Working Committee of the

Surveying Authorities of the

States of the Federal Republic of Germany (AdV)

Progress Report

2002

President of AdV: Friedrich Wilhelm Vogel
Ministry of the Interior,
North Rhine-Westphalia
– Department 36 –
Haroldstraße 5
D -40213 Düsseldorf

Phone: +49-211-871-2630

Vice-President: Reinhard Klöppel
Ministry of Economics, Transportation, Urban
and Regional Development, Hesse
Kaiser-Friedrich-Ring 75
D-65185 Wiesbaden

Phone: +49-611-815-2445

Secretary General: Wilhelm Zeddies
State Survey and Geospatial Basic Information
Lower Saxony (LGN),
Government Agency
Podbielskistraße 331
D -30634 Hannover

Phone: +49-511-646 09-110

Further contacts and presentations:

Internet: **www.adv-online.de**
www.atkis.de
www.sapos.de

Production: State surveying and mapping agency of North Rhine-Westphalia, Bonn

Planet Earth is the focus of attention of the "Year of Geosciences" which is taking place in 2002. With the depiction of the landscape, as performed and realised by spatial reference systems, maps and digital models in state survey and real estate cadastre, each state of the Federal Republic of Germany in close co-operation with federal authorities is making an important contribution to the documentation of the Earth's surface. They provide users with this geospatial basic data in the context of national existential provision as a sovereign infrastructure measure with due consideration to data protection regulations.

The Working Committee of the Surveying Authorities of the States of the Federal Republc of Germany (AdV) has continued to deal intensively with the economic use of geospatial data produced by the member administrations. At its 107th plenary session, the AdV commissioned a task force to examine the establishment of a geospatial data infrastructure in Germany (GDI) from the AdV´s point of view. An excerpt of the policy paper presented by the task force as a first result is attached to this progress report.

The AdV presented this policy paper to the Permanent Conference of the Ministries of Interior of the states. On January 14th, 2002 it was decided that the states, in co-operation with the federal authorities, will elaborate a co-ordinated concept for establishing a GDI as a part of a European geospatial data infrastructure to come and will also intensify the collaboration for development, maintenance and realisation of international standards as well as for the organisation of European and international geospatial data infrastructures. The Permanent Conference has recommended to the federation, states and municipalities to establish networked geodata portals, to carry out co-ordinated pilot schemes for public private partnerships and to put into action a networked meta-information system for public and private institutions as soon as possible. At the same time, the AdV has been commissioned to initialise the necessary co-ordination and, in co-operation with federal authorities, the required agreements.

To open the market for geospatial data and services based on it, AdV also wants to enter into product and sale partnerships with private service providers ("public private partnerships" –ppp–). These "ppp" are politically intended and in that respect AdV is striving to support the use of geospatial data by such "ppp". An example of this is the intended co-operation with a private enterprise in the field of SA*POS*®. During the 4th SA*POS*®-Symposium in May 2002 in Hanover, the AdV and Ruhrgas AG signed a memorandum of understanding concerning the principles of a co-operation in the field of satellite positioning systems.

Also the inner structure of the AdV has received a new form, due to additional and/or changed requirements for Official Surveying and Mapping in Germany. An advisory group has been established to support the work of the plenum and the president of the AdV. The main tasks for this group are to work out both the strategic orientation of the AdV and the objectives and guidelines for the working groups as well as to prepare the results and proposals of the working groups for the plenary sessions. This includes the setting up of a task force "Public Relations and Marketing". The advisory group shall also deal with all questions having more principle nature or far-reaching financial consequences. The working group "Matters of Principle" has been dissolved. Aspects overlapping working groups that could not be taken into consideration by the advisory group will be examined by temporarily established task forces.

With this brochure, the AdV submits its progress report for the year 2002.

Friedrich Wilhelm Vogel	Wilhelm Zeddies
President of AdV	Secretary General

1 Organisation

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

Survey and Cadastre Administrations of the States (Länder)

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

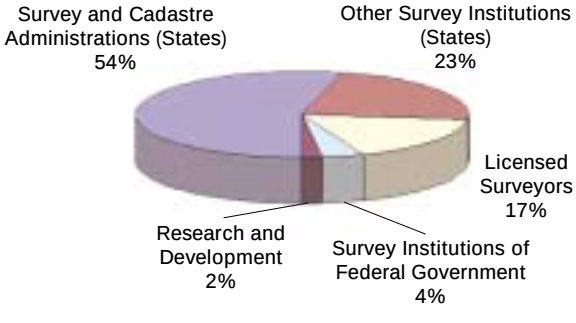
The range of services of the survey and cadastre administrations includes:

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

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

On behalf of the states, the BKG is producing the topographic maps at scales smaller than 1:100 000.

