than 30 years. In the context of the “International VLBI Service for Geodesy and Astrometry” (IVS), extensive quasar measurements are being carried out with the 20 m radio telescope which are contributing to the realisation of the celestial and terrestrial reference systems and for the derivation of the Earth orientation parameters. The planning for replacing the more than 25 years old radio telescope with a modern design, a so-called „twin telescope“, has been completed this year. Distances, coordinated 365 days per year around the clock by the International Laser Ranging Service (ILRS) to the geodetic satellites are being measured with the existing Laser Ranging System. A new laser distance measurement system is currently being installed which should make it possible to measure the distances to satellites largely automatically. The existing system will then be optimised for distance measurements to the moon and to high flying GNSS satellites. The Wettzell observatory as “IGS Operations Centre” is remotely operating 21 permanently installed GNSS stations in the context of the IGS and the European (EUREF) and the German

GNSS Reference Network (GREF). The spatial geodetic techniques are supplemented by local observations such as gravity measurements, meteorological and seismological observations. Unique in the world, a ring laser is used at the Wettzell observatory which makes it possible to record short term rotation fluctuations of the Earth. A time and frequency measuring system, integrated in the global generation of the UTC world time, provides the necessary time information and reference frequencies for the observations.
One installation comparable to the Wettzell observatory, the Transportable Integrated Geodetic Observatory TIGO, is maintained by the BKG in Concepcion, Chile. Due to its location on the southern hemisphere, TIGO is making significant contributions to the IAG services, IGS, ILRS and IVS. Supplementary gravimetric, seismic and meteorological measurements are also performed and provided here. A time and frequency measuring system is operated as well.
At the northern tip of the Antarctic Peninsula, the BKG is jointly operating the GARS O'Higgins "German Antarctic Receiving Station" with the German Aerospace Center (DLR). VLBI observations on a campaign basis and continuous GNSS measurements are being performed here.
The Federal Agency for Cartography and Geodesy is contributing to the global reference systems with its IVS, ILRS and GNSS analysis centres, the central office of the International Earth Rotation and Reference System Service (IERS) and the data and information centres which, among other things, are the basis for the European and national horizontal and gravity networks.
The BKG is collaborating with well-known partner institutions on the use of the future European GNSS „Galileo". The basic principles for the realisation of the Galileo geodetic reference system and a prototype for a service provider to ensure further operation are being developed in the course of the "Implementation of Galileo Geodetic Service Provider Prototype" (GGSP) project.
The Federal States align their nationally standardised geodetic control framework on international reference systems in order to standardise the spatial reference system at the European and global levels as well as to achieve standardised georeferencing. The BKG provides the necessary products for the linking between regional and global reference systems. The GREF network stations of the BKG which are integrated in the international reference system are used for this. The GREF network stations are equipped with combined GPS/GLONASS receivers. The data transmission on all stations is made in real-time via „Networked Transport of RTCM via Internet Protocol" (NTRIP). The extension of GREF also includes the combination of the geometric satellite positioning process with dynamic methods of height determination and/or gravity measurements. Therefore, there are also some stations located close to level measuring stations, geophysical observatories or stations of the German gravity reference network. They therefore correspond to the GGOS concept which envisages a linking of the geometric and gravimetric observations.

Fig. 15: The Diepholz GREF station

Outlook

Modern satellite measuring methods in particular have permanently changed the spatial reference tasks and work. In the future, the basic network installations for all types of measurements will no longer be in the foreground but instead the quality and up-to-dateness of the spatial reference data, which is clarified by the example of the modernisation of the German Height Reference System.

The results of this nationally standardised project will on the one hand provide a valuable data record for the future task of the integration of the components of the nationally standardised geodetic control framework to an integrated system and on the other hand enable high quality analysis methods for the examinations of kinematic changes in the geodetic control frameworks. Against the background of a future increasing demand for data with equally high and homogeneous accuracy and quality, this task must already be taken into account today. The provision of the spatial reference data using modern communications media based on international standards sustainably rounds off the future range of tasks of the working group and results, particularly for **SA*POS*®**, in constant modernisation of methods and technologies.

Real Estate Cadastre Working Group

Importance of the real estate cadastre

The real estate cadastre has been constantly further developed since its creation in the 19th century. New opportunities for optimising the process have been produced due to ongoing technical development, particularly in the last 10 years. The state authorities in the official German surveying and mapping primarily want to make their modernly managed and structured geospatial reference data available. These data provide the basis for all spatially-referenced information, using which mainly infrastructure tasks can be resolved. Besides, the assurance of property ownership is guaranteed.

The licensed surveyors and the other official surveying agencies contribute to the update of the real estate cadastre using their official surveying results. The land register and finance authorities are still agencies with permanent communication to the real estate cadastre.

The established users include land owners, authorities, local authorities, planning offices, banks, insurance companies, supply utilities and waste disposal companies. Recently added are companies which refine and resell the geospatial data. Administrations and associations with their specialised requirements want to use the real estate cadastre and expect compatible data.

The standardisation of the official data since the end of the Nineties has become increasingly more important here. For this purpose, standards for the collection and homogeneous management of the real estate cadastre data as well as the provision of products are coordinated and qualified for the application.
The following pages show the important developments and decisions for the real estate cadastre in the last 10 years.

Content of the real estate cadastre

The real estate cadastre data belong to the geospatial reference data. These are official surveying and mapping data which present and describe the landscape, the real estate and the georeferencing based on a standardised geodetic spatial reference - independent of application. They are the basis for specialised applications with spatial reference.

Core data

A nationally comparably structured recorded documentation in the real estate cadastre is essential for the nationally active users and the GIS industry. The real estate (cadastral parcels and buildings) data, which should be managed as core data and mandatorily displayed in standard presentations, should be provided in the same way by all Federal States.

ALKIS core data occurring feature types
Cadastral parcel
Specific cadastral parcel boundary
Boundary point
Building
Position
Actual use
Responsibility
Municipal area
minor control point
Point location
Posting sheet
Posting location
Name number
Person
Group of persons
Address
Stipulation according to the road laws
Stipulation according to the water laws
Other stipulation according to federal law

Fig. 16: ALKIS® core data

Standardised official statements for the property usage are required for statistics, development planning, residential and environmental management, promotional programmes and for private purposes (e.g. land plot usage and financing). A catalogue with highlighted term definitions has been defined (AdV utilisation types catalogue).

Importance of the real estate cadastre

The real estate cadastre

- ➤ being created before 1900 modern again and again
- ➤ supplier of geospatial reference data for infrastructure and assurance of property ownership
- ➤ licensed surveyors contribute to the update of the real estate cadastre
- ➤ accordance with the land register is guaranteed

Content of the real estate cadastre

AdV definition of geospatial reference data

Geospatial reference data are data of the official surveying and mapping that present and describe the landscape, the real estates and the georeference based on a standardised geodetic spatial reference - independent of application. They are the basis for specialised applications with spatial reference.

Core data of the real estate cadastre

- ➤ nationally comparably structures in the real estate cadastre for parcels and buildings is required
- ➤ AdV utilisation types catalogue was implemented mainly for statistics
- ➤ structured metadata catalogues serve as standardised description of the data.

Unified outputs

- ➤ Portrayal and layout as well as the data contents will be harmonised nationally
- ➤ state-specific presentations remain possible as an option

AdV utilisation types catalogue
utilisation types domain
utilisation types group
Residential area
housing area
commercial and industrial area
Dump
mining site
open pit, cavern, quarry
area of mixed utilisation
area with special functional imprint
area for sport, leisure and recreation
cemetry
Traffic
road traffic
way
square
railway traffic
air traffic
shipping traffic
Vegetation
agriculture
forest
grove
heathland
marsh
swamp
without vegitation
Waters
body of flowing water
port basin
body of standing water
ocean

Fig. 17: AdV utilisation types catalogue

Metadata

The Federal States manage selected metadata elements for the establishment of metainformation systems. For example, these include information about

- ➤ restriction of use,
- ➤ quality of the data,
- ➤ update,
- ➤ the geodetic reference system,
- ➤ expansion,

with refererence to

- ➤ the feature catalogue,
- ➤ the portrayal catalogue and
- ➤ contact information.

Portrayal

Portrayal and layout of the outputs are made according to the specifications of the ALKIS® portrayal catalogue. The Federal States usually output in their state-specific presentations, however they should also be able to provide nationally standardised outputs.

Management of the data at the Federal State boundaries

A seamless transition for the presentation of spatially referenced objects in the real estate cadastre should be realised for cross-state usage of the real estate cadastre data.

Implementation of the Authoritative Real Estate Cadastre Information System ALKIS®

The central theme in all bodies of the AdV is the implementation of ALKIS® within the next years. It is planned to implement ALKIS® in all Federal States by the end of 2010.

Apart from ALKIS®, state-specific analogue or digital cadastral records, which will continue to be managed, used and archived, contain relevant decisions as documents for the purpose of cadastral law and are used for updating ALKIS®. These are basically only available for the parties, courts of law and qualified persons.

Development of technical standards for real estate surveying

The real estate cadastre data are collected and described based on a standardised geodetic spatial reference.

The previous concept of establishing and maintaining state-wide terrestrial minor control points has been abandoned with the use of satellite surveying methods using the satellite positioning service of the German state survey - **SA*POS*®** service - for real estate surveying. Minor control points should only be established where **SA*POS*®** cannot be used.

The successive establishment of a coordinate-based real estate cadastre is supported by corresponding surveying methods. For this, a standardised protocol for the **SA*POS*®** and tachymeter measurements called „MessDokLika“ has been developed in order to facilitate manufacturer-independent software solutions with low development costs.

Implementation of the Authoritative Real Estate Cadastre Information System ALKIS®

ALKIS® - the main topic in AdV

- ➤ maintenance and further development of the AFIS®-ALKIS®-ATKIS® data model in cooperation with the AdV working groups
- ➤ migration in the Federal States between 2008 and 2012
- ➤ for actual status refer to www.AdV-online.de

Development of technical standards for real estate surveying

Technical innovation for cadastral surveyings

- ➤ surveyings based on the spatial reference system ETRS89 with UTM projection
- ➤ use of satellite surveying methods using the satellite positioning service of the German state survey (SA*POS*®)
- ➤ maintenance of state-wide terrestrial minor control points has been abandoned
- ➤ permanent extension of the coordinate cadastre with high quality of the numerical cadastral records

Measures for updating the data registered in the real estate cadastre

- ➤ Actual information in the real estate cadastre
- ➤ daily updates at owner´s request and on the basis of the information of the authorities
- ➤ up-to-dateness in the document of the land use
- ➤ topical registration of the buildings

Actions for the updating of the data documented in the real estate cadastre

The long achieved standard has always been the daily updating of the data in the primary database based on applications of the property owners or information from other authorities. Further requirements are the following:

Up-to-dateness of the utilisation types

In order to optimise the area-wide updating of the utilisation types according to the AdV utilisation types catalogue, the demarcation of actual uses in undeveloped areas should be made primarily from aerial photographs. Other external sources will be verified.

Redundant data collections should be avoided in favour of a continuous process-oriented operation. This can be possible using a common ALKIS® / ATKIS® technical schema and the resulting harmonisation of the feature catalogues.

Timely recording of the buildings

Different users, in particular the energy industry, expect top up-to-dateness of the building documentation in the real estate cadastre. The Federal States use corresponding information and reporting methods in order to arrange the recording of the buildings without delay.

Products of the real estate cadastre

The AdV has the objective of arranging and defining the real estate cadastre data in the complete system of geospatial reference data of the official surveying and mapping as well as facilitating the efficient sale of new products in line with market requirements and also via central distribution points. The provision of the products is subject to the fees regulation for the issue of geospatial reference data decided by the AdV in 2007.

Standard outputs

The following products are available as modelled outputs in ALKIS®:

- digital extract from primary database,
- user-related update of primary database,
- revision data records to the administration of justice (land register administration),
- real estate map, optionally with soil classifacation for valuation,
- cadastral parcel document, optionally with soil classifacation for valuation,
- cadastral parcel /property owner document, optionally with soil classifacation for valuation,
- plot certificate,
- primary database,

- building documentation,
- point documentation,
- real estate map with cadastral parcel and property owner information, optionally with soil classifacation for valuation including state-specific topography,
- update notification,
- update communication to property owner / finance authority,
- statistics of the areas of actual use and
- statistics of the areas according to valuation law.

These products will be provided as nationally standardised standard outputs. Other products can be defined state-specifically with regard to form and content.

Other product potential

New product variations for specific application areas can be produced supplementing the standard outputs using selection and combination of available geospatial reference data.

- **Official house coordinates**
  The official house coordinates define the precise position of a house. The data source is the real estate cadastre of the Federal States and thus the official register of all land parcels and buildings in Germany. The data records basically contain data records with coordinates which represent the buildings and their (postal) addresses. The content and delivery interface as well the fees for the „house coordinates“ have been defined in a standardised way. More than 19 million house coordinates are managed nationally. The product is maintained centrally for all Federal States and is usually acquired by major customers for transfer to third parties.
- **House outlines** are building objects with house outline and their association to the local authority, a supplement of the official house coordinates in a manner of speaking. The central provision is in preparation, in the meantime with data from eleven Federal States.
- **Planning maps in the target scale 1:5 000** come from ALB/ALK (ALKIS® and ATKIS®) databases; the content can be derived from the geospatial reference data in an automated way. This basically concerns the output of a geotopographical map with cadastral parcel layers. They can be obtained in some Federal States.
- **Combinations of outputs of the real estate cadastre and digital orthophoto** can already be realised with information systems and show the cadastral parcel oriented representation of the landscape.

Products of the real estate cadastre

Future orientation to the requirements of the products of the real estate cadastre

- standard outputs in accordance with the market
- permanently enhanced product potential
- national harmonised provision
- transparent the fees regulation and reasonable fees

Provision of geospatial reference information of the real estate cadastre via internet technology

Potential of geospatial reference data

- technical pre-conditions can be taken for granted
- cadastral data meet the norms and standards
- product range will be regulated

Technical agreement with authorities and agencies

The Real Estate Working Group (AK LK) monitors the requirements of other technical areas as a permanent task. Thus, the geospatial reference data are provided to potential actors and interpreted for different technical use; possible applications are presented.

The legally recognised technical communication with other areas justified by public law is also made whereby their data are taken over for the real estate cadastre.

Interaction with the electronic land register

With the ALKIS® development, the technical and normative requirements for the exchange of data between real estate cadastre and land register and the possibilities for common maintenance of databases which are available in both systems have basically been created. The AdV is collaborating with the Government-States Commission for Data Processing and Rationalisation in the Judiciary to update the principles for the interaction and the technical requirements for the exchange of data between ALKIS® and the mechanically managed land register, first defined in 1999.

Connection to the Land Consolidation Technical Information System

In collaboration with bodies of the Task Force for Rural Development, the LEFIS Land Consolidation Technical Information System, currently in development, will be created according to the conventions of the AAA model. Thus, the previous technical communication will be optimised.

Agreement with the statistics authorities

According to the federal Agricultural Statistics law, the actual usage data are evaluated annually by local authority and provided to the statistics authorities. The utilisation types catalogue of the AdV and the actual utilisation types in ALKIS® have been produced from close collaboration with the statistics authorities.

Support of the networked standard ground value information system concept

The AdV is advocating the standardisation of the land plot value determination data.

The GDI-compliant model of the Networked Standard Ground Value Information System (VBORIS) has been produced according to the AAA data model. The AK LK is technically supporting the „Gutachterausschüsse ONLINE“ joint portal for the access to VBORIS. National issues of the land plot value determination are also being discussed in the working group

Fig. 18: Logo VBORIS

Support of legislative projects

The AK LK monitors and supports various Federal Government legislative projects as a permanent task.

Examples of these are

- reform of the ground evaluation law,
- property tax reform,
- reform of the inheritance tax law,
- national legislation for the implementation of INSPIRE and GDI-DE,
- railway rearrangement and the
- census preparation.

Outlook

Apart from the continuous agreement and realisation of the current actions, the AK LK will soon investigate other possibilities for the harmonisation of the ALKIS® core data with AFIS® and ATKIS® because the AdV considers the integrated management of the geospatial reference data as one of the most important objectives of the national collaboration.

Technical agreement with authorities and agencies

Technical communication

- coordinated Interaction with the electronic land register
- data collection will be harmonised between ALKIS® und LEFIS
- the real estate cadastre provides the basis data for the statistics authorities

Real estate valuation

- purchase price information systems are attended
- the concept of the networked standard ground value information system was developed by AdV
- questions concerning real estate valuation are discussed

Outlook

Future of the real estate cadastre

- quality assurance
- coordination with users
- monitoring of user requests

Geo-topography Working Group

The AdV working group acting as the Geo-topography Working Group (AK GT) since 2001 can look back on a long tradition. Until 1996, the Topography working group dealt with topics for the acquisition and documentation of geotopographical core data and the manufacturing and updating of the German base map 1:5 000. The Cartography working group dealt with topics for the manufacturing and updating of topographical map books and special editions derived from these. With the model sheets for the German base map and the topographical map book, both working groups created the basics for the establishment and management of a nationally standardised map book under the existing federal structures in the Federal Republic of Germany.

With the reunification of Germany in the year 1990, both working groups faced a new challenge. Solutions for a prompt merging of the „East“ and „West“ topographical map books had to be found. At the same time, it was also a matter of applying potentials arising from the technical development, particularly in the area of information and communication technology, to the recording, management and presentation of geospatial reference data describing the landscape. With the publication of the documentation for the implementation of the Authoritative Topographic-Cartographic Information System (ATKIS®) in the year 1989, both working groups faced the task of supporting the implementation of ATKIS® in the Federal States and for the Federal Government. The holistic approach of ATKIS® also required a reorganisation of the AdV technical working groups. This was completed in 1996 with the merging of the Topography and Cartography working groups into the Topography and Cartography Working Group, which, at the beginning, still felt obliged to the conceptual tradition.

ATKIS® – The Authoritative Topographic-Cartographic Information System of the official surveying and mapping

In the years 1985 to 1989, the ATKIS® project was conceived by the AdV with the objective of transferring the existing topographic map book 1:25 000 and smaller into a digital, object-based database, the Digital Landscape Model (DLM). From it, the future topographic map books should be derived via Digital Cartographic Models (DKM). With integration of the new Federal States in the ATKIS® project from 1991, taking account of the developments in the geospatial data market as a whole and the requirements for increasingly more modern geoinformation and communications systems, ATKIS® was further developed

and presents itself today as the topographical basic information system of the AdV for descriptive landscape geospatial reference data. The original model approach with the DLM and DKM modules has given way to a complex model approach which takes account of the current requirements for a topographical basic information system. ATKIS® today includes the Digital Landscape Models, Digital Terrain Models, Digital Topographic Maps and Digital Orthophotos components. The modelling requirements for these components, documented in the feature and portrayal catalogues, and the agreements of standards for the descriptive metainformation and product creations ensure for the possibility of regional diversity a largely national standardisation in ATKIS®.

The AK GT is obliged to maintain the ATKIS® project, adapt the ATKIS® components to current needs and to clarify issues arising from the merging of the databases of the Federal States into one homogeneous database for the territory of the Federal Republic of Germany. In this context, the AK GT is also involved with the principles of usage rights and fees.

Digital landscape models

Digital landscape models (DLM) describe the topographic landscape objects using object-related modelling. The individual objects are defined in terms of their position, form, name and characteristics. These identity characteristics and attributes are coded alphanumerically. In a feature catalogue, the object creation rules for the ATKIS® DLM component and the contents for the individual DLM are specified. The ATKIS® DLM component includes the basic landscape model, which, within the bounds of the model accuracy, is complete and provides precise positioning. It also includes the DLM50, DLM250 and DLM1000, all of which can be derived from this using model generalisation.

The AK GT is supporting the establishment and the update of the landscape models. In doing so, the content specification of the individual DLMs, the issue of the ATKIS® feature catalogues and their further development for new requirements as well as the assurance of the compatibility of the landscape models with each other and with the other ATKIS® components are in the foreground.
Furthermore, the AK GT provides the state survey institutions with a forum for exchanging experiences with many different technological approaches and methods for collecting and updating the topographic landscape objects. The possibilities of updating the Basic DLM using mobile data collection methods in the field are analysed and issues of

ATKIS®

Geotopographic reference data for Germany

1989 Publication of the ATKIS® documentation

1995 Analysis of the ATKIS® project with users, scientist and GIS manufacturers

1995 Updating of the ATKIS® documentation

1997 Concept fort he common ALKIS®/ATKIS® data model

1998 ATKIS® product catalogue

2008 ATKIS® documentation in the GeoInfoDok

ATKIS® component Digital Landscape Model (DLM)

Vector data for highest demands

1997 Completion of the first level of the Basic DLM

1998 Criteria for up-to-dateness for Basic DLM

2000 Project ATKIS® model and cartographic generalisation

2006 Completion of the DLM50

2007 Publication of the DLM50 business graphics

information management for the timely recognition and collection of change information are technically evaluated.
With the availability of the Basic DLM in its first realisation stage from the middle of the Nineties, the AK GT managed the technical discussion with initial users and technical users about data quality and future requirements for this geotopographical database. Apart from issues concerning the specification of the feature catalogue, the up-to-dateness quality criterion also had to be dealt with. In former times, an approx. five-yearly update cycle due to technical reasons had been accepted by the users for the management of the topographic map books. Now, however, the state survey institutions face the challenge of promptly documenting changes in topographical landscape objects in the Basic DLM. Specifications for ensuring prompt updating of prominent landscape objects, mainly the transport network and the administration structures, have been made in a catalogue of feature types, attributes and attribute values with top up-to-dateness. This catalogue is also subject to examination for adaptation to current requirements. With the intended national availability of the Basic DLM in 2009 in its final 3rd realisation stage, the state survey institutions face the task of transferring this database into the common AFIS®-ALKIS®-ATKIS® data model. The AK GT will support this task.

Digital terrain models

Digital terrain models (DGM) record the physical surface of the land. They describe the terrain of the land using with points georeferenced by position and height, which are arranged in regular grids. Furthermore, DGMs can contain vectorial structure elements in the form of terrain form lines and particular terrain points such as crest and trough points. The object creation rules for the ATKIS® DGM component are specified in a feature catalogue and the contents for the individual DGM are specified. The ATKIS® DGM component includes DGMs with different quality levels (DGM5, DGM25, DGM50, DGM250 and DGM1000) and the DGM2 for the special requirements of flood protection. The latter must be created with a height accuracy of < 1 m dependent on terrain type and a grid width of < 15 m at least for areas which can be flooded in the case of high water or their flooding is used to avoid flood damage.

With the start of the collection of the first topographic landscape objects in the implementation of the original ATKIS® concept, it became clear that, assuming different requirements for DLM and DGM objects and the associated collection methods and applications and last but not least the data storage and use, DGM must be established as an independent ATKIS® component. For this, the AK GT has created the basics in the form of the features catalogue and taken over the catalogue maintenance.
Until the middle of the Nineties, the state survey institutions only had very time-consuming and cost-intensive methods for the collection of DGM data, i.e. local surveying and mapping as well as the photogrammetric evaluation, at their disposal. The development of aircraft-supported radar and laser scanner measuring methods at the beginning of the Nineties showed alternatives. These methods were tested, assessed and requirements profiles for the quality requirements for the DGM of the official surveying and mapping were created in the AK GT with pilots in various state survey institutions. Even if the laser scanner method has established itself today as the most effective method for the collection of wide-area and high-precision DGM grid data, the creation and management of the DGM remains a time-consuming and complex task in the state survey institutions.

Following an evaluation of the high-water catastrophes at the beginning of the 21st century of the rivers Danube, Elbe and their tributaries, actions were initiated by the Federal Government in order to be able to avoid or reduce future damage resulting from flooding. These actions contained the task for the official surveying and mapping to derive a homogeneous DGM Germany by means of computerised merging from the digital terrain models of the state survey institutions and data reconciliation at the Federal State boundary areas. This DGM Germany is available with a terrain type dependent height accuracy of ± 1 m to ± 3 m and a grid width of 25 m. The AK GT developed the product standard for this and supported the product implementation.

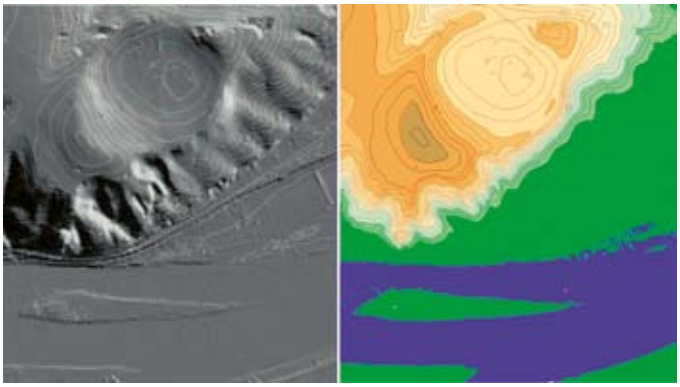


Fig. 19: Visualisation of laser scanner data in combination with contour lines

Digital topographic maps

Digital Topographic Maps (DTK) are derived from the corresponding Digital Landscape Models and Digital Terrain Models using computerised generalisation and presentation methods. The description of the landscape is made using portrayals, text and colouring. The projection rules, the portrayal and the contents for the individual DTK are specified in a portrayal catalogue for the ATKIS® DTK component. The ATKIS® DTK component includes the topographic maps with the scales 1:10 000, 1:25 000, 1:50 000, 1:100 000, 1:250 000 and 1:1 000 000. Until the topographic map books that to be created on the basis of the ATKIS® portrayal catalogues are available, the Federal Government and its States will update the conventional topographic map books within the required scope (also as preliminary stages of the new DTK if necessary), keep them ready for printing and store them as raster data record for diverse applications.

The portrayals catalogue for the DTK25 was published in 1998 as the first in the series of the ATKIS® portrayal catalogues. This publication was the result of a Cartography Working Group process started in 1989 for the further development of the map graphics of the Germany

ATKIS® component Digital Terrain Model (DGM)

Detailed hight information of the earth´s surface

1996 Studies concerning radar and laser scanner technologies

1996 Take over of German Federal Armed Forces for civilian use

2001 Principles for a DGM Germany

2003 Extension of DGM Germany for the demands of flood protection

ATKIS® component Digital Topographic Maps (DTK)

Raster data of high quality cartography

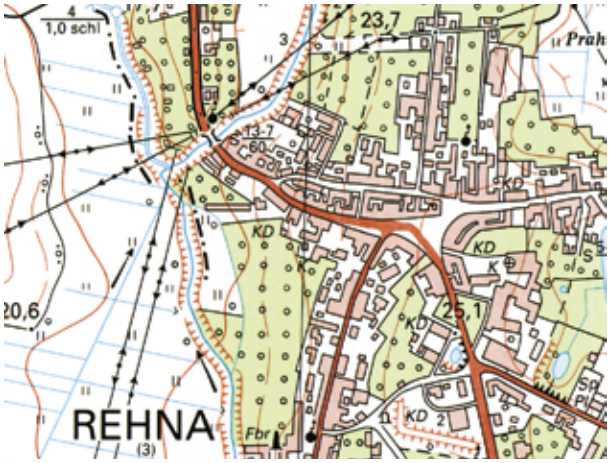
1995 First tests fort he future Topographic Map 1:25 000

1998 Publication of the CD-ROM series Top50/Top200

2000 Government-States–Agreement on the civil-military topographic map book 1:50 000

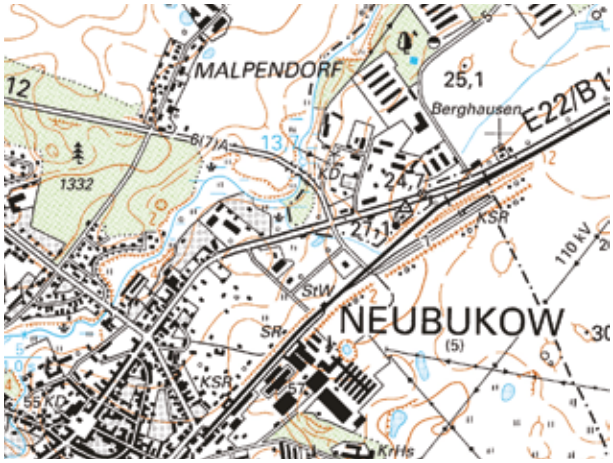
2006 Government-States–Agreement on the civil-military topographic map book 1:100 000

2007 Provision of the Web Mapping Service for DTK



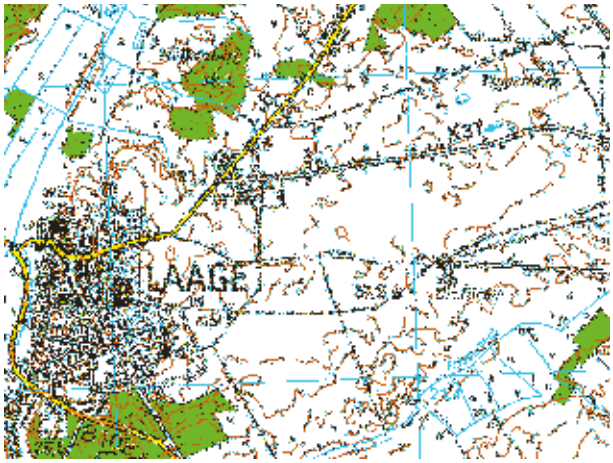
Topographic Map 1:10 000 (excerpt)

Digital Topographic Map 1:10 000 (excerpt)

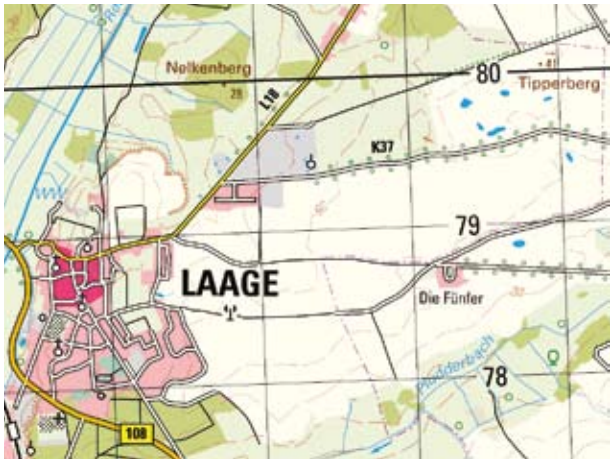


Topographic Map 1:25 000 (excerpt)

Digital Topographic Map 1:25 000 (excerpt)



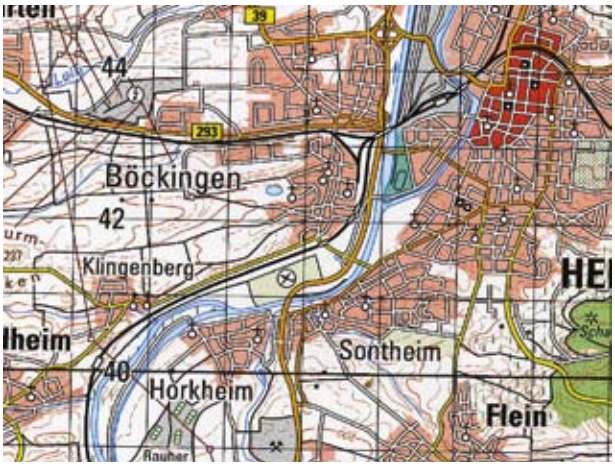
Topographic Map 1:50 000 (excerpt)



Digital Topographic Map 1:50 000 (excerpt)

Fig. 20a: Development of the map graphics in the topographic map books

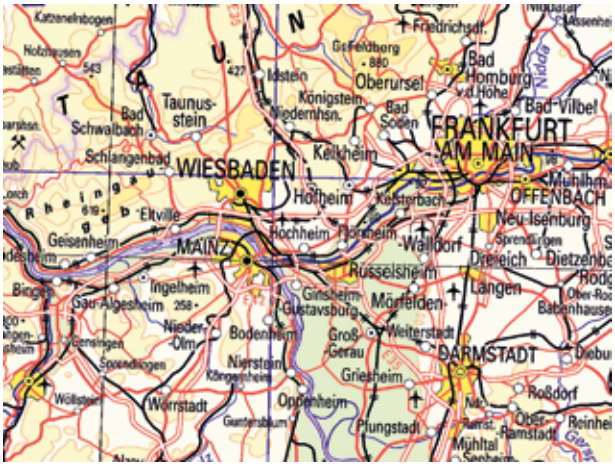
Topographic Map 1:100 000 (excerpt)



Digital Topographic Map 1:100 000 (excerpt)

Topographic Overview Map 1:200 000 (excerpt)

Digital Topographic Map 1:250 000 (excerpt)



Topographic Map 1:1 000 000 (excerpt)

Digital Topographic Map 1:1 000 000 (excerpt)

Fig. 20b: Development of the map graphics in the topographic map books

topographic map book resulting from the implementation of graphical cartographic presentations and the requirements for modern official maps arising from changes in society. Map samples 1:25 000 covering different landscapes from the coastal area to residential structures (villages, small town, large city) to the high mountain range were developed and published for discussion. Design principles were developed from this very comprehensive work on the basis of which the actual detail work of the portrayal design was carried out. In a further discussion of the map graphics, particularly for the medium and small scale maps, military geographic and European requirements were taken into account. For the DTK50 and DTK100, this resulted in a graphical re-design of the residential areas and a merging of the previously separately issued civil and military editions into future joint civil-military topographic maps 1:50 000 and 1:100 000. The portrayal catalogues are now available for all DTKs. In some Federal States, area-wide DTK10, DTK25 and DTK50 are already available and/or in progress. The DTK1000 is also available.