The ca. 78 000 employees in surveying and mapping are allocated to the different responsible authorities and organisations as follows:



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

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

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

ArgeLandentwicklung (Bund-/Länder Working Committee for Rural Development) **www.landentwicklung.de**

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

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

Responsibilities of AdV:

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

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

Plenum		
Members Baden-Württemberg, Bayern, Berlin, Brandenburg, Bremen, Hamburg, Hessen, Mecklenburg-Vorpommern, Niedersachsen, Nordrhein-Westfalen, Rheinland-Pfalz, Saarland, Sachsen, Sachsen-Anhalt, Schleswig-Holstein, Thüringen, Federal Ministry of the Interior, Federal Ministry of Defence and Federal Ministry of Transport, Building and Housing		
President	**Advisory Group**	**Secretary General**

↕

Working Groups (AK)			
Spatial Reference	**Information and Communication Technology**	**Real Estate Cadastre**	**Geo-Topography**

2 Recent Work of AdV

Within the scope of the treatment of special problems of our profession and state-overlapping issues that need to be solved in a uniform way, the work of AdV has concentrated on the following topics in the period covered by this report.

Spatial Reference

With the Satellite Positioning Service SA*POS*® a uniform system is available for Germany that makes an economical and made-to-order utilisation possible for both state survey administrations as well as other users. In November 2001, in order to provide the users of SA*POS*® with this uniform system throughout Germany, AdV defined standardised components. In the future there will be standards that the states (Länder) as SA*POS*® providers have to keep (compulsory standards) and add ons (optional standards) that are standardised and authorised.

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

The construction of SA*POS*® is nearing completion. A network of multi-functional, permanently operating GPS reference stations provides data for differential GPS (DGPS) to make positioning for various application fields possible. Depending on the equipment used, an accuracy from one meter down to several centimetres can be achieved. For this, various service areas with differing attributes have been set up.

Fig. 1 shows a summary of the development of the SA*POS*® reference stations in the Federal Republic of Germany. Currently (May 2002) 95% of the reference stations planned are in operation.

In most of the states online networking of the reference stations has been set up. With individually calculable location and time dependent correction data arising herefrom the accuracy and reliability of positioning have been increased. The state of development for networking was approx. 89% as of May 2002. Comprehensive networking for the whole of Germany will have been completed by the end of the year. At the moment SA*POS*® is probably the largest area in the world with networked DGPS data for real time solutions.

The concept for the uniform, networked "High precision Real Time Positioning Service" SA*POS*®-HEPS has been determined. Mobile telephony is used as the medium for transferring data from the service provider to the user in order to thus achieve comprehensive coverage. Compulsory standard requires transmission via GSM, optional standard utilises 2-m-band radio.

Over and above this the online networking of the reference stations will be introduced as compulsory standard, beyond state borders. The procedure for area correction parameter (FKP) is compulsory standard, the procedure for virtual reference stations (VRS) is optional standard. Networking will have been completed in the states by December 31, 2002.

In the SA*POS*® Technical Committee the co-operation between the AdV delegates and the manufacturers of GPS hardware and software as well as in communications technology has been continued. Format definitions were agreed upon and arrangements made for SA*POS*® compatible products.

A SA*POS*® symposium has been taking place regularly since 1998. The 4th SA*POS*® Symposium in May 2002 in Hanover was attended by over 300 participants from 6 countries. This showed the great interest in expert circles both inside and outside of Germany for SA*POS*®.