Figure 20 shows the development of the map graphics in the topographic map books.

With the merger of the raster data records into a national data set per topographic map book, it was possible for the official surveying and mapping to present the topography of Germany in a series of CD-ROMs jointly issued by the Federal Government and the Federal States. This CD-ROM series is based on the raster format topographic map 1:50 000 and the topographic overview map 1:200 000 and is offered under the „Top50“ and „Top200“ descriptions. The AK GT has prepared the product implementation and supported the publication of new versions with the agreement of expanded content and functions since version 1.0, which was nationally available in 1998. Version 5.0 will be nationally available by the end of 2008 and will contain, in addition to the 3D view and the possibility of an overflight, mainly functional expansions such as the client/server capability, which can be activated with a licence key, the integration of a plug-in for planning, upload and download of GPS routes for GPS receivers as well as freehand drawing on a touch screen or with a mouse.

Fig. 21: CD-ROM Top50 – Cover

Digital orthophotos

Digital orthophotos (DOP) supplement the ATKIS® components. Due to the image-based documentation of the landscape, DOP are designed for viewing-oriented applications. With the management of DOP, the AdV is pursuing the objective of maintaining the aerial photographs of the topographic state recording in a national standard for further uses.

High resolution aerial photograph data, produced on the basis of aircraft-supported remote sensing methods, are an essential component for the collection of current topographic landscape objects for the creation and updating of digital landscape and digital terrain models. High resolution aerial photograph scanners and the associated evaluation technologies, which enabled the integration of aerial photograph data in the computerised data collection process, were available to the state survey authorities from the middle of the Nineties. At the beginning of the 21st century, the replacement of analogue photographic technology by digital aerial photography technologies emerged with the first marketable digital aerial photography cameras. The technical evaluation of these aerial photography technologies as well as the necessary special software for the data evaluation and use became increasingly important in the AK GT. Apart from issues of quality requirements for digital aerial photography and the data transfer and evaluation, the state survey authorities must solve the problems of data compression and historical data management in the terabyte range. The replacement of black and white aerial photographs by colour aerial photographs supplemented by infrared aerial photographs for environmentally relevant evaluations also arises due to the efficiency of the multi-channel recording of the digital aerial photography cameras. New possibilities for three-dimensional recordings of topographic landscape objects in the form of digital surface models also emerge from the combination of digital aerial photograph cameras and laser scanners.

With the establishment of standards for DOP products and the management of metadata, the AK GT has created the basis for the establishment of the ATKIS® DOP component and is supporting the merging of the DOP of the Federal States into one DOP Germany at the geodata centre of the Federal Agency for Cartography and Geodesy. DOP Germany is currently available with a ground resolution of 40 cm and will be available with a ground resolution of 20 cm by 2010. With the participation in the corresponding DIN bodies and projects with the German Society for Photogrammetry, Remote Sensing and Geoinformation (DGPF), the technical issues for digital aerial photography will continue to be supported by the AK GT in the future.

ATKIS® component Digital Orthophoto (DOP)

Raster data of high-precision georeferenced aerial photographs

1999 Framework of national standards for DOP

2004 Analysis of digital aerial camera systems and implementation of digital evaluation technologies

2006 Publication product standard for DOP

2007 Publication data set DOP Germany

Fig. 22: DOP – Extract of the Reichstag, Berlin

Copyright and sales

Together with the traditional range of official printed topographic map books, the range of digital topographic geospatial reference data as well as the corresponding PC-based application software, the use of this database has also established itself in administration and the economy. Apart from the provision of the topographic geospatial reference data on data storage media, web-based applications achieve an increasingly higher profile and geoportals, geoservices and geoviewers are developing into the standard for data provision and use.

Changes in the protection of the copyright, the conditions of use for official topographic geospatial reference data and usage fees entail this development, which the AK GT has actively supported with the development of fee structures for the data and maps. This area of activity has been transferred to the Public Relations and Marketing task force, taking account of the recently formed central sales structures for geospatial reference data of the official surveying and mapping as well as the requirements which thus arise for unified licence models.

Outlook

New requirements for the official surveying and mapping also arise from the INSPIRE directive which was decided by the European Parliament for the creation of a geospatial data infrastructure for the European Union and the parallel geospatial data infrastructure for Germany, the construction of which is currently in progress.

Thus, the subject-neutral ATKIS® components must be developed into homogeneous products which are nationally available using web technologies. The decentralised management in the state survey institutions therefore requires the agreement and implementation of product standards, which include the standards for the data provision, layer structures and the descriptive metadata, as well as the specifications for data content and quality. The AK GT will still have to check user requirements for the topographic geospatial reference data and evaluate technical developments for their use for the current management of the ATKIS® components as well as support their implementation.

Information and Communication Technology Working Group

Information and communication technology forms the technical interface between the spatial reference, real estate cadastre and geo-topography work. It supports the establishment of the geospatial data infrastructure (GDI) on the basis of official geospatial reference data using networks and geoservices. The focus is both the maintenance and further development of the AFIS®-ALKIS®-ATKIS® concept for the modelling of the geoinformation from the official surveying and mapping and the IT coordination of the GDI activities for the AdV at national level.

The Automation working group of the AdV was established in 1961; it received its current name of „Information and Communication Technology“ in 1989. Therefore the working group is not a newborn but with respect to its siblings, the other working groups, effectively a latecomer. However, this did not turn out to be a disadvantage for its development. 49 meetings in 47 years of existence are, as a first approximation, a clear indication of a continuous development.

That is sufficient for the personal details of the working group. In the following, the focus should be on the contents of its life, in fact basically on the last 10 years. The previous years have already been highlighted for the 50 years anniversary of the AdV.

If the core topics of the working group between 1998 and 2008 are considered, then these are marked by combinations of letters. It is striking here that three letters are involved in each case: WWW, GDI, WMS, WFS, AAA, ISO, OGC, XML, GML[1]. Using these abbreviations, the range of work is shown in the following.

[1] Defining explanations of GDI, WMS, WFS, ISO, OGC, XML, GML have been referred to in essential parts of the „Guideline for establishment and operation of web-based geoservices“ of the Inter-departmental Committee for Geoinformation (©Federal Agency for Cartography and Geodesy, Frankfurt am Main, 2006).

World Wide Web

The World Wide Web (WWW) is a subset of the Internet, but people sometimes use „Internet“ interchangeably with „World Wide Web“. The above no longer needs any further explanation today.

After the launch of www.adv-online.de in 1997, the AdV is already operating the third generation of its web presence today. The web content is stored in a Content Management System which enables the web design office of the AdV to keep the web pages up to date in a relatively uncomplicated way and with reasonable effort. In the meantime, the web site has become an indispensable part of the publicity work of the AdV and - with its embedded internal area - a convenient document server for the member authorities.

Email traffic is an integral part of the Internet. The AdV member authorities have made the exchange of email messages between their bodies the standard for the exchange of information.

Fig. 23: AdV website www.adv-online.de

Information and communication technology forms the technical interface between the spatial reference, real estate cadastre and geo-topography work.

The Internet is indispensable.

The geospatial data infrastructure is developing rapidly.

A Web Map Service visualises geospatial data.

Geospatial data infrastructure

GDI designates the user-friendly provision of geoinformation using services which access distributed geospatial data in an interdisciplinary and multi-level way. A GDI consists of a geospatial database, a geospatial data network, services and standards. It serves the purpose of acquiring, evaluating and applying geoinformation in all application areas.

The working group coordinates the GDI activities for the AdV with respect to information technology. In order to support the rapid GDI development as well as assuring the core competence and expert knowledge for the AdV in the areas of data modelling, data exchange and geoservices, the GDI Standards project group was established in 2004. The clear positioning of the official surveying and mapping within the GDI has significant importance. However, the geospatial reference data form the core component of the national GDI.

The measures that enable the web-based provision of the nationwide geospatial reference data must also be related to this context. The AdV has decided on an actions catalogue for this; its implementation has been started and its result is that the surveying and cadastral authorities make an important contribution to eGovernment.

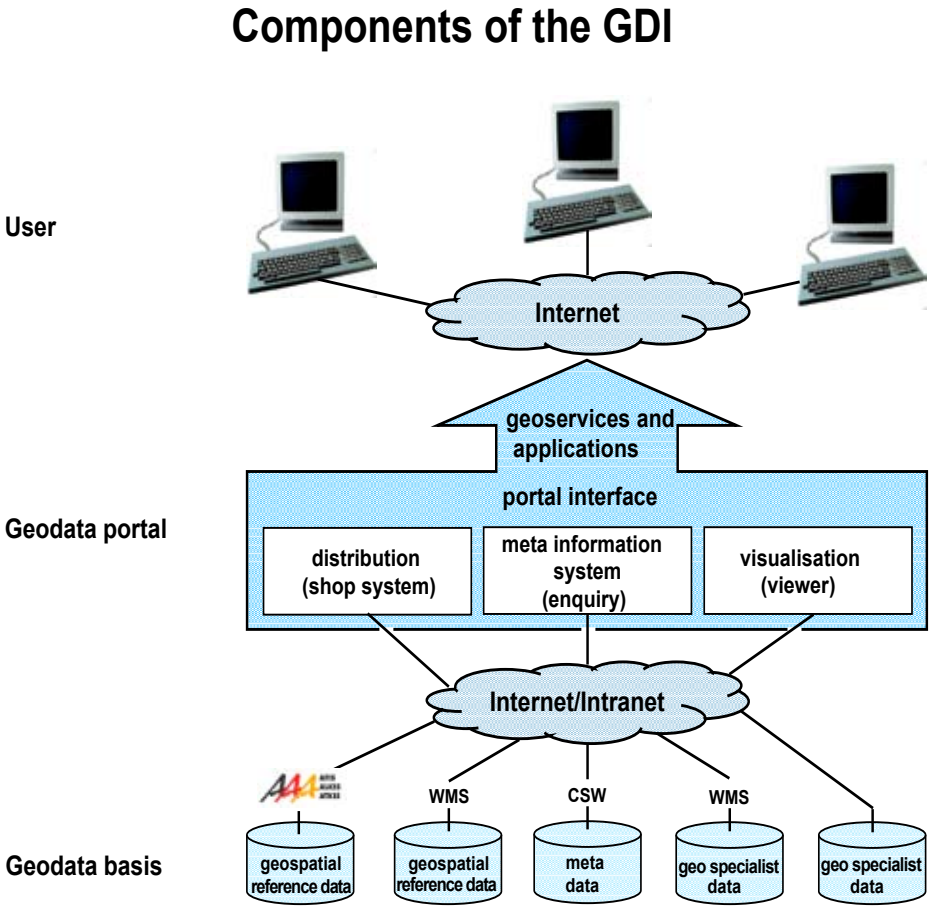


Fig. 24: Components of the GDI

Web Map Service

A Web Map Service (WMS) is used for the visualisation of geospatial data which is available online. A map is presented as an image as the result of the visualisation. Accordingly, no geometry data are transferred but their visual presentation as a georeferenced image as a standard-based web map. The geospatial data are converted to a simple raster image format and can be displayed with any common web browser.

The visualisation program (viewer) can be either on the user‘s computer or on a server of the provider. Server-based clients for the visualisation have become common and frequent in the meantime. Accordingly, for the viewing of WMS-based maps it is not necessary to install Geographic Information System software (GIS software), which is often linked with licences and corresponding costs for the user. A conventional web browser is sufficient. Furthermore, it is possible to integrate and use WMS services in modern GIS software via a WMS interface.

In 2004, the AdV made a resolution for providing the raster data of the topographic maps as standardised WMS services. Consequently, the working group occupied itself with the specification of the WMS application profiles for the geospatial reference data as the prerequisite for nationally standardised data provision.

A Web Feature Service facilitates the analysis of data.

AFIS®, ALKIS® and ATKIS® form the AAA model.

Web Feature Service

The functionality of a Web Feature Service (WFS) is limited to the graphical display of geospatial data in the form of static maps or images. If available, it is true that information about individual geoobjects specified in a WFS can be queried, however the analysis and interpretation of the geospatial data must be made by the observer himself. There is only as much information available to him as can be derived from the map presentation.

It is possible with the WFS to access the objects on which the data is based online. A WFS is limited exclusively to vector data. The user can visualise, analyse or process these data otherwise. Apart from read access, write access can also be made possible as an option.
A completely expanded, standards-compliant WFS provides five different operations using which geographic objects (features) can be added, updated, deleted, queried and found.

WFS services within the AdV are still in the prototype stage. Conceptually, the necessary developments have been initiated in order to be able to provide WFS services. For a first product, the Official House Co-ordinates, a profile was agreed within the Germany Online project which specifies the WFS interface. After the evaluation phase of the profile, other nationally standardised product standards of the AdV should be provided using WFS services.

AFIS®-ALKIS®-ATKIS®

The AFIS®-ALKIS®-ATKIS® model (AAA model) is used to merge the core data of AFIS®, ALKIS® and ATKIS® to one core database of the geospatial data of the official surveying and mapping. In the „Documentation for Modelling the Geoinformation of the Official Surveying and Mapping" (GeoInfoDok), the AdV projects AFIS®, ALKIS® and ATKIS®, with their nationally standardised features are commonly described and associated with each other in a general format.

All contents and relationships are described in an application schema which is specified in the Unified Modelling Language (UML). It consists of the basic schema and the technical schema. Basic properties of geoobjects are specified in the basic schema. It can thus be used as the basis for technical information systems. The arrangement of object classes, feature type groups, feature types and their attributes is specified in the technical schema. It includes all the information in the areas of spatial reference, real estate cadastre and geo-topography occurring in the official surveying and mapping for the member authorities of the AdV.

Fig. 25: AAA logo

The maintenance and further development of the AAA concept for the modelling of the geoinformation of the official surveying and mapping is a core task of the working group. Ten years ago, after ALKIS® and ATKIS® were still operating relatively independently of each other, an overlapping working group, the ALKIS®-ATKIS® Working Group was established. The geodetic control points of the state survey were also included in the ALKIS®-ATKIS® data model in the year 2000. Since then, the AAA family has become complete with AFIS®. The AAA coordination committee has now been active as a cross-working group body which responsibly supports the development and maintenance of the AAA model and also includes GIS manufacturers in its decision processes.

The results of this work manifested themselves in the „Documentation for the Modelling of the Geoinformation of the Official Surveying and Mapping" (GeoInfoDok), which, with version 6.0 from early 2008, reached a state which is assessed as mature for implementation by the member authorities of the AdV. With respect to the future maintenance of the AAA concept, the AdV expressed a guarantee of maintenance in 2005 to maintain AAA until at least the year 2012. This guarantee is both an order and an obligation for the AAA coordination body with respect to the support of the GeoInfoDok.

In the year 2004, the AdV issued a „Guideline for Modelling Technical Information using the GeoInfoDok“. Recommended actions for standards-compliant and future-proof modelling of the technical information system are given here. The AdV is thus making its expert knowledge available to third parties and is counting on synergy effects which result from geospatial reference data and technical data being subject to an equal modelling approach.

Based on a decision of the AdV in the year 2001, the conception and implementation of a quality assurance system for the geospatial data of the official surveying and mapping must be emphasised in the AAA coordination.

Using national standardised specification, naming and descriptive and quantitative quality features, the AdV identifies and guarantees the quality of the products of the official surveying and mapping. For this, national up-to-dateness, uniformity, completeness and availability of the products are essential characteristics. The member authorities guarantee compliance with AdV product quality by standardised test procedures and declare conformity with the AdV standards. The objective is comprehensive quality assurance for the geospatial reference data.

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

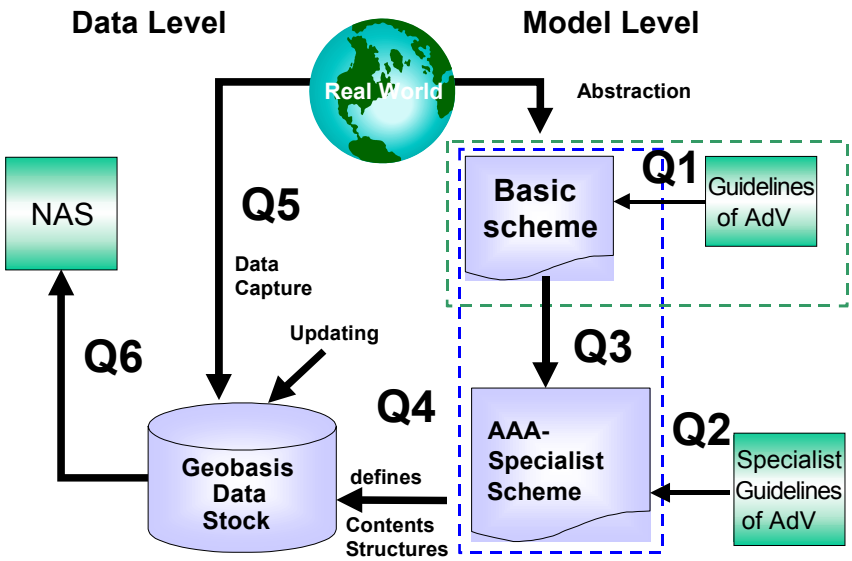


Fig. 26: Quality assurance model for the AAA application schema

Q1 measures the AAA basic schema against the strategic and technical stipulations of the AdV, Q2 measures the AAA technical schema

The AdV is guaranteeing to maintain AAA until at least 2012.

The AdV decides on a quality assurance system.

The AAA technical standard is standards-compliant.

against the technical stipulations of the AdV. Q3 determines whether the AAA technical schema corresponds to the regulations of the AAA basic schema. Q1, Q2 and Q3 verify the conceptional, internal quality. Q4 verifies the geospatial reference data database internally as a product for logical agreement with the AAA application schema and compliance with the quality specifications defined there while Q5 compares the geospatial database externally with the real world. Q6 concerns the quality of the standard-based data exchange interface (NAS) to the user.

The quality assurance principles for Q6 assume that when data is output from the AAA model, the created NAS files do not have to be checked against the model. The model-compliant implementation must guarantee this using the respective applicable schema files; interoperability must be guaranteed. Data migration is part of the qualifying process. For this purpose, appropriate test tools, which guarantee the quality of the migration data in terms of correct form and validity using the respective applicable schema files, must be available.

International Organization for Standardization

Fig. 27: ISO-Logo

The International Organization for Standardization (ISO) is the international association of standardisation bodies from approx. 150 countries. The ISO develops international standards in all technical areas (with the exception of electrical equipment and electronics). The purpose of the ISO is the promotion of standardisation in the world in order to support the exchange of goods and services as well as to develop mutual collaboration in different technical areas. The ISO develops ISO Standards, which should be adopted unchanged by the member countries (in Germany as DIN ISO standards). The ISO is also working on standardisation in the area of geoinformation with five working committees. The ISO 191xx family with 20 different standards must particularly be mentioned in this respect.

As early as 1999, the AdV argued for aligning the modelling of its information systems in compliance with ISO Standards. With this decision, crucial strategic directions were set and planning reliability - also for the GIS industry - were given at a very early time, when the standardisation work was from being completed. Today, the AAA technical standard is completely based on the ISO 191xx family.

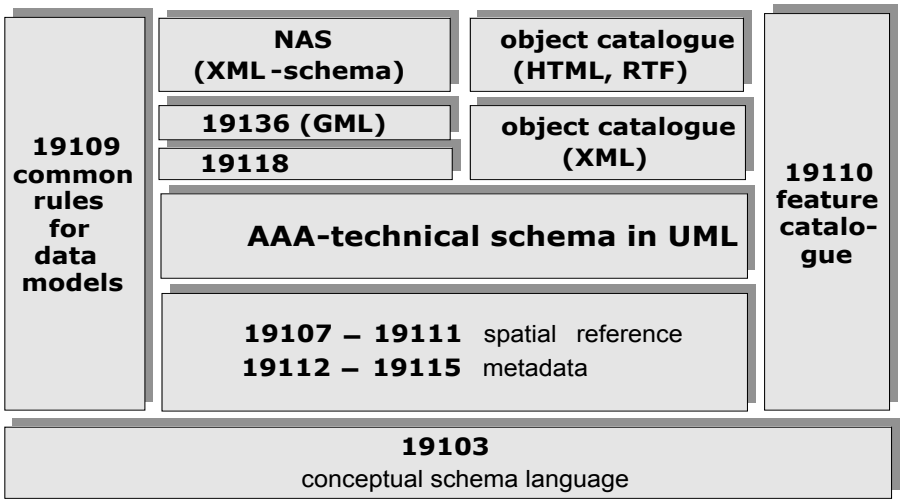


Fig. 28: AAA technical standard

Open Geospatial Consortium

The Open Geospatial Consortium (OGC), founded in 1994, is an international industrial consortium with almost 300 members from the areas of industry, public administration and research, which has set itself the objective of developing principles for standardised and thus interoperable access methods for spatially-related information. Today, it is the institution for the creation of the interface specifications necessary for interoperable geoinformation services.

The „OpenGIS Implementation Specifications“ of the OGC are worldwide freely available implementation specifications which can be used at no cost. In this way, information providers and application developers are able to provide the consumers with powerful products and services in the shortest time with high flexibility and low costs.

The ISO developments have been significantly influenced by OGC. The AdV made use of this perception in the years of the development work on the AAA modelling, foresightedly taking account of the OGC specifications. After their formal approval by the ISO bodies, the transition to the resulting ISO standards could then be completed relatively easily.

The Open Geospatial Consortium has an influence on the international standardisation.

The AAA data coding is based on the schema of Extensible Markup Language.

The AAA exchange interface uses the Geography Markup Language.

The AdV has been a member of the OGC since the beginning of 2008 in the form of a „Combined Technical Membership“.

Fig. 29: OGC logo

Extensible Markup Language

Extensible Markup Language (XML) is a web standard, based on recommendations of the World Wide Web Consortium (W3C). W3C is an international consortium where member organisations and the public work jointly on developing web standards. The objective of the W3C is to open up the complete possibilities of the World Wide Web by developing protocols and guidelines that ensure a long-term growth of the web. Another web standard based on recommendations of the W3C is the Hypertext Markup Language (HTML).

The NAS exchange interface of the AAA model is based on the XML standards. The XML schema provides – independent of the technical contents – the syntax for the data coding.

Geography Markup Language

With the Geography Markup Language (GML), the OGC has formulated an adaptation of the XML interface for the modelling, the transport, the storage and management of geographic information. A large variety of both simple as well as complex geometries and the characteristics of the objects (reference system, topology, dimensional unit, attributes, metadata, raster data, defined styles) are specified.

The GML has a particular role in the AAA model as this is used within the NAS for the description of the feature types. GML 3.2 was integrated in the ISO family (ISO 19136) in the year 2007. Thus, the last still missing component in the AAA model was also ISO-compliant and meets the corresponding AdV requirement in this respect from the year 1999.

Outlook

The range of work of the working group was, is and will remain versatile. A standstill in technological development cannot be detected. Due to the fusion of the information, data and telecommunications technologies, no areas in the official surveying and mapping can be localised which do not in one way or another make use of more or less information technology support. However, it could be the case that the rate of development in the coming years will be somewhat slowed - in fact not because the working group is approaching fifty years and distancing itself from youthful aggressiveness. Rather, such constraints in the official surveying and mapping could be caused by the still difficult situation of the public budget. The investments in AAA-compatible GIS will initially have to amortise before their expansion or even replacement is discussed.

The working group will arrange its activities under these basic conditions. It will support the developments strategically and conceptually. And it will develop foresighted solutions which will meet future requirements. In this respect, the Information and Communication Technology Working Group is looking confidently into the future. Whether this confidence will be justified in retrospect will be seen in the publication for the next AdV anniversary.

The working group is looking confidently into the future.

Public Relations and Marketing Task Force

Self-conception

All spatially-related planning and decision processes require geospatial reference data to link the relevant technical information with the corresponding location on the Earth's surface in each case. Such geospatial reference data consist of interest- and application-neutral descriptions of the topography of the Earth‘s surface (state survey) and the real estate (real estate cadastre). In order to ensure the availability of the geospatial reference data for the state and society, the surveying and mapping authorities of all Federal States are legally obliged to collect, manage and provide geospatial reference data.

With the provision of the geospatial reference data, the surveying and mapping authorities provide corresponding geospatial reference data products and usage services. The following work must be performed in the scope of this task:

- Establishment and maintenance of an effective geospatial data infrastructure must be coordinated and geospatial reference data services/portals must be developed and operated with the objective of making the geospatial reference data optimally accessible and usable.
- The requirements must be closely defined in order to match the provision as best as possible with the demand.
- The users and potential users must be regularly informed about the usability and availability of geospatial reference data (metadata) for optimum dissemination and usage.
- In the course of the licensing, the consumer must be advised with respect to the suitability of the geospatial reference data for the intended usage; a suitable offer must be submitted and the usage rights and costs related to the planned use must be regulated.
- Based on the requirements analysis in general and the concrete licensing in particular, the geospatial reference data must be provided as products and services, analogue and digital, with respect to their content and form so that they are tailored best possible to the various user groups and the actual usage.

Requirement

The Federal States have the constitutional legal responsibility for the official surveying and mapping. However, since the need for many spatially-related applications goes beyond the provision of geospatial reference data within one Federal State, it is necessary to maintain a nationally standardised provision and make it accessible to the „geomarket“. The standardisation for the collection and management of the geospatial reference data should be guaranteed by the joint standardisation of the products and the production methods in the diverse bodies of the AdV.

In order to cope with the requirements with respect to national availability and usage of the geospatial reference data as a whole, the association of the surveying authorities of the Federal States and the federal department concerned must also be organised and actively involved with the national provision of the geospatial reference data.

Self-conception

- Collection, management and provision of geospatial reference data

Requirements

- nationwide, nationally standardised, current, geospatial reference data satisfying the requirements
- national provision
- standardised national provision

Model

Three central distribution points have been established for the national distribution of geospatial reference data. With the objective of a corresponding perception of the official surveying and mapping for the national provision of the geospatial reference data as well as achieving and permanently ensuring an overall optimum satisfaction of the national requirement, it was decided in Autumn 2005 to institutionalise the resolution with the tasks of Public Relations and Marketing (PRM). A new permanent body, the Public Relations and Marketing Task Force (TF PRM) has been established for performing this task. According to the resolution mentioned, the working groups and the AdV office, including the member authorities should ensure the operative PRM tasks in relation to the national provision of geospatial reference data and also collaborate in the TF PRM.

Since then, the TF PRM has been obligated to perform the operative business of Public Relations and Marketing for the nationally available geospatial reference data as well as the national provision of the geospatial reference data of the official surveying and mapping. In doing so, the following subject areas must be covered:

- Requirements analysis (market research)
  Collection and documentation of the state and society requirements for the geospatial reference data,

Elements of the provision

- Collection, documentation and analysis of the need
- Product development based on the requirement
- Development and updating of suitable licence models
- Accomplishment of a suitable infrastructure
- Information about usability and availability of geospatial reference data
- Regulation of the usage rights and data output
- Image building actions

- Product development (product policy)
  Analysis of the state and society requirements for geospatial reference data and comparison with the available geospatial reference data,
- Licence models (conditions policy)
  Establishment and maintenance of the licence and costs models and sample licence agreements for the provision and usage of the geospatial reference data,
- Infrastructure
  Support of activities for the performance of a strategic and technical infrastructure for the provision and usage of geospatial reference data,
- Product information (marketing)
  Carrying out actions for information about the availability and usability of the geospatial reference data,
- Licensing (distribution policy)
  Execution of example licensing for national use of geospatial reference data and
- Image building (Public Relations)
  Execution of actions for the (positive) perception of the official surveying and mapping and its national geospatial reference data.

Development

The development from a product-oriented to a needs-oriented view of the collection, management and provision of the geospatial reference data as well as to an intensified involvement with all aspects of provision according to requirements have been completed gradually. The background for the change was a new understanding with respect to providing the state and society with geospatial reference data as well as the in this context increasing focus on alignment with needs of state actions in favour of optimised target fulfilment. It was now particularly a matter of achieving optimum distribution of the geospatial reference data which meant a consequent orientation to needs in all parts carrying out the task. As regards the new perspective, the official surveying and mapping had to provide national geospatial reference data matching the needs.

The involvement of the AdV with the national provision of the geospatial reference data up to the establishment of the TF PRM developed as follows:

- 2001: joint financing of public relations tasks,
- 2002: Establishment of a PRM working group for development of a strategy for PRM,
- 2002: Development of a user-oriented PRM strategy,
- 2003: Resolution of the „Guidelines for the marketing and PR strategy of the AdV“ and implementation of a PRM Strategy Group (SG PRM) for clarification of the implementation of the guideline,
- 2003: Development of product sheets for the „marketing-relevant“ geospatial reference data products,
- 2004: Discussion of the „Streamlining of the work structures“ of the SG PRM in favour of higher effectiveness and efficiency,
- 2004: Assignment of the SG PRM with the development of „PPP business models“ and „Model licence agreements“ and assignment of the advisory group with the clarification of the future organisation of PRM,
- 2005: Resolution that from now on the operative PRM tasks will be ensured by the working groups and the AdV office including the member authorities, that the President of the AdV has the strategic responsibility for PRM and that the President of the AdV implements a plenum working group which develops the proposals for further implementation of the guidelines,

- 2005: Establishment of the TF PRM and a strategy group based on the previous resolution,
- 2006: Assignment and involvement of the TF PRM with concrete PRM tasks and the strategy group with the development of the „Strategic guidelines of the official German surveying and mapping“ and
- 2007: Resolution for the „Strategic guidelines“, the trade fair participation of the AdV, the AdV model licence agreements, the structure of a new AdV fees guideline and the tasks catalogue of the TF PRM.