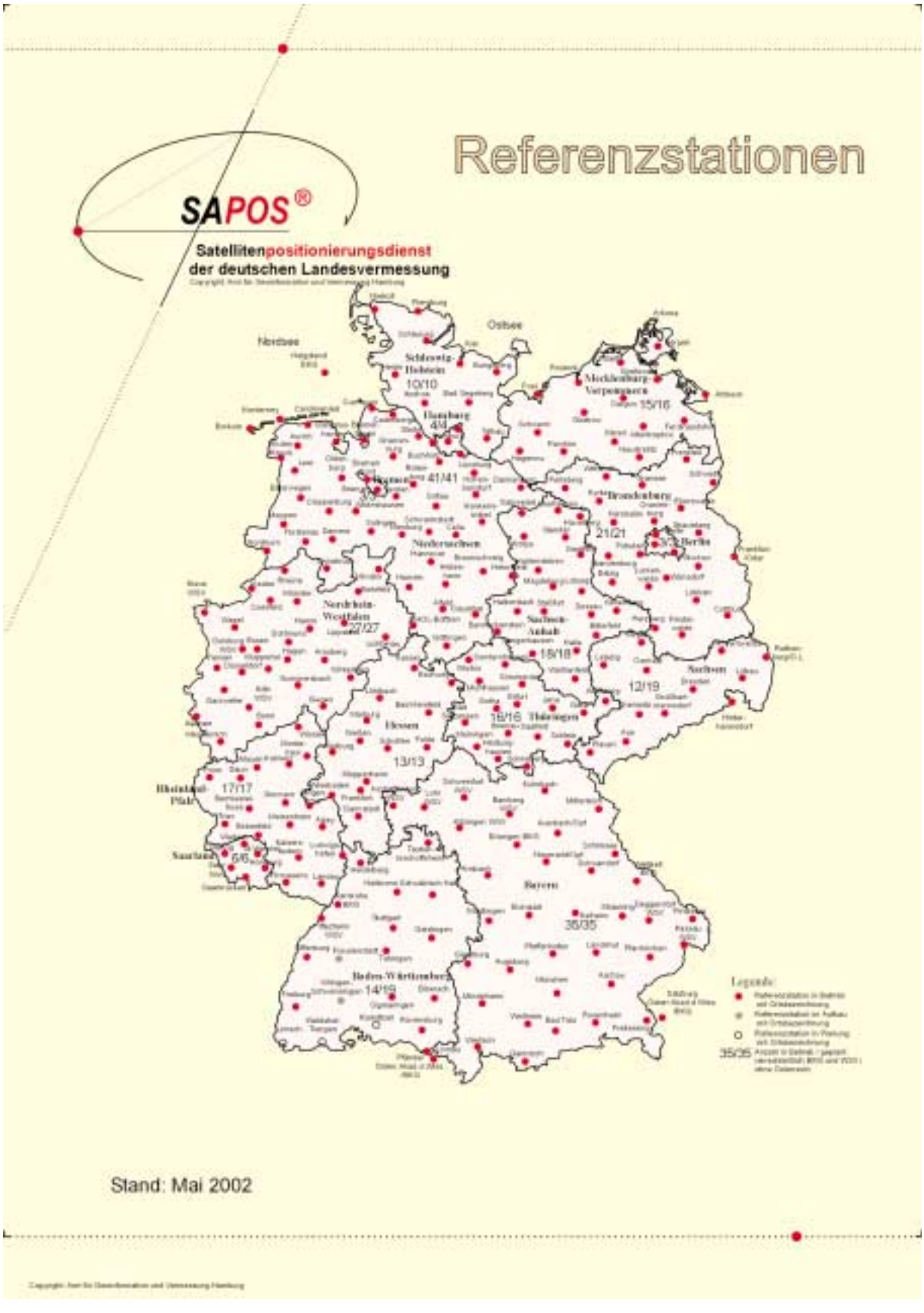


Fig. 1: Summary of the SA*POS*® reference stations in the Federal Republic of Germany.

Uniform Height System for Germany

After German reunification in 1990 it was necessary to introduce a uniform height system for the whole of Germany. In the old states normal orthometric heights were used with the designation "Höhe über Normalnull (NN)" (heights referring to the Amsterdam gauge), in the new states normal heights with the designation "Höhen über Höhennull (HN)" (referring to the mean sea level at the tide gauge of Kronstadt, near St. Petersburg) were valid. A uniform height system on the basis of the most recent precision levellings of old and new states was implemented under the designation "Deutsches Haupthöhennetz 1992 (DHHN 92)" (German height reference System 1992). Heights were calculated as normal heights according to Molodensky's Theory with the normal gravity formula of the geodetic reference system (GRS 80) based on the former Amsterdam gauge. Heights calculated within the system of DHHN 92 are designated "Höhen über Normalhöhennull (NHN)" (heights above German reference surface). The differences between the former height system and DHHN 92 can be of the order of several decimetres.

As of the key-date of January 1, 2002 the system of normal heights in the system of DHHN 92 has been completely implemented in the new states. The degree of completion in the old states differs from state to state. In all, about one third of all height reference points in Germany are available as heights above NHN.

Linkage to Global Reference Systems

The BKG realises the linkage of the German planimetric, altimetric and gravimetric networks to the European and global reference systems and within the scope of the Special Research Fund Satellite Geodesy it operates together with the Research Institution Satellite Geodesy (FESG), maintained by the University of Munich, the fundamental station Wettzell. By these activities the Federal Republic takes an active part in the International Services of the International Association for Geodesy (IAG), which means undertakes predominantly efforts towards the objective of realising global and regional reference systems. This task basically includes the maintenance of the

- International Celestial Reference Frame (ICRF),
- International Terrestrial Reference Frame (ITRF),
- European Reference Frame (EUREF),

which at the same time concerns geodynamical and geokinematic issues, such as the sensing of the earth rotation (polar motion, rotation velocity and position of the axis of rotation in space) and also continental drifts.

Above all, regular observations are carried out that are coordinated by the IAG services on the global level comprising, among others, the following components: observations with several radio telescopes (Wettzell, O'Higgins, TIGO) for very long baseline interferometry (VLBI) within the framework of the IVS (International VLBI Service for Geodesy and Astrometry), laser ranging systems (WLRS (Wettzell Laser Ranging System), TIGO) to earth satellites, SLR/LLR within the framework of the ILRS (International Laser Ranging Service) and GPS/GLONASS – permanently established stations within the IGS (International GPS Service), EUREF (European Reference Frame) and GREF (German Reference Frame), which means all in all 45 stations.

The IERS Central Office (**www.iers.org**) established at BKG in 2001 is operating a data and analysis centre, which ensures the transfer of the IERS product data extracted from a complex system of measuring and evaluation processes in an appropriate and up-to-date manner. BKG constitutes one of the three global "Primary Data Centres" of the international VLBI service.

Real Estate Cadastre

An era of redirection has come to a close. Parallel to the technical concept for an automated, integrated management of both the alphanumerical and graphic data of the real estate cadastre, AdV has also defined the profile for a forward looking real estate cadastre. Designed as a comprehensive scheme, a finely spun network has evolved with compliance to international standards, with a holistically harmonised view of official surveying and mapping and a customer oriented understanding for quality in order to survive in an increasingly internationalised market.

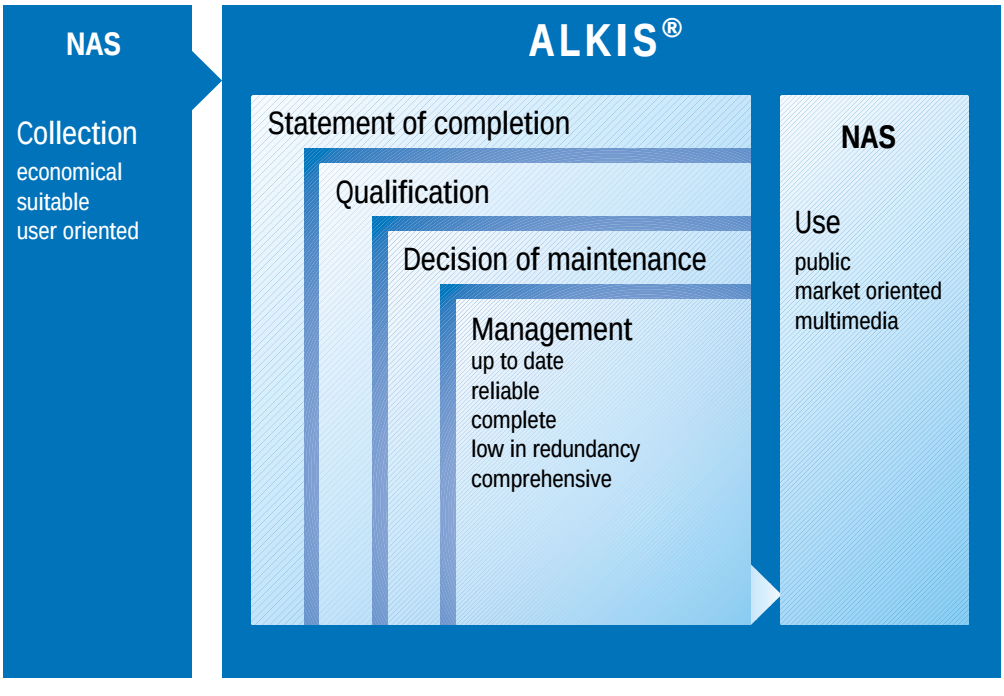


Fig 2: Future oriented real estate cadastre

Quality Features

The real estate cadastre is a description of the land with geodetic spatial reference, in the public interest, neutral to the parties concerned, comprehensive, up to date and reliable. With its unambiguous and generally binding allocation of land into parcels, its collection of objective and legal data on properties and the corresponding metadata with their qualitative descriptions and by its permanent availability, it serves the most varied economical and personal needs. At the same time with the digital data interface based on the ISO standard a suitable instrument is at hand for the growing needs of the information and communication society for georeferenced basic information.

The quality demanded by society and individuals entails

- a quality assurance system for the set of rules and regulations, procedures and products,
- economical need oriented data collection,
- integrated management of alphanumeric and graphic data, low in redundancy,
- user oriented, liberalised data access.

Corresponding to the demands of users from far and wide and of the GIS industry a federally uniform basic data set has been defined in ALKIS® in view

of the contents and structure of the real estate cadastre as well as for reasons of economy. This basic data set is the data set which will in future be managed uniformly by all surveying authorities in the Federal Republic of Germany in ALKIS® and which will be available to users independent of the state in which they reside in.

User and Market Orientation

How far official surveying and mapping fulfils these tasks depends on:

- in what quality and form the users need geoinformation from official surveying authorities,
- how effectively data management and access including the transmission of updates via the "Normbasierte Austauschschnittstelle NAS" (standard based exchange interface) can take place,
- how the need for geoinformation develops further.

The performance capacity of survey institutions secures the future oriented quality of the geospatial basic data. Their political relevance will grow in the context of the policies on technology, location and infrastructure, potential for creating value will be made transparent. The increasingly international market for geospatial data will be offensively served by customer oriented product design.

Real Estate Market Data

The building code (BauGB) of the Federal Republic of Germany stipulates the formation of independent committees of experts for determining the values of real estate, among other things. These have to manage a collection of selling prices and derive from this for every municipality average prices for plots of land (standard real estate values). The need for real estate data articulated in recent times by representatives of credit, expert witness and real estate agents circles should be covered by making these data available in the Internet. First trials are being held e.g. in Lower Saxony (**www.gutachterausschuesse-ni.de**) for the whole state and in other states for individual counties and local councils.

In addition it is obvious that the technical data of the expert commissions should be connected with the geospatial basic information system of official surveying and mapping as a related ground information system. This makes it possible to compare data between systems and with other georeferenced data, representations of sales prices and standard real estate values according to specific plots of land or simple zonal boundaries, specific research as well as need oriented forms of presentation and paves the way for a comprehensive real estate information system.

Geo-Topography

The necessary increase in topicality and the customer directed distribution of geospatial basic data continue to represent an additional challenge for the survey administrations. With the completion of the "Geodatenzentrum" (geodata centre) at the BKG and the progress in specific state "geodata portals" data and metadata can be offered to a wider circle of users. Now as ever an animated exchange of ideas in respect to dealing with access conditions and extended usage conditions is pending. The draft concepts and strategies for the increasing topicality of geospatial basic data are being put into practice.