Services

Requirements survey and requirements analysis

In the context of the sovereign actions of the surveying and mapping authorities, an organised requirements survey must be carried out because geospatial reference data products and services must be created and provided according to need. Accordingly, it must cover the production and provision on the part of the surveying and mapping authorities and requires that a task review follows the collection and analysis of the needs with the objective of scrutinising the current provision and adapting it where expedient and possible. In this complete process, the TF PRM is obliged to carry out the survey and analysis using model surveys as well as to communicate the results. The following task review takes place in the working groups of the AdV.

The Deutsche Dachverband für Geoinformation e.V. (DDGI), in accordance with its self-conception, is working towards a general improvement of the availability, usability and usage of geoinformation. In doing so, it sees itself as a neutral entity which equally represents the interests of all disciplines from the economy, science and administration. Due to its self-conception, the association is a suitable forum in order to communicate the geospatial reference data provision of the official German surveying and mapping in a concentrated manner to a representative group of representatives of the geomarket. Besides, it is able to receive representative feedback with respect to their requirements. The TF PRM is in constant contact with a corresponding technical group of the association, regularly discusses supply and demand aspects with it and develops proposals for adaptation of the supply of geospatial reference data.

Services for the national provision

- model requirements surveys
- active communication of supply and demand aspects

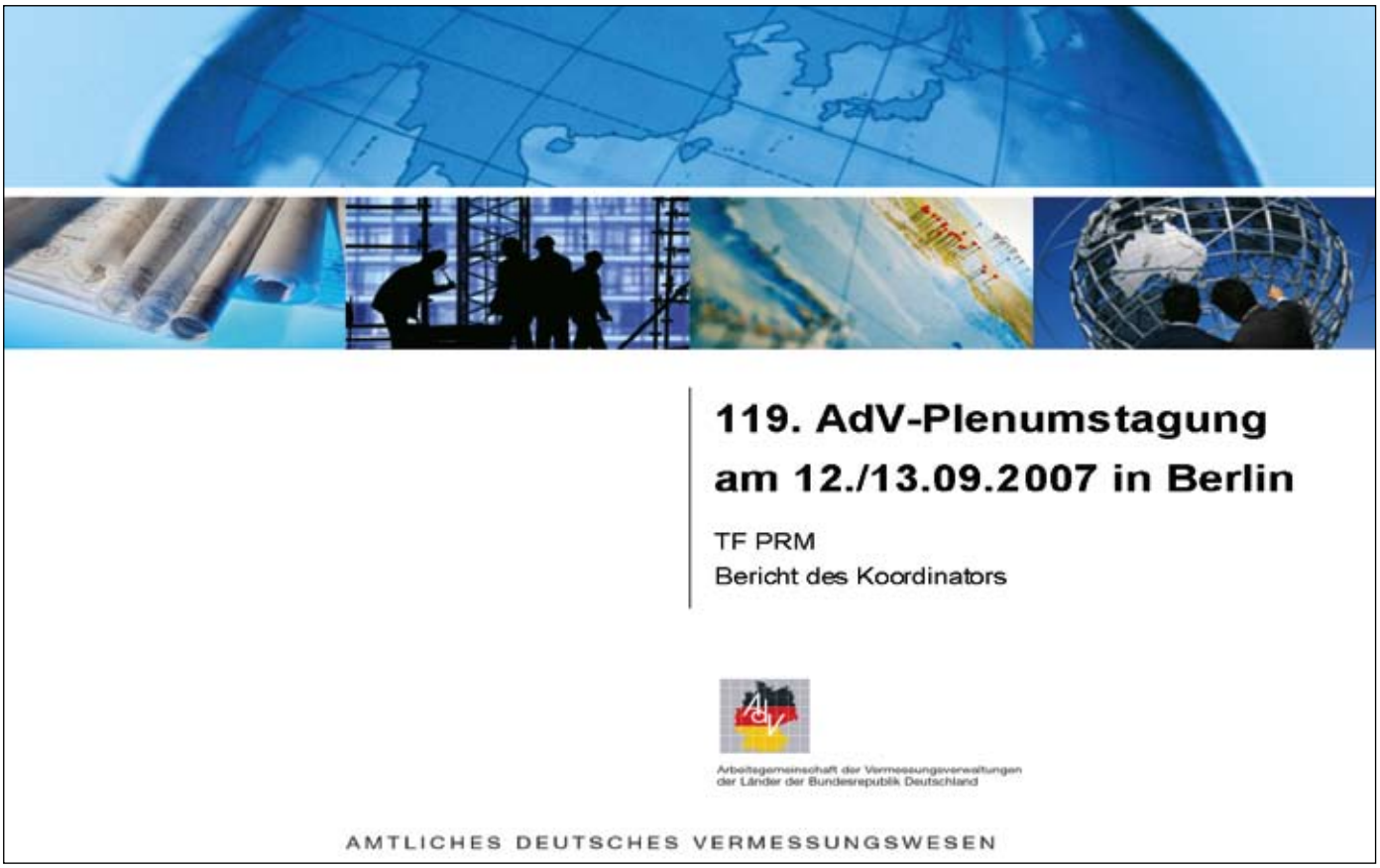


Fig. 30: Design requirements for presentations

Licence and costs model

For the regulation of the usage rights in relation to the provision of the geospatial reference data a nationally standardised licence and costs model is needed, which is sufficient for the current requirements, is simple and clear and regulates the usage of all currently provided geospatial reference data products and services. The official surveying and mapping has developed and approved a new fees model which meets these requirements and which is from now on the basis for the national provision of the geospatial reference data. The TF PRM is obligated to maintain this fees model according to the requirements of the AdV and in agreement with the working groups.

Model licence agreements

Standardised model licence agreements and General Terms and Conditions of Business (AGB) have been developed by the TF PRM against the background that the geospatial reference data themselves and also their provision according to need should be nationally standardised and harmonised as well as that the association of the surveying and mapping authorities wanted to be perceived as an association of providers with their national provision of geospatial reference data. They are also used for the national provision. Use of this model for state-internal licensing is also aspired.

Information material and Corporate Design

For a standardised appearance of the official surveying and mapping, a standardised presentation in words and pictures, a common Corporate Design, is necessary. Suitable information material is needed for effective information in the language of the geomarket about the availability and usability of the nationwide provision. Accordingly, the TF PRM has developed a product folder which gives information about the products and services of the surveying and mapping authority and focusses on utilisation and benefits. On that basis, product brochures with detail information for each product will be created in a second step and solutions for a common Corporate Design of the AdV will be developed. A standardised appearance will be achieved by the specification of design rules for the various forms of output.

Written information and web portal(s)

Written information should be published for regular information about the current range of products and services as well as the latest developments in the AdV. The „Newsletter“ has been conceived in the TF PRM and should be issued two to three times per year from there. The website of the AdV (www.adv-online.de), which also provides information about tasks, range of products and services and developments, has been given a user-friendly interface and released in the new design. In a further step, the various product-related websites will be merged and adapted accordingly.

References

The presence of the AdV in the references available on the World Wide Web is important because role, tasks and range of products and services can be widely communicated via this medium. Currently there are entries in Wikipedia, but various other portals are also used. Constant checking is required because the entries can be changed by anyone. A suitable process for continuous performance of this maintenance work will be developed by the TF PRM. Accordingly, the entries placed in Wikipedia will initially be updated; in further steps they should be upgraded and extended to other reference works on the World Wide Web.

- maintenance of a national licence model
- maintenance of national model licence agreements
- provision of product information (product folder and product brochures)
- development and maintenance of a common Corporate Design
- provision of various information media (newsletter, website, geo-film)
- information in web-based reference works

Exhibition appearances

The AdV presents itself regularly at relevant geographic exhibitions in the context of the product information. This particularly includes the regular appearances at INTERGEO® where the qualified consumers should particularly be reached; the geospatial reference data services are the main focus at this exhibition. CeBIT and book fairs were previously interesting particularly for approaching distributors of topographic stock products. In the future contacts to service providers who develop new products and services using the geospatial reference data as well as make these accessible to third parties should be looked for at such exhibitions. The TF PRM coordinates and carries out the exhibition appearances and performs suitable success measurements as the decision basis for future activities.

Fig. 31: Exhibition stand at INTERGEO

Product information

Organised product information on the part of the surveying and mapping authorities must be provided as an important prerequisite for optimum provision of geospatial reference data as well as for activation of the geomarket. Users and potential users should be regularly informed specifically and comprehensively about the range of geospatial reference data products and services (benefits, usability and availability). Concrete

Fig. 32: Product folder for the complete range of geospatial reference data products and services

actions for the product information have been developed by the TF PRM for the national provision of the geospatial reference data and also for the individual surveying and mapping authorities.

Licensing

In order to clarify the marketability of new national products and services based on the geospatial reference data, model licences of geospatial reference data for completion by the individual surveying and mapping authorities will be provided by the TF PRM. The subject of such testing is also the viability of the new conditions models developed for such new products and services. The TF PRM also sees itself as the communication platform for the distribution points of all surveying and mapping authorities as well as the common distribution points.

Image bulding

For a positive perception of the surveying and mapping authorities it is necessary to conduct organised and active public relations work as well as create suitable media for this. Essential tasks of the image building are the increase and retention of a positive perception of the official surveying and mapping. This will be achieved by effective public appearances. Regularly held theme days are effective, efficient and frequently practiced. According to this model, the AdV is planning to arrange a „Geo Day“ always on the same date each year, where information about the different geothemes will be given at the same time by all surveying and mapping authorities. The arrangement of these „Geo Days“ should be supported and communicated by the TF PRM. With the objective of being able to provide suitable media for the image maintenance, a geo-film has been developed by the TF PRM. It describes the organisation, role and range of products and services of the official surveying and mapping in a form suitable for the general public.

- appearance at relevant geographic exhibitions
- model licences for testing new products and business models
- arrangement of „Geo Days“

Geospatial Reference Data of the Official German Surveying and Mapping

Satellite positioning data of the German state survey

Satellite positioning methods today are being used in more and more areas. Previously, the classic domain of official surveying and mapping was the main user of high-precision satellite positioning data. Today, this also includes domains like shipping and hydrography with the water and shipping authority, dredging companies, energy suppliers, telecommunications, aerospace and also positioning systems companies, amongst many others.

In order to make **SA*POS*®**, the satellite positioning system of the German state survey, suitable for other application areas outside its own administration, the orientation to the requirements of the users was necessary. These include:

- nationally standardised services,
- open standards,
- efficient process and simple usage,
- planning reliability,
- measuring in a homogeneous reference frame,
- transformation in official reference systems,
- inclusion of other global satellite navigation systems,
- standardised licence and fees model and
- a contact person.

SA*POS*® provides high-precision real-time (HEPS) and postprocessing services (GPPS) to the user. These are based on the currently operable global satellite positioning systems GPS and GLONASS and in the future on the signals of the European system in development, Galileo. Observation and correction data based on a network of more than 260 reference stations are provided to the user in standardised format via mobile telephony and the Internet. An improvement in the positioning up to a range of a few centimetres for position and height is achieved nationwide in real-time due to the networking of the reference stations and integration of stations from the neighbouring Federal States. Accuracies < 1 centimetre can be achieved in the postprocessing. The data for evaluations can be called up later in the office via the World Wide Web.

Apart from the development of standardised services, a central contact person is important mainly for interregional and nationally active users in Germany.

The users' desire for a central contact person was taken into account in 2003 by the establishment of the central **SA*POS*®** office at the State Survey and Geospatial Basic Information Lower Saxony (LGN). The tasks of the central office are shown below:

- Germany-wide merging and provision of all **SA*POS*®** data,
- granting of usage rights including the specification of associated fees according to the resolutions of the AdV.
- support of the AdV for the coordination of national activities,
- marketing of **SA*POS*®** to users throughout Germany and
- transfer of the networking calculation of the **SA*POS*®** data to the neighbouring Federal States in each case as needed.

The central **SA*POS*®** office is thus the authorised contact and negotiation point for all users active throughout Germany and can conclude contracts with third parties in the name of the Federal States involved. The technical components for the central data provision have been installed and have been successfully operated and further developed since then. Its own website has been established to increase the awareness. Due to the constantly increasing number of users, the previous measures can be judged as an overall success.

However, in order to ensure the usage of **SA*POS*®** data via its own services and to acquire a larger number of users, collaborations with partners from the economy have been made. They provide their own products and services based on the **SA*POS*®** data.

Apart from these important sales partnerships, the central **SA*POS*®** office could acquire many users in different sectors itself and thus contribute to further use of **SA*POS*®**. Beyond the core target groups of licensed surveyors, shipping/hydrography and supply network operators, new sectors are already becoming apparent, which could be considered as large-scale users of high-precision satellite positioning data.

The preservation of the unique selling point for a reference station network for the creation of positions with centimetre accuracy and thus the cooperation with large customers is important for the distribution of **SA*POS*®** data in the future. Furthermore, the possibilities of the integration and provision of other databases of the official surveying and mapping for the **SA*POS*®** services provided must be researched. Combined offers of high-precision positioning data, topographic maps and house coordinates for example can be realised in the future upon user request using the World Wide Web.

Core statements

Market developments

- Growing importance for high-precision positioning market

User requirements

- Definition of the user requirements for positioning services
- Examples: nationally standardised services, open standards, efficient process, simple usage, ...

Services

- Implementation of the user requirements in the provided SA*POS*® real-time and postprocessing services
- Network of more than 260 stations, networked, usage of all global satellite navigation systems (GPS, GLONASS, Galileo), cm accuracy

SA*POS*® central office

- Establishment and tasks of the SA*POS*® central office
- Merging and provision of the data, marketing to national users, home page

Sales partnerships

Future alignment

- Existing core target groups licensed surveyors, shipping / hydrography and supply network operators; the agricultural domain is gaining importance
- Reference station network unique selling point, cooperation with large customers, integration of services via Internet

Geospatial Reference Data of the Official German Surveying and Mapping

House coordinates and house outlines of the real estate cadastre

The geoinformation market has developed rapidly in recent years so that, due to the entry of companies from the domain of telecommunications and navigation, geospatial data will have permanent entry to the mass market in the future - web services, mobile telephones, personal navigation devices (PND). In the course of these developments, globally established data providers will establish themselves more and more as „one-stop data shops".

The AdV is taking account of these drastic changes in the general conditions and forcing the central provision of selected products and services. The following core requirements of the customers were and still are today the requirement for these activities:

- products and services aligned with the need,
- nationally available products,
- homogeneous data formats,
- standardised and marketable licence and fees models,
- ONE central contact person.

The foundation of a new form of distribution of the geospatial reference data of the real estate cadastre, which satisfies the requirements of the inter-regional and nationally active customers, was laid at the end of 2003 with the founding of the „Association for the distribution of house coordinates (GVHK)". After eight Federal States had already joined this initiative after a very short time, a nationwide provision of official house coordinates has been available since September 2006.

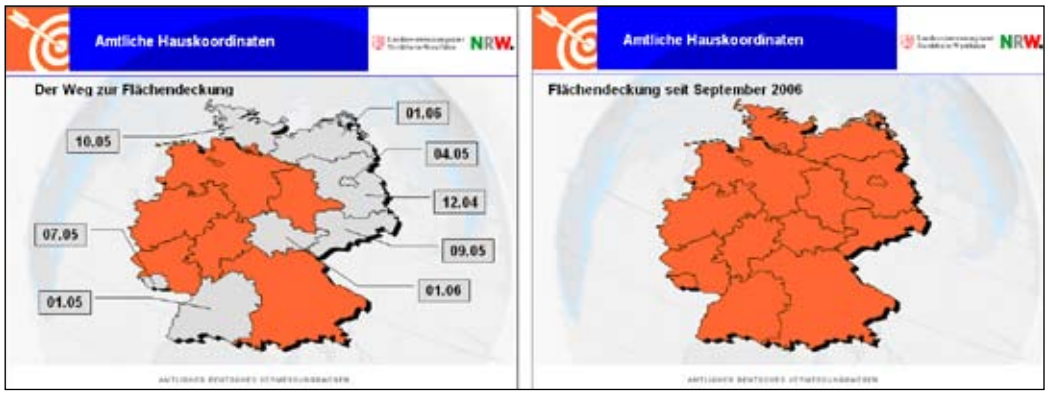


Fig. 33a and b: House coordinates (development 2003–2006)

Important providers of navigation data licensed the official house coordinates in 2007 in order to integrate them in their products in different ways - a milestone in the licensing of geospatial reference data of the real estate cadastre. These licences substantiate the need for a central national provision of geospatial reference date of the real estate cadastre as well. This is even more the case as high quality alternatives to the individual data contents of the real estate cadastre are increasingly available on the market. A development which will certainly increase in the future.