Digital Terrain Model (DTM)

Within the states the German state survey manages DTM in high but also varying accuracies. As a result of the computer merging of the existing state DTM the homogenous DTM of Germany is currently being constructed with an average accuracy of ±2m. A number of applications, e.g. city and rural development, in three dimensional navigation and visualisation, in the management of mobile communication networks and in protection from flooding, require not only an accurate 3D model of the ground surface but also other topographic data, e.g. vegetation, buildings. The survey administrations are therefore concerned with this question, insofar as it has to deal with the production or the central co-ordination of "3D city models" and digital surface representations as a public assignment.

The Product Line ATKIS®

The further development of the product line ATKIS® including its digital landscape models and maps remains a central task for the German survey administrations. Thus the third and last realisation phase of the basic landscape model (Basic-DLM) started in 2001. The DLM250 (scale 1:250 000) is available in its first version covering the whole territory of Germany and is updated annually. Its content is continuously being extended in order to ensure linkage of technical data and to prepare Euro-RegionalMap. The DLM1000 (scale 1:1000 000) which is also available covering the whole area of Germany is currently being updated, its content extended and densified. In particular in the object group of bodies of water specific questions from federal and state authorities are under consideration.

Up-to-dateness of Topographic Geodata

After the AdV successfully completed drafting strategies and technical concepts to increase the up-to-dateness of geotopographic data and maps, the states and the BKG are now going to implement the topicality aimed at within less than a year. In doing so they bank on the expertise and co-operation of the originators of topographic changes, and also on the application of photogrammetric and computer-assisted terrestrial reconnaissance techniques.

Fig.3: The ATKIS®-DTK250 (Figure is not full-scale)

After the cartographic layout of the new topographic map was defined as an AdV standard in 2001, work has been taken up on also developing and defining the map graphics for the digital topographic maps 1:250 000 and 1: 1 000 000 (fig. 3). It also has to be thereby attempted to comply with the requirements of the uniform European EuroRegionalMap 1:250 000 and EuroGlobalMap 1:1000 000 and as far as possible with military-geographic requirements.

Further, the state survey administrations are developing working processes, partly in co-operation with university institutions, which have as objective the technical and data processing-specific generation of the Digital Topographic Maps at the scales 1:10 000, 1:25 000, and 1:50 000 as ATKIS®-DTK from the basic DLM. These processes refer to the AdV standard ATKIS® object and signature catalogues. Numerous map sheets of the DTK10 and DTK25 have already been published.

Topographic Maps on CD-ROM

Also in the year 2001 the CD-ROM series published for the whole of Germany by the states and the BKG, which presents raster data of the topographic map 1:50 000 and 1:200 000 in a software aided way under the trademarks "***Top50***" and "***Top200***", were extraordinarily successful on the market. Especially the new version 3.0 which is distinguished by exten ded functions, above all the depiction of the third dimension, attracted the attention of individual and professional buyers (fig. 4). The version 4.0 for simulating flights over the landscape is in preparation and will be published in 2003.

Copyright and Sales

The states and the BKG have been further extended the geodata centre at BKG, from which the digital ATKIS® Landscape Models and the Digital Topographic Maps will be distributed both state-overlapping and for the whole of Germany. Among the tasks assigned to the geodata centre are adoption, verification and harmonising the data from the state survey administrations, the data distribution as well as the development of product specifications. At the end of 2001 the adoption and editing of all planned large, medium and small-scale basic geospatial data concerned was completed. The Internet portal of the geodata centre (**www.geodatenzentrum.de**) was developed further and now also includes a download area with test data as well as a webmapping server for direct access to data inventories and their spatial structuring. This is accompanied by the establishment of a metainformation system according to ISO standard which was developed at BKG and is fed with data directly from the states but which will also be networked with there own metainformation systems.

Fig.4: The CD-ROM ***Top50*** with its 3D functions

Pricing and fees for use of official geospatial data and maps are also in Germany still subject to discussions. Through an amendment and technical update of its fees and charges guidelines the AdV has complied with the demands made both by public and private users to grant substantial price reductions, thus allowing for the value and exclusive marketing characteristics of official basic geospatial data, the demand for these data on the market, and that they are provided to the public.

Fig.5: The geodata shop of LGN
(State Survey and Geospatial Basic Information Lower Saxony)

Geodata Portals and Geodata Shops

Not only private companies are offering geospatial data via so-called Internet shops, which often include public geospatial basic data. The state survey administrations and BKG too are more and more going to offer their digital data stocks in the Internet through "geodata portals" and "geodata shops" (fig.5). Examples can be found under **www.lvbw.de**, **www.saarshopping.de/home/lkvkstore,** **www.geoshop.hkvv.hessen.de**, **www.lgn.de** and **www.bkg.bund.de**.

Public Relations Work, Fairs and Exhibitions

The German state survey, represented by AdV, is taking part in important trade fairs and congresses on a regular basis. Thus AdV is bringing together all states and the BKG in a large exhibition booth and is moreover proactively involved in organising presentations and panel discussions. Most successful are especially the annual events INTER**GEO**® as central fair for surveying and mapping, which takes place every year in another city, and the Frankfurt Book Fair (fig. 6).

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

Fig.6: Common booth of AdV at INTER**GEO**® 2001 in Cologne

Geographical Names in the German Coastal Seas

The "Ständiger Ausschuss für Geographische Namen -StAGN - " (Permanent Committee on Geographic Names) has started to collect the geographical names referring to the German coastal seas. About 350 names of the North Sea coast of Lower Saxony are ready in manuscript form as list and map. Altogether ca 1500 names will have to be recorded covering the area between the rivers Ems and Oder. This collection of geographical names will be edited, in co-operation with AdV, as names list and as map subsequently to the map already published by BKG "Federal Republic of Germany 1:1000 000, edition Landscapes –Names and Delimitations" . This work shall contribute to a standardised use of geographical names in the products of official surveying and mapping and thus promote also standardisation of geographical names as requested by the United Nations.

Common Civil-military map 1:50 000

For historical reasons, topographic map collections for military and non military geographic (civilian) purposes have been processed according to different aspects and published by different authorities. For example, with basically the same map graphics the maps published by the state survey offices use the Gauss-Krüger co-ordinate grid whereas the military maps use the UTM grid. In cases where both maps are used together, for example in an emergency, confusion in determining positions may arise. The Bundeswehr and the states have within the framework of an administrative agreement assented to convert at first the topographic map 1:50 000 to a common civil-military map with UTM grid. The development of this which has already begun in Baden-Württemberg will probably be completed in 2006 (fig. 7).

Common Civil-military Map 1:250 000

The map series VMap level 1 at the scale 1:250 000 was developed by order of the German Military Geographic Service and is presently in its 1st stage of updating. The BKG cooperates in the VMap Coproduction Working Group (Technical Group) under the general supervision of the U.S. National Imagery and Mapping Association (NIMA) to which belong the NATO member countries.

Fig.7: Start of the common civil-military Topographic Map 1:50 000 in Baden-Württemberg

Technological Changes in Map Printing

The German state survey offices increasingly go to printing the topographic maps in the European printing scale, thereby utilising the frequency-modelled screening (FM screen). This allows reproduction of the fine map structures and makes available the whole colour range of the four-colour offset printing comprising ca one million colours. Therefore, this method is particularly suited for printing the Digital Topographic Maps (DTK) in a new, multi-colour map graphics. However, the new technique approaches the physical limits of the production equipment owing to the very large picture element size, which means that high-quality instruments, materials and appropriate software are an absolute prerequisite for a successful production. In future, it is planned to employ the Computer-to-Plate-Technology.

ATKIS®-Model and Cartographic Generalisation

With the ATKIS®-Basic-DLM, the German state survey has an outstanding potential of object-oriented topographic geospatial data at its disposal. One of the most urgent tasks is to derive the future digital topographic maps from these data in graphics suited to new media. In order to solve the complex and integrated processes occurring with the model and cartographic generalisation, AdV has initiated in 2001 the research and development project "ATKIS®- Model Generalisation and Cartographic Generalisation". As a first partial project tenders on the European level have been invited for the development of a program system serving to derive ATKIS®-DLM50. The order was awarded to Laserscan, Cambridge, U.K.; the state survey office of Baden-Württemberg will attend to the project.

Development Project 'Knowledge-based Photogrammetric-cartographic Workstation for Quality Assurance of the ATKIS®-Basic-DLM'

The research and development project "Knowledge-based Photogrammetric-cartographic Workstation (WiPKA)" is a co-operation scheme of BKG with the University of Hanover and the Technical University of Munich. The overall concept aims at developing prototypes of the future technology serving data maintenance for all DLM of the ATKIS® project in accordance with the ALKIS® – ATKIS® data model, the acquisition of objects from topographic and thematic maps as well as their integration into the corresponding DLM, and also for the purpose of quality assurance (WiPKA–QS). In the partial project WiPKA-QS, meanwhile advanced farthest, a knowledge-based procedure for quality assurance (QS) of the ATKIS® basic-DLM by photogrammetric means is being developed. While doing this the reality is compared with the ATKIS® data stocks by assistance of orthophotos.

Information and Communication Technology

Information and communication technology forms the technical interface between the operations in the areas of spatial reference, real estate cadastre and geo-topography. For the period covered by this report, the activities of the AdV working group have been concentrated on information technological tasks within the framework of the further development of the AFIS®-ALKIS®-ATKIS® concept for the modelling of official surveying and mapping information. In particular, the expert group "Data model/data exchange" was responsible for continuing work on the AFIS®-ALKIS®-ATKIS® data model and the development of NAS.

Revision of the AFIS®-ALKIS®-ATKIS® basic scheme

The AFIS®-ALKIS®-ATKIS® basic scheme (AAA-basic scheme) forms the basis for the technical application scheme for modelling AFIS®, ALKIS® and ATKIS® objects and for the exchange of data. It is technically neutral; other specialist information systems can use the model classes defined in the basic scheme as well (e.g. land register, state development). In the period covered by this report the basic scheme has been overhauled. The data elements in the object header (identifier, life period, reason and operation) were removed from the spatial reference elements. Implementations were thereby facilitated, as spatial reference elements will now no longer be assigned a version independent of the technical objects. In all, the basic scheme has become simpler and more clearly arranged not only conceptually but also in external areas. Every object has a non-ambiguous, 16 digit object identifier.