In parallel with the licensing of the house coordinates to end customers and in addition to the navigation companies, a network of other external licence holders from the area of publishing software and geomarketing is creating the basis for a wide usage of the house coordinates in many different target groups. Such companies refine the data, integrate them in software solutions or supplement other data elements; Thus they ensure that the official house coordinates are individually prepared for the customers and thus can therefore be accordingly optimally used according to customer requirements. Apart from a series of newspaper publishers, advertising papers and delivery companies, energy suppliers, cable network operators and providers of map-based Internet services have licensed the house coordinates.

Within the framework of a model project of the Deutschland-Online initiative, the online provision of the house coordinates via a chargeable gazetteer service will also be realised in the course of the year 2008 for registered users. This concerns a service based on the OGC specification for a Web Feature Service which will perform the provision of individual coordinates, e.g. in the context of an online geocoding of addresses.

Due to the continuous exchange of official house coordinates with service providers and end users, it quickly became clear that apart from the coordinates, the graphical presentation of buildings is gaining importance. Particularly in the navigation area, the demand for rooftop-precise cartographic visualisations and the 3D presentation of buildings and complete towns is increasing. For this reason, the „house outlines“, supplementing the house coordinates, will also be provided in the future.

Market developments

- Geospatial data will finally conquer the mass market in the future, concentration on a few „One-stop data shops“, globally active companies as trendsetters

Market requirements

- Homogenuous and needs-oriented national geospatial reference data of the real estate cadastre, marketable licence conditions, provision from one source

AdV actions

- Establishment of the GVHK, derivation of the house coordinates as marketable product, development of fees models in line with the market, realisation of a national range of products and services, set-up of a Web Feature Service (gazetteer), expansion of the range of products and services by the house outlines product.

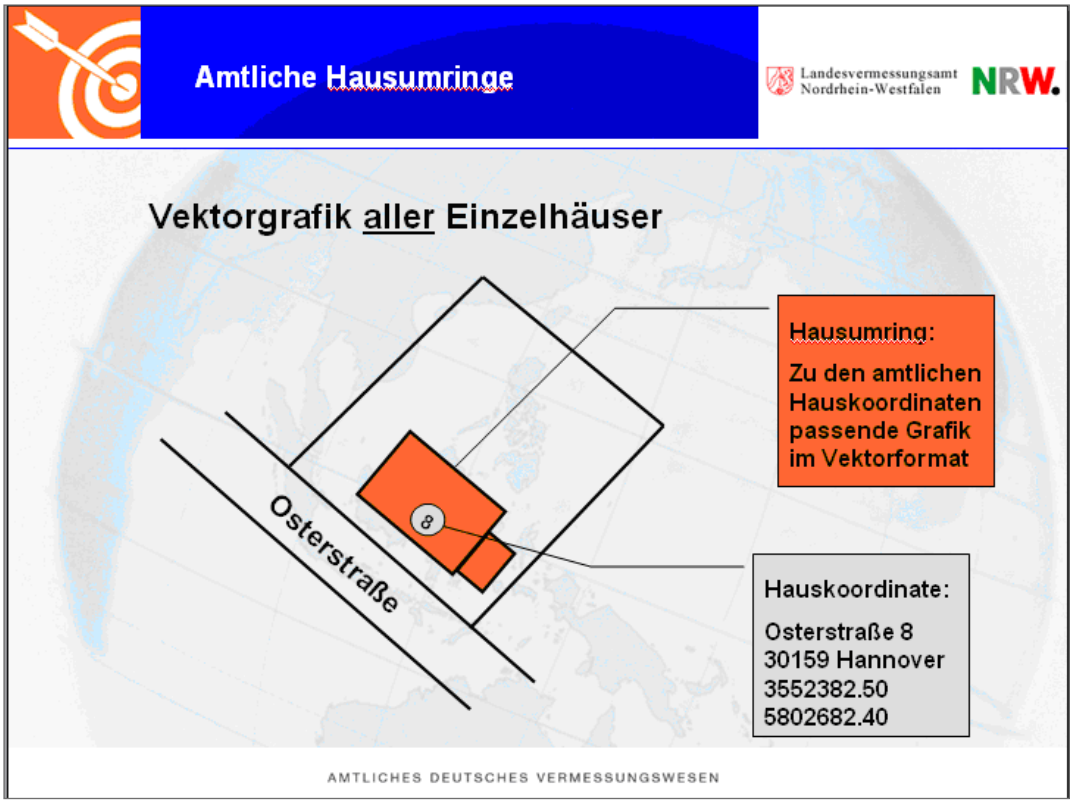


Fig. 34a and b: House outlines

This concerns the ground plan of all main buildings and adjacent buildings documented in the real estate cadastre, all of which should be provided in vector format without attributes. The house outlines for the first eleven Federal States, together with the official house coordinates, can be obtained from the middle of 2008 according to the same rules as for reference and use of the house coordinates. A nationwide provision is planned for the end of 2008.

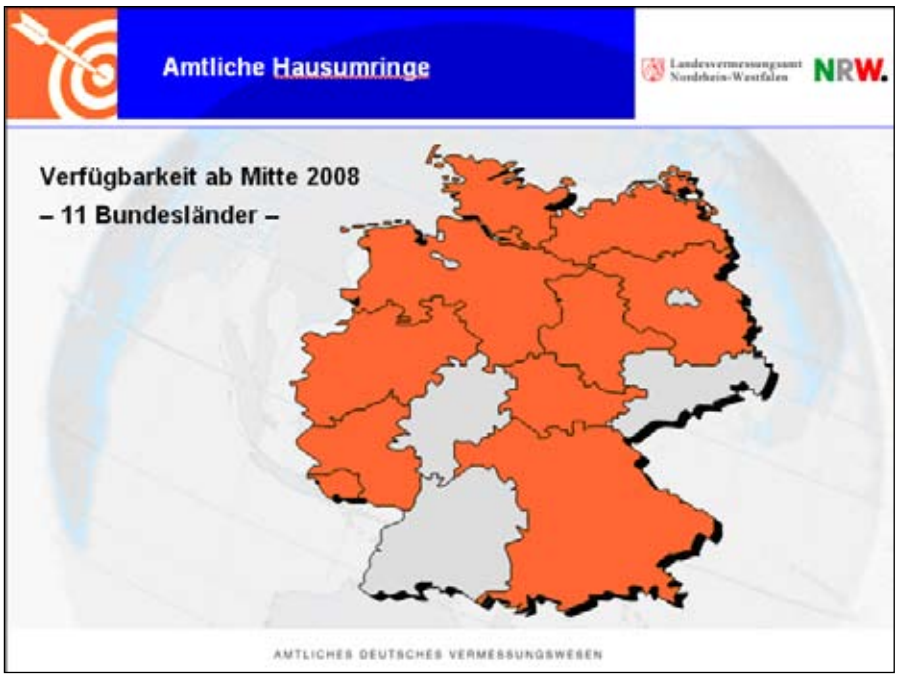


Fig. 35: House outlines, date 2008

House coordinates and house outlines quality characteristics

- official real estate cadastre data source, continuous updating guaranteed, also in rural regions, legal duty, long-term investment security for customers

Provision

- One national contact person, strategic mix of direct licensing to end customers and establishment of a network of third party licence holders (service providers), customer-specific individual provision of the geospatial reference data as basis for wide usage.

Sectors

- Delivery and distribution services, supply network operators, operators of Internet services and Location Based Services, navigation (vehicles, pedestrians), geomarketing, authorities and organisations with security tasks (BOS)

Geospatial Reference Data of the Official German Surveying and Mapping

Geospatial data of the German state survey – Geodata centre of the BKG

History

Against the background of many user requests to provide standardised geospatial reference data, the geodata centre as an organisational unit of the Institute for Applied Geodesy – today: Federal Agency for Cartography and Geodesy (BKG) – was established. This was done on instruction by the Federal Ministry of the Interior dated April 29, 2006 and with the resolution of the AdV for the geodata centre guideline.

The above guideline was replaced on January 1, 2006 by the binding „Geodata centre“ administrative agreement between the Federal Ministry of the Interior and the Federal States. The BKG was authorised by this agreement to directly conclude usage contracts with third party users for the use of the geospatial reference data of the Federal States. The usage fees here are determined according to a standardised fee structure (AdV fees guideline).

Tasks and services of the geodata centre

The large and medium-scale data provided in the scale range from 1:25 000 to 1:100 000 are created by the state survey institutions of the Federal States and submitted to the geodata centre. They are checked, merged, harmonised and standardised there for national data outputs. The small-scale data and map books from the scale 1:200 000 are produced and maintained in the BKG itself. The geodata centre of the BKG thus represents a services centre which focuses on the harmonisation and standardised product preparation as well as the provision and licensing of the descriptive landscape (topographic) geospatial reference data of the territory of the Federal Republic of Germany.

A central information service (metainformation system) provides information about the availability, quality, possible uses, subscription terms and costs of analogue and digital geo-topographical data of Germany. It was set up in the geodata centre in the context of an information association with the surveying and mapping institutions of the Federal States. Apart from the BKG data, the provisions of all the Federal States are also documented here and maintained by the Federal States themselves.

The geodata centre also provides several online services, such as, for coordinate transformations or for the search for place names and other geographic objects in interactive maps of the whole of Germany. Based on industry standards (ISO, OGC), all common web services (e.g. WMS (Web Map Service) or WFS (Web Feature Service)) are implemented for the online usage of the comprehensive databases.

Fig. 36: Germany Viewer

The data themselves are available at short notice in common standard formats, in different cartographic projections and geodetic reference systems as well as in selections and desired regional excerpts. Apart from the traditional ordering methods (post, fax, email), a convenient online ordering system, which supports a transparent view of the data, has been made available to all users since September 2003.

Geospatial reference data

Official topographic geospatial reference data are maintained and output in many specifications throughout Germany by the geodata centre. These are mainly data sets from ATKIS® in the scale range between 1:5 000 and 1:1 000 000.

They include

- Digital landscape models,
- Digital terrain models,
- Digital orthophotos,
- Digital topographic maps,
- Geographical names and
- Administrative boundaries.

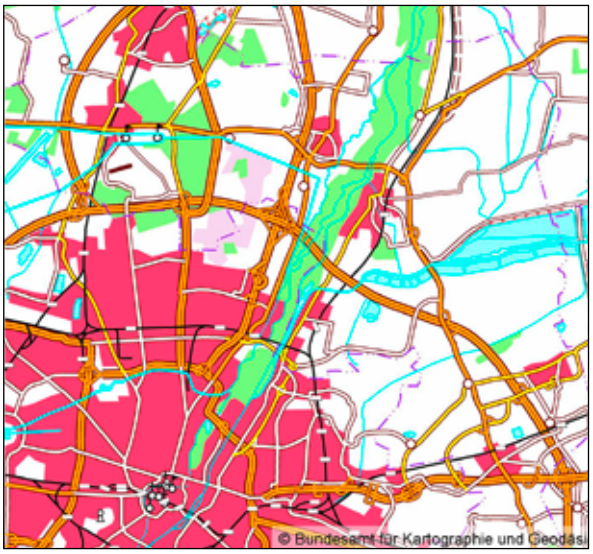


Fig. 37: Example DLM250 as presentation graphic

Digital Landscape Models (DLM) describe the topographic objects of the landscape (residential areas, water, roads, etc.) and the relief of the Earth's surface in object-structured form (vector data). The Feature Type Catalogue specifies which feature types a DLM contains as well as how the objects must be formed.

The following DLMs are established or planned:

- Digital Basic Landscape Model – Basic DLM (Scale 1:5 000 to 1:25 000)
- Digital Landscape Model 50 – DLM50.1 (Scale 1:50 000)
- Digital Landscape Model 250 – DLM250 (Scale 1:250 000)
- Digital Landscape Model 1000 – DLM1000 (Scale 1:500 000)

The DLM250 and DLM1000 are processed in the BKG. Among other things, the content is used for the production of the official pan-European products EuroRegionalMap and EuroGlobalMap of the Association of the National Mapping and Cadastral Agencies of Europe (EuroGeographics) and is continuously expanded for the integration of technical data.

Digital Terrain Models (DGM) are basically data in the form of regular grids which describe the landform of the Earth's surface. The grid points are geocoded for position and height. DGMs can also contain enhanced information (e.g. scarps, structure lines, individual geodetic points).

The following Digital Terrain Models are available in the Federal Agency for Cartography and Geodesy (information about grid width and height accuracy in brackets):

- DGM Germany (DGM-D) (25 m/50 m, ± 1-5 m)
- DGM250 (200 m, ± 20 m)
- DGM1000 (1000 m, ± 50-100 m)

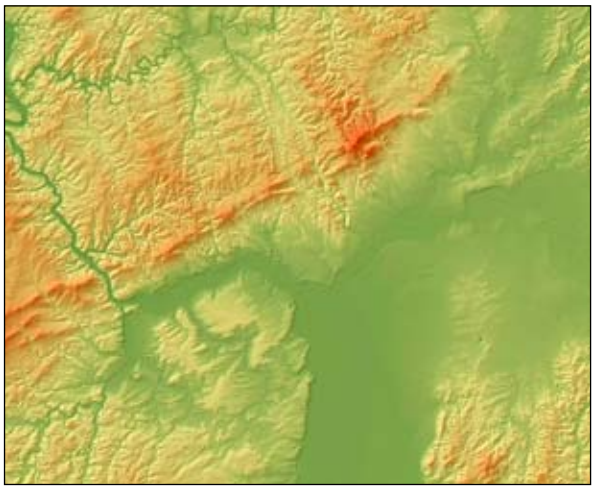


Fig. 38: Section from a visualisation of the DGM Germany

Digital Topographic Maps (DTK) are raster data of the available topographic map books. Digital Topographic Maps are maintained and distributed throughout Germany in the following scales:

- 1:25 000
- 1:50 000
- 1:100 000
- 1:200 000
- 1:500 000
- 1:1 000 000

The BKG produces the small-scale DTKs from the scale 1:200 000.

Fig. 39: Excerpt from the DTK1000

The **Administrative Boundaries (VG)** include the administrative units of the hierarchical administrative levels with their boundaries and reference points, statistical key figures and the name of the administrative unit as well as the specific designation of the administrative level of the respective Federal State. They are available in two resolutions. The data in the scale 1:250 000 form the administrative boundaries for the local authority, and those in the scale 1:1 000 000 for the district.

The **Geographic Names (GN)** are a collection of local authorities, local authority districts, landscapes, mountain ranges, mountains, islands, rivers, canals, lakes and other geographic characteristics with their names as well as a series of attributes which particularly include position information.

The **Digital Orthophotos (DOP)** are high-resolution, distortion-free illustrations of the Earth‘s surface. The pixel size of the DOP on the ground is 0.2 m x 0.2 m or 0.4 m x 0.4 m. They are true to scale and can thus be directly compared with maps of the same scale or digitally merged with technical data, e.g. street plans.

Provision

The geospatial reference data provided by the Federal Agency for Cartography and Geodesy are proprietary. The output of these data therefore requires the customers' acceptance of the terms of use.
Amongst other things these are:

- the usage of the data is limited to the approved purpose,
- the data must be protected against unauthorised access by third parties and
- the disclosure making original or reworked data publicly accessible is only allowed with specific permission.