Data Exchange Interface NAS

The AdV describes its standards AFIS®, ALKIS® and ATKIS® on the basis of the ISO family of standards 19100 - geographical information. On this basis, the work to derive an interface for the exchange of AFIS®, ALKIS® and ATKIS® objects called NAS has been continued in the year covered by this report. Starting with an initial feasibility study on the realisation of NAS, rules and software for the program supported derivation of NAS from UML (unified modelling language) scheme have been established. The ISO standard 19118 encoding rules define.

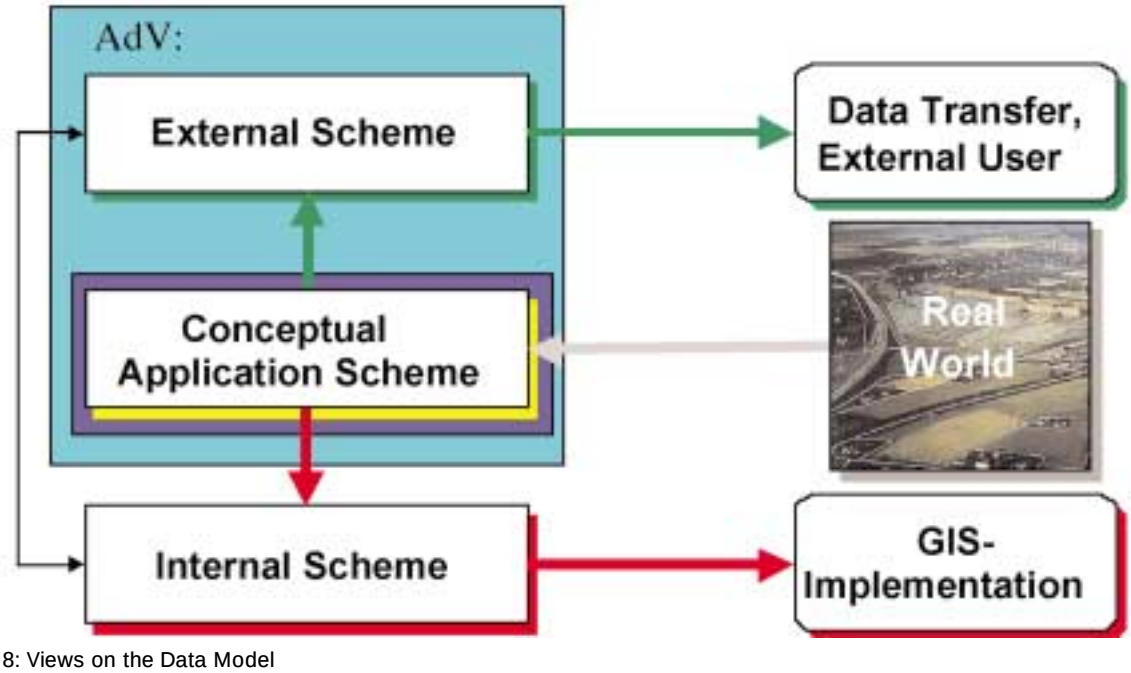


Fig. 8: Views on the Data Model

rules for the derivation of XML (extensible markup language) scheme definitions from the UML application scheme. This draft standard exhibits at the moment a number of degrees of freedom. On the contrary OGC has developed a firm XML scheme definition for representing geoinformation in XML called GML (geography markup language), which can also serve as the basis for NAS. GML provides a substantially firmer definition than ISO but it still has technical limits in the current version 2.0.

The AdV has introduced into the deliberations on ISO/TC 211 and OGC the necessary extensions into the beginning development and harmonisation of the ISO 19118 XML encoding rules and OGC-GML. The aim is to achieve conformity with ISO 19118 level 2 for the NAS within the GML scheme definition.

Information Exchange with GIS Producers, Documentation

As in previous years the needs of information- and communication technology for implementation were also taken into consideration during the conceptual work in the period covered by this report. The working results were regularly checked with the GIS producers in workshops or AdV committees as the case may be.

The completed sections of the "Documentation for Modelling Geoinformation in Official Surveying and Mapping (GeoInfoDok)" are published under **www.adv-online.de/neues**.

Geospatial Data Infrastructure

Making available geospatial data on the Internet on a large scale requires devising an infrastructure for geospatial data. The working group IT has proposed information technological principles for the complete conceptualisation of a geospatial data infrastructure in Germany. In the meantime, the AdV has completed a position paper for organising a geospatial data infrastructure for Germany.