Applications

The data of the state surveying and mapping authorities and the Federal Agency for Cartography and Geodesy (BKG) are used in many areas. Federal authorities, state authorities and local councils use the data as the basis for land use plans and a variety of urban development plans. They use the data as the cartographic basis for the performance of their own tasks. Police, fire brigade and emergency services plan their missions using cartographic principles or derive special maps from them.

Other application areas are environmental protection, traffic management systems, forestry and agriculture to name only a few.

The data are also widely used in the economy and industry, e.g. in the telecommunications sector, the insurance industry, navigation, in the tourism industry etc.

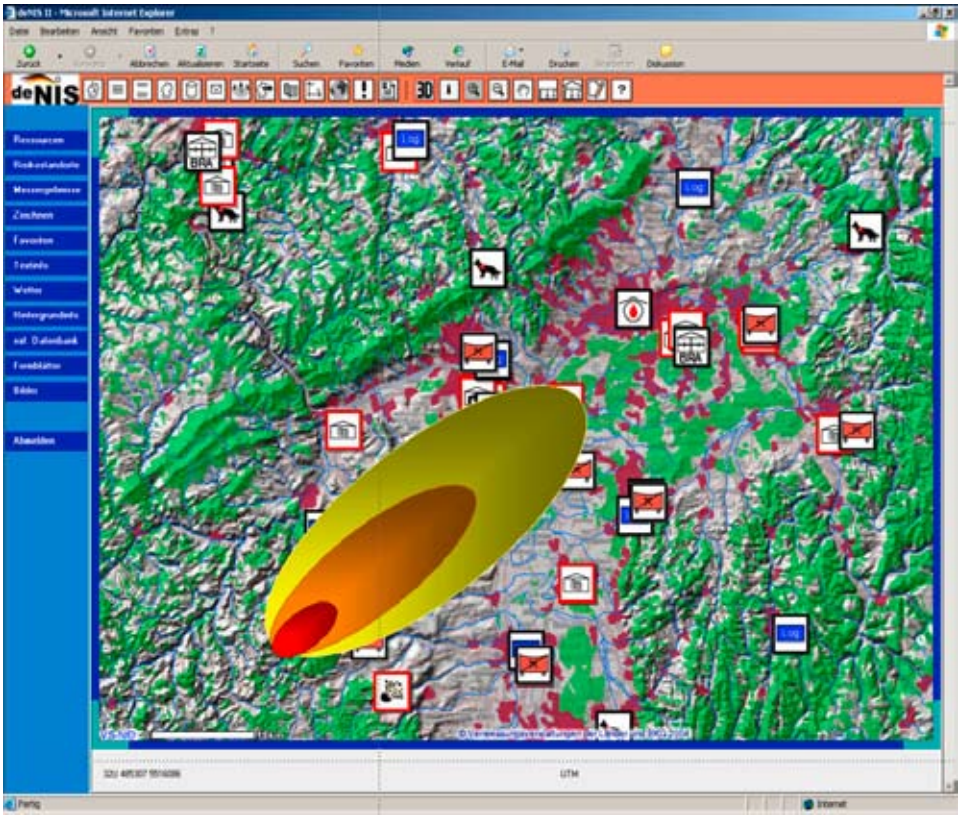


Fig. 40: deNIS II interface

With deNIS II, the Federal Agency for Civil Protection and Disaster Response (BBK) has established a network in the domain of civil protection in order to overcome large-area dangers. This will support the Federal Government and Federal States during crisis management.
This is mainly achieved with the presentation in location maps, which are primarily based on the geospatial reference data of the surveying and mapping authorities. Current damage events (e.g. explosion), potential assistance (e.g. blood products) and locations fraught with risk (e.g. industrial plants) are accessed, displayed against the background of the topographic geospatial reference data and queried in table form in a Geographic Information System (GIS) oriented at the needs of crisis management.

Involvement in National and International Organisations

EuroGeographics

Formation and tasks

On the initiative of the general director of the French Institut Géographique National (IGN-France) the directors of some neighbouring surveying and mapping authorities met in 1979 in order to discuss a possible federation at the European level. They then founded CERCO (Comité Européen des Responsables de la Cartographie Officielle) in 1980.

Fig. 41: Logo of EuroGeographics

The objective of CERCO was to promote the exchange of experiences between the authorities and to find solutions for common problems such as quality assurance and copyright issues. In 1991, CERCO then founded MEGRIN (Multipurpose European Ground Related Information Network) in order to coordinate European projects in the area of geoinformation. The membership of CERCO increased to 37 by the year 2000. More than half were also members of MEGRIN at the same time. In order to bundle the thither to separately pursued objectives, pursue them even more efficiently and to be able to present oneself unified to the outside world, the resolution was made in year 2000 at the joint general meeting in Malmö: a new and joint body under the name of EuroGeographics for the national surveying and mapping authorities in Europe was founded. The Federal Agency for Cartography and Geodesy (BKG) was a founding member of the EuroGeographics association, created in 2001.

Since the general meeting in Istanbul in 2003, EuroGeographics sees itself also as the representative of the European cadastral authorities. There is a joint responsibility both for surveying and mapping as well as for the cadastre for approx. half of the member authorities. The term „cadastre“ is very broadly defined here and also extends to the responsible authorities for land registration as there is no cadastre in all European countries according to our understanding. Examples of these would be United Kingdom, the Republic of Ireland and Iceland.

EuroGeographics has set itself the task of representing the national surveying and mapping and cadastral authorities in Europe, which are participating in the establishment of a European geospatial data infrastructure. The primary objective of EuroGeographics is the representation of the National Mapping and Cadastral Agencies at the European level and the provision of interoperable reference data (geodetic reference networks and geospatial reference data) for a European geospatial data infrastructure.

Organisation and products

EuroGeographics is an association according to French law with headquarters in Marne-la-Vallée (Paris). The business office is situated there and is managed by a full-time „Executive Director". There is also a full-time secretary and three other persons delegated from its national organisation working at EuroGeographics.

The working language in EuroGeographics is English.

Currently, there are 51 members of EuroGeographics: organisations from the domains of state survey and cadastre from 46 countries. The members are differentiated between

- active members and
- associated members.

Only the active members are entitled to vote in the annual general meeting. Associated members should convert their membership to an active member after three years at the latest. It is possible that several administrations from one country can be members of EuroGeographics. Thus the AdV (in this case as representative of the Federal States) has been an associated member since the beginning of 2008 while the Federal Agency for Cartography and Geodesy (BKG) has been an active member for many years.

All members must pay a membership fee. This is composed of a basic amount (currently € 6,000) which all members must pay and an amount dependent on gross national product. The largest contributors are Germany, France and Great Britain.

The management board conducts the business between the general meetings. The management board currently has three permanent members (Germany, France and Great Britain as they each pay more than 10% of all membership fees). Non-permanent members, who are each elected for two years by the general meeting, are currently the

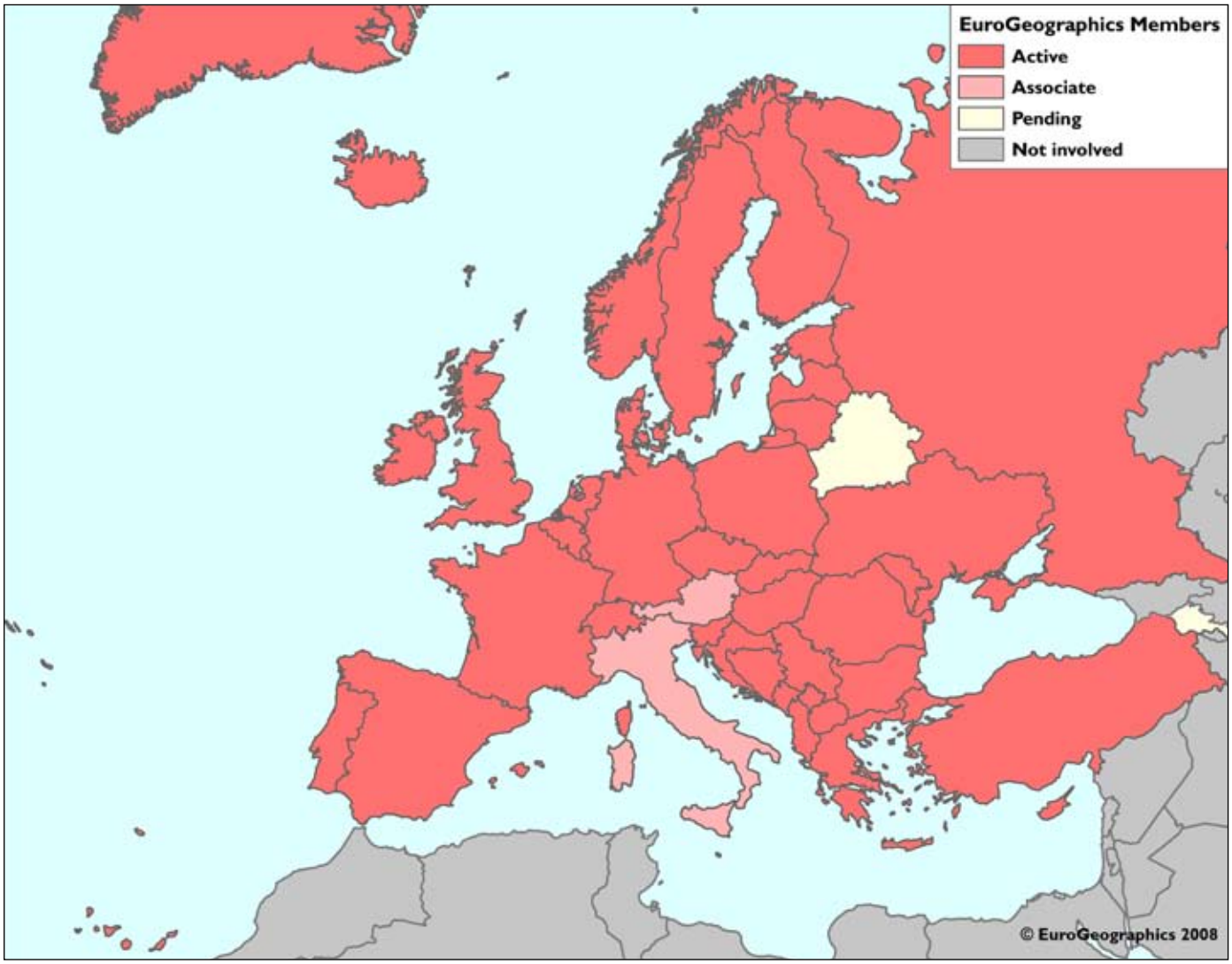


Fig. 42: Members of EuroGeographics (Date 2007)

representatives of Croatia, Iceland, the Netherlands and Portugal. The members of the management board elect the President of EuroGeographics amongst themselves. Currently, Magnus Gudmundsson from Iceland is performing this function.

The technical work in EuroGeographics is performed by expert groups and also in projects. The following expert groups are currently established:

- Business Interoperability,
- Quality,
- Information and Data Specifications,
- Distributed Services Architecture and
- Cadastre and Land Registry

Two of these expert groups are led by employees of the Federal Agency for Cartography and Geodesy. On the part of the Federal States, experts in the areas of quality management and cadastre are collaborating. Within the context of EuroGeographics, the Federal Agency for Cartography and Geodesy is decisively participating in the creation of the products EuroBoundaryMap, EuroRegionalMap, EuroGlobalMap and EuroDEM.

Following the resolution of the EuroGeographics 2006 annual general meeting, the Federal Agency for Cartography and Geodesy started the development of a Digital Elevation Model (DEM) of Europe, **EuroDEM**. The data set calculated from the individual DEMs of the member countries is based on a Europe-wide standardised position and height reference systems and will be available from April/May 2008.
Further information can be found at www.EuroGeographics.org.

Permanent Committee on Cadastre in the European Union

PCC

Permanent Committee on Cadastre in the European Union

Formation and tasks

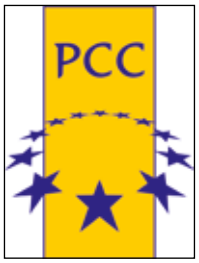


Fig. 43: Logo PCC

On the initiative of the Spanish Presidency of the EU Council in the first half of 2002, the PCC was established by the representatives of the responsible authorities for the cadastre and/or land administration of the then 15 EU member states in October 2002. The objective of the Spanish initiative was to establish an institution as a contact for the EU Commission for cadastre-related issues at the level of the EU member states. This primarily concerned the usage of cadastral data by the various general directorates of the EU Commission.

Organisation

Members of the PCC can only be administrations from the EU member states which are responsible for cadastre and/or land administration. The expansion to land administration is necessary as no cadastre according to our understanding exists in some EU member states. Examples of this United Kingdom and the Republic of Ireland. If in one country there are several institutions responsible for cadastre or the land administration (e.g. Germany, Spain and United Kingdom), only one institution can be a member of the PCC and must represent the others. The AdV has taken over this function for Germany. Apart from the members, several non-EU countries and other organisations have observer status.

There is no formal procedure for obtaining membership. It is sufficient if the institution responsible for cadastre and/or the land administration expresses its desire for membership in writing to the President of the PCC. If the membership will no longer be exercised, a notification to the President is sufficient. If possible, the new country representative should also be named. If this is not done, the PCC President can select a new suitable representative himself.

The working language in the PCC is English.

If possible, the presidency in the PCC is aligned with that of the EU presidency. Slovenia currently has the presidency in the PCC. As the PCC has no permanent secretary, this function is taken over by the country which has the presidency.

The German cadastral and surveying and mapping authorities are represented in the PCC by the President of the AdV and the Secretary General of the AdV. The AdV has also taken over a coordination function for the countries where German is spoken (Austria, Luxembourg and Belgium). This means that the Secretary General of the AdV produces a German translation of the English-language documents of the PCC if necessary.

Since 2005, a joint working group of PCC and EuroGeographics has existed, which concerns itself with „Role of the cadastral parcel in INSPIRE“. The results of this working group have been directly incorporated in the INSPIRE drafting team‘s work of „Data Specification“. The working group also continues to support the definition process.

Further information can be found at www.eurocadastre.org.

Working Party on Land Administration

Formation and tasks

As the first international organisation, the „United Nations Economic Commission for Europe“ (UN-ECE) has extensively concerned itself with the issue of land administration. The „Meeting of Officials on Land Administration (MOLA)“ was established in February 1997 as an ad hoc expert group under the patronage of the UN-ECE committee for „Human Settlements“. MOLA was transferred to the „Working Party on Land Administration“ (WPLA) in 1999. The objective of WPLA is to promote the administration (documentation and registration) of the ownership of real estate by assuring the land usage, the establishment of a plot market in the countries of the former Eastern

Fig. 44: UNO building Geneva

bloc („countries in transition“) as well as the modernisation of land registration systems.

WPLA provides its support in the following areas:

- Basic legislation in the area of land management. This includes the rights for plots, the registration of the ownership, mortgages, transfer of ownership and the resolution of objections to the registration and usage restrictions.
- Administrative measures (creation of ownership, land registration, creation of cadastre maps, valuation),
- Establishment of land information systems (geospatial data infrastructure, establishment of ownership registers, data about the land usage) and
- Establishment and organisation of the administration (e.g. financing issues, data policy, refinancing, training, participation of private agencies).

Organisation and activities

WPLA operates under the patronage of the UN-ECE committee for „Human Settlements“. The office is located in Geneva. The President of WPLA is currently Peter Creuzer from Germany. WPLA has acquired extensive experience in the promotion of privatisation and the effective real estate market by promotion of modern land registration systems in the ECE region. Workshops and meetings are organised regularly; guidelines and proposals for policy have been prepared. WPLA operates by sending independent experts to the ECE countries in order to support the policy and make recommendations for national programmes for the development of a real estate market and the registration of the plots using national programmes for opening up the land market and real estate adjustment. These activities are performed due to the high demand from the ECE member countries.

WPLA collaborates closely with other international public and private organisations such as UN-Habitat, FAO, UNDP, FIG, EUROGI and EuroGeographics.

WPLA has published various publications. The following should be mentioned here in particular:

- Land Administration Guidelines,
- Inventory of Land Administration Systems in Europe and North America and
- Land (Real Estate) Mass Valuation Systems for Taxation Purposes in Europe.

Further information can be found at http://www.unece.org/env/hs/wpla/welcome.html.

WPLA

Working Party on Land Administration

INSPIRE

The „Infrastructure for Spatial Information in Europe“ (INSPIRE) EU framework directive which came into force on 15 May 2007, has the objective of creating a European geospatial data infrastructure (EGDI) in the next 10 years with interoperable spatially-related information services using the national geospatial data infrastructures (e.g. GDI-DE) for the purposes of the EU Commission. The specifications for the technical implementation will be developed in the course of the year 2008 by five working groups with the participation of the BKG experts.

An important contribution to the EGDI will also be made by the **GMES project** (Global Monitoring for Environment and Security), started in 2001. This will basically be supported by the European Commission and the European Space Agency (ESA). The objective of the GMES project is to develop an independent Earth monitoring capacity for the collection and evaluation of the relevant environmental and security information for the EU and to use it for the implementation of the EU policy. The Federal Agency for Cartography and Geodesy is participating in the realisation of the GMES project, particularly with respect to the integration of geo-topographical core data (ATKIS®) and remote sensing data. The President of the BKG is also leading the implementation group for the GMES land cover core service.

European Spatial Data Research

The BKG is also a member of EuroSDR (European Spatial Data Research).

The objective of EuroSDR is the practically oriented development and examination of methods, systems and standards for the collection, processing and transfer of topographic geospatial reference data.

International Association for Geodesy

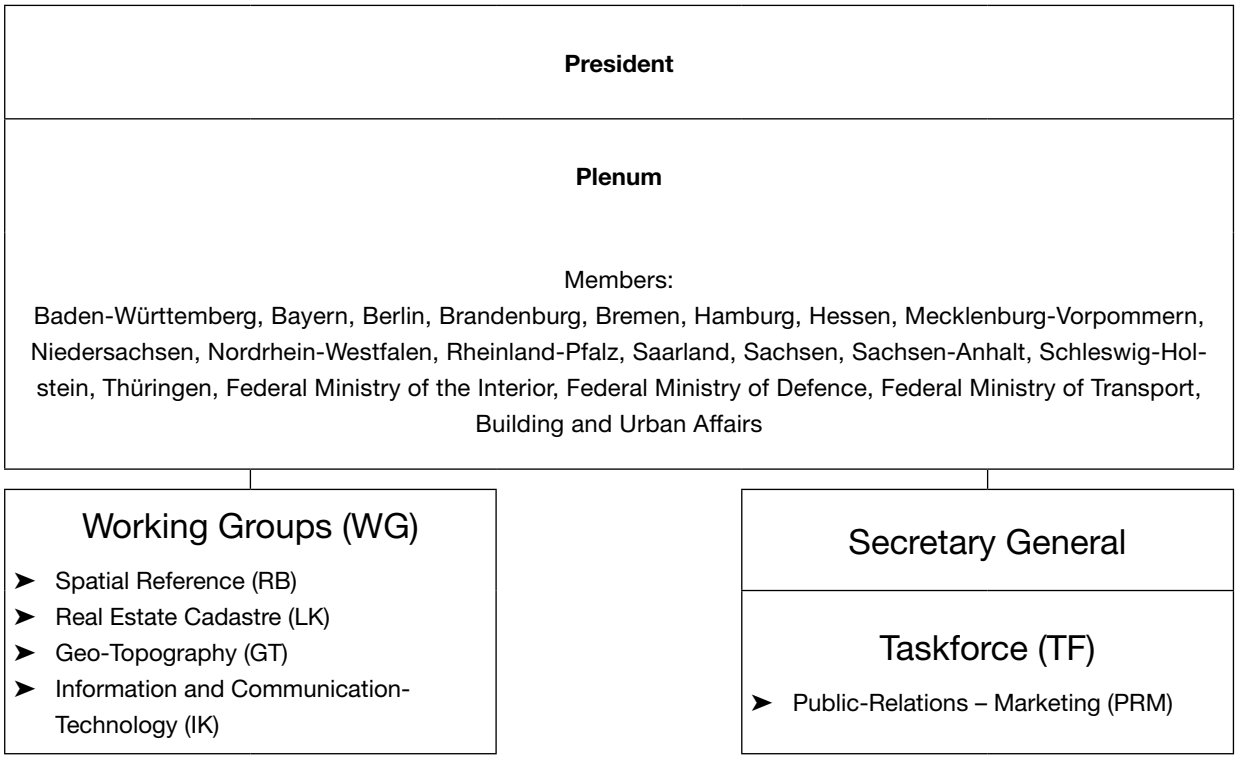
With its Geodesy Department, the Federal Agency for Cartography and Geodesy has been participating in the services of the International Association for Geodesy (IAG) (see Spatial Reference Working Group report) for decades. More than 30 years of collaboration with the Satellite Geodesy Research Facility of the Munich Technical University (FESG) and the framework of the **Satellite Geodesy Research Group**, which also includes the German Geodetic Research Institute and the Geodetic Institute of Bonn University, must also be emphasised.

The stations of the national **Geodetic Reference Network GREF** of the BKG are part of the European and global GNSS station networks. It must be emphasised that GREF also creates the basis for the position, height and gravity reference systems in the Federal States. It is thus possible for the surveying and mapping authorities of the Federal States to use modern, efficient methods in the real estate surveying and geo-topographical state recording.

Due to the linking of the geometric and gravimetric observations, GREF also corresponds to the modern concept of the **„Global Geodetic Observing System“ (GGOS)** of the IAG. GGOS is the geodetic component of the **„Global Earth Observation System of Systems (GEOSS)“** project initiated in 2003 by the G8 countries for which the intergovernmental **Group on Earth Observations (GEO)** is responsible. The objective of GEOSS is a better coordination of the global environment monitoring systems for the benefit of a proper and sustainable global environmental policy. In the framework of the widely diversified participation of Germany in the establishment of GEOSS, the BKG is also participating in the GEO Committee for „Architecture & Data Specification“. It is also worth mentioning that crosslinks to GEOSS between the EU projects „Global Monitoring for Environment and Security“ (GMES) and INSPIRE exist.

Fig. 45: Logo IAG

Organisation of the Working Committee of the Surveying Authorities of the States of the Federal Republic of Germany



AdV-President:	Hans Gerd Stoffel
AdV-Vice-President:	Wolfgang Draken
AdV-Secretary General:	Wilhelm Zeddies
Chair WG RB:	Dr. Cord-Hinrich Jahn
Chair WG LK:	Wilfried Wiedenroth
Chair WG GT:	Jörg Schaffer
Chair WG IK:	Jürgen Kremers
Chair TF PRM:	Martin Knabenschuh

Presidents of AdV

from – to	Name	Position	Ministry	Land
1948-1958	Kurandt, Friedrich	Dr.-Ing. E. h., Ministerialrat	Hessischer Minister der Finanzen	HE
1959-1960	Pinkwart, Ernst	Prof. Dr. phil., Ministerialrat	Innenministerium des Landes NRW	NW
1960-1971	Nittinger, Johannes	Prof. Dr.-Ing. habil., Dr. Ing. E.h., Ltd. Ministerialrat	Nieders. Minister des Innern	NI
1972-1973	v. d. Weiden, Adam	Dr.-Ing. Ministerialdirigent	Ministerium des Innern, Rheinland-Pfalz	RP
1974-1975	Graf, Franz Xaver	Prof. Dr.-Ing., Ministerialdirigent	Bayerisches Staatsministerium der Finanzen	BY
1976-1977	Grundt, Werner	Leitender Ministerialrat	Innenministerium Baden-Württemberg	BW
1978-1979	Hübner, Günter	Prof., Senatsdirigent	Senator für Bau- und Wohnungswesen, Berlin	BE
1980-1981	Watermann, Helmut	Leitender Ministerialrat	Innenministerium des Landes NRW	NW
1982	Lämmerhirt, Erich	Erster Baudirektor	Freie und Hansestadt Hamburg – Baubehörde –	HH
1983-1984	Lucht, Harald	Dr.-Ing., Direktor der Kataster- und Vermessungsverwaltung	Freie Hansestadt Bremen, Senator für das Bauwesen	HB
1985-1988	Schröder, Wulf	Ministerialrat	Hessisches Ministerium für Wirtschaft und Technik	HE
1989-1990	Schlehuber, Jürgen	Ministerialrat	Niedersächsisches Innenministerium	NI
1991-1992	Herzfeld, Günter	Ministerialdirigent	Ministerium des Innern und für Sport, Mainz	RP
1993-1994	Engelsberger, Max	Dr., Ministerialdirigent	Bayerisches Staatsministerium der Finanzen	BY
1995-1996	Vetter, Hans	Leitender Ministerialrat	Wirtschaftsministerium Baden-Württemberg	BW
1997-1998	Graeff, Hagen	Erster Baudirektor	Freie und Hansestadt Hamburg – Baubehörde –	HH
1999	Rokahr, Friedrich	Leitender Senatsrat	Senatsverwaltung für Stadtentwicklung Berlin	BE
2000-2001	Tilly, Heinrich	Ministerialrat	Ministerium des Innern Brandenburg	BB
2002-2003	Vogel, Friedrich Wilhelm	Leitender Ministerialrat	Innenministerium des Landes NRW	NW
2004-2005	Klöppel, Reinhard	Ministerialrat	Hessisches Ministerium für Wirtschaft, Verkehr und Landentwicklung	HE
2006-2007	Kummer, Klaus	Prof.Dr.-Ing., Präsident	Landesamt für Vermessung und Geoinformation, Sachsen-Anhalt	LSA
2008-2009	Stoffel, Hans Gerd	Leitender Ministerialrat	Ministerium des Innern und für Sport, Rheinland-Pfalz	RP

AdV general meetings

1	24.-25. Mai 1948	Stuttgart
2	30. März 1949	München
3	27.-28. Oktober 1949	Marburg
4	31.Juli -1. August 1950	Bad Godesberg
5	3. November 1950	Wiesbaden
6	12.-13. Juni 1951	Marburg
7	19. September 1951	München
8	13. Juni 1952	Marburg
9	11.-12. September 1952	Hannover
10	19.-20. Mai 1953	Lübeck
11	26.-27. November 1953	Bernkastel
12	15.-16. Juni 1954	Münster/Westfalen
13	22.-23. Oktober 1954	Münster/Westfalen
14	1.-2. September 1954	Kassel
15	11. Dezember 1955	Bad Godesberg
16	19.-20. April 1956	Berlin
17	25. September 1956	Essen
18	27.-28. März 1957	Wiesbaden
19	13. Juni 1957	Stuttgart
20	14.-15. November 1957	Göttingen
21	29.-30 Mai 1958	Wiesbaden
22	28.-30. April 1959	Würzburg
23	2.-4. Dezember 1959	Bad Godesberg
24	23.-25. Mai 1960	Norderney
25	8.-10. November 1960	Bad Kreuznach
26	27. Januar 1961	Wiesbaden
27	16.-18. Mai 1961	Mölln
28	8.-10. November 1961	Freiburg/Breisgau
29	22.-24. Mai 1962	Bad Hersfeld
30	23.-25. Oktober 1962	Hamburg
31	5.-7. Juni 1963	Bamberg
32	5.-7. November 1963	Berlin
33	2.-4. Juni 1964	Norderney
34	27.-29. Oktober 1964	Bad Godesberg
35	19.-21.Mai 1965	Augsburg
36	10.-12. November 1965	Bremen
37	24.-26. Mai 1966	Saarbrücken

38	25.-27. Oktober 1966	Heilbronn
39	30. Mai -1. Juni 1967	Kiel
40	7.-9. November 1967	Bad Neuenahr
41	28.-30. Mai 1968	Fulda
42	12.-14. November 1968	Hannover
43	6.-8. Mai 1969	Düsseldorf
44	11.-13. November 1969	Bonn
45	24.-25. Februar 1970	Hannover
46	8.-10. Juni 1970	Passau
47	10.-12. November 1970	Saarbrücken
48	4.-6. Mai 1971	Friedrichshafen
49	20.-22. Oktober 1971	Hannover
50	16.-18. Mai 1972	Kiel
51	7.-9. November 1972	Frankfurt
52	15.-17. Mai 1973	Berlin
53	12.-14. November 1973	Stuttgart
54	7.-9. Mai 1974	Hamburg
55	13.-15. November 1974	Bonn
56	22.-24. April 1975	Bremen
57	4.-6. November 1975	Bad Nauheim
58	18.-20. Mai 1976	Cuxhaven
59	9.-11. November 1976	Koblenz
60	10.-12. Mai 1977	Homburg/Saar
61	26.-28. Oktober 1977	Würzburg
62	26.-28. April 1978	Bad Meinberg
63	18.-20. Oktober 1978	Bad Homburg
64	25.-27. April 1979	Göttingen
65	17.-19. September 1979	Kiel
66	7.-9. Mai 1980	Viechtach
67	29.-31. Oktober 1980	Berlin
68	6.-8. Mai 1981	Freiburg
69	7.-9. Oktober 1982	Hamburg
70	5.-7. Mai 1982	Edenkoben
71	6.-8. Oktober 1982	Bremerhaven
72	4.-6. Mai 1983	Limburg/Lahn
73	19.-21. Oktober 1983	Emmerich-Elten
74	9.-11. Mai 1984	Bernkastel-Kues
75	24.-26. Oktober 1984	Saarlouis
76	8.-10. Mai 1985	Bayreuth
77	16.-18. Oktober 1985	Münster
78	14.-16. Mai 1986	Fulda
79	15.-17. Oktober 1986	Goslar

80	6.-8. Mai 1987	Lübeck
81	14.-16. Oktober 1987	Darmstadt
82	4.-6. Mai 1988	Berlin
83	28.-30. September 1988	Stuttgart
84	26.-28. April 1989	Hamburg
85	27.-29. September 1989	Bad Bodendorf
86	09.-11. Mai 1990	Bremen
87	17.-19. Oktober 1990	Kassel
88	6.-8. Mai 1991	Saarbrücken
89	28.-30. Oktober 1991	Trier
90	13.-15. Mai 1992	Bonn
91	14.-16. Oktober 1992	Dresden
92	12.-14. Mai 1993	Nürnberg
93	6.-8. Oktober 1993	Schwerin
94	17.-19. Mai 1994	Mönchengladbach
95	12.-14. Oktober 1994	Karlsruhe
96	17.-19. Mai 1995	Potsdam
97	11.-13. Oktober 1995	Celle
98	08.-10. Mai 1996	Magdeburg
99	16.-18. Oktober 1996	Lam
100	13.-15. Mai 1997	Erfurt
101	08.-10. Oktober 1997	Bonn
102	13.-15. Mai 1998	Kiel
103	6.-8. Oktober 1998	Stuttgart
104	6.-7. Mai 1999	Bremen
105	7.-8. Oktober 1999	Berlin
106	11.-12. Mai 2000	Frankfurt/Main
107	19.-20. Oktober 2000	München
108	10.-11. Mai 2001	Bautzen
109	18.-19. Oktober 2001	Speyer
110	25.-26. April 2002	Saarbrücken
111	7.-8. November 2002	Hamburg
112	15.-16. Mai 2003	Brandenburg
113	23.-24. Oktober 2003	Düsseldorf
114	12.-13. Mai 2004	Göttingen
115	6.-7. Oktober 2004	Wismar
116	27.-28. April 2005	Bonn
117	28.-29. September 2005	Magdeburg
118	20.-21. September 2006	Schleswig
119	12.-13. September 2007	Berlin
120	9.-11. September 2008	Stuttgart

Member authorities of AdV

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