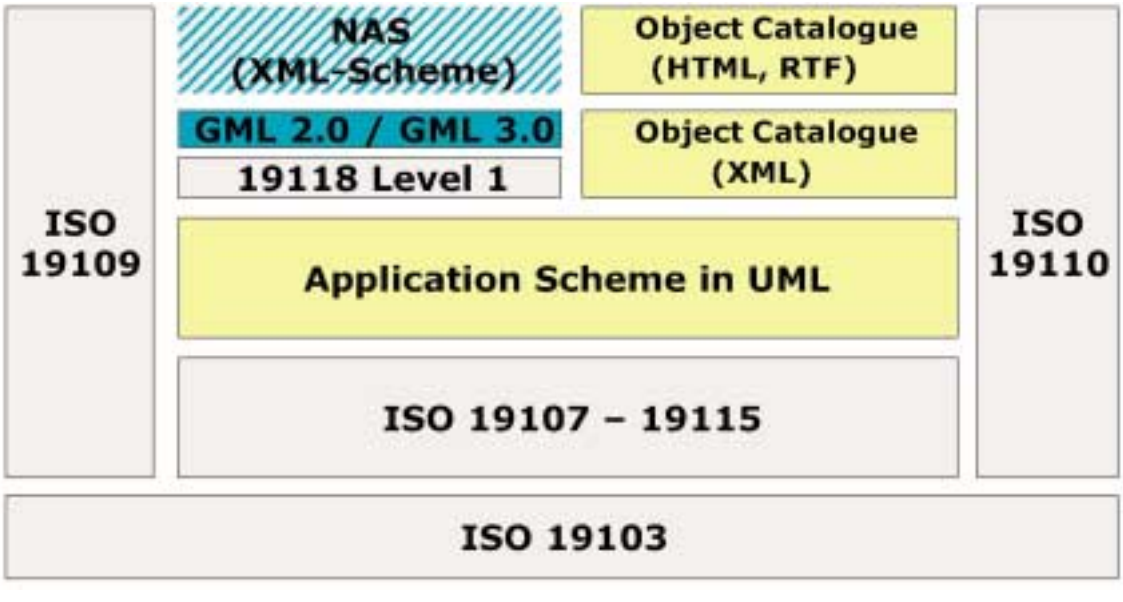


Fig. 9: Embedding of the Data Exchange Format NAS into Standards

3 National and International Co-operation

The official surveying and mapping of Germany is represented in national and international committees for working on inter-disciplinary and international tasks. Related to the respective task, either delegates from the Federal authorities or from the state (Länder) authorities will join the work or attend relevant meetings on behalf of AdV.

Permanent Committee on Geographic Names (StAGN) / 8th UN Conference

Central task of StAGN is the standardisation of the official and private use of geographic names for the German-speaking area. Members of StAGN are Germany, Austria, Switzerland and other German-speaking regions. They are representing the fields of cartography, topography, geography, and linguistics from science, administration, and practice. The administrative office is located at the BKG.

At the invitation of the Federal government the United Nations will hold the 8th UN Conference on the Standardisation of Geographic Names in August/September 2002 in Berlin. The conference will be accompanied by a technical exhibition on geoinformation systems and geographic names. A number of technical excursions will be part of the supporting programme, for instance a visit to the settlement area of the Sorbs for the illustration of the topic multilingualism constituting one of 22 Conference items. In the run-up to the Conference a training course with the subjects geographical toponymy and cartography will be organised for participants from developing countries at BKG in Frankfurt/Main and also at the ITC Enschede.

For the technical preparation of the conference also a workshop under the direction of the Dutch-German Division (DGSD), the U.N. Group of Experts on Geographical Names (UNGEGN), and StAGN was held on the occasion of the 50th Cartographers' Day, at Berchtesgaden, dealing with the handling and categorisation of exonyms.

EuroGeographics

EuroGeographics was established from the merger of the former European organisations CERCO and MEGRIN and continues the relevant activities with the aim of structuring the reference data (geospatial data) of a European geodata infrastructure. Within the framework of EuroGeographics the BKG cooperated over the period under review mainly in the products SABE (Seamless Administrative Boundaries of Europe) as the project managing institution, as well as a project partner each in EuroRegionalMap and EuroGlobalMap.

Since the transition of MEGRIN to EuroGeographics the BKG has taken care of the SABE data set in its capacity as project co-ordinator. This data set of European administrative boundaries comprising the administrative structures from the national to the communal level is harmonised from the individual national data sets on the basis of a specification designed at BKG (resolutions: 1:100 000 and 1:1 000 000). Work on the European data set is carried on intensively in order to support the forthcoming European Census (EUROSTAT) with current data on the European administrative areas. A new concept has been developed in the period under review, that includes an improved marketing strategy, new harmonised formats and types of products as well as additional European countries (30 up to the present). Beyond provision of the specific data BKG offers its technical support to SABE clients and on **www.eurogeographics.org** a specimen data set.

Within the scope of the eContent programme development funds for the setup of the data set EuroRegionalMap and EuroGlobalMap could be acquired. EuroRegionalMap has been conceived as a multi-functional, topographic reference data set related to the scale 1:250 000. In the period considered BKG contributed substantially to the elaboration of a specification on the economic use of national data inventories. The EuroGlobalMap project aims

at a topographic data set with a resolution of 1:1 000 000. As regional co-ordinator responsible for the Netherlands, Belgium, Germany, Austria, Czech Republic, Slovenia, and Croatia BKG assumes the task of supervising the data deliveries of the member countries as well as the integration and harmonisation of these data at the regional level. A first harmonised version comprising Europe of the data set shall be available by the end of 2002. A subset of these data will constitute the European contribution to GlobalMap, a global topographic data set. It is also tried to obtain a harmonisation of the specifications of EuroGlobalMap and EuroRegionalMap.

In order to meet the growing demand all over Europe for data on roads and related services, EuroGeographics is starting a project initiative called Road Data & Services, which is intended to promote co-operation of national survey authorities and private data suppliers in this specific field. BKG is involved in this project within the scope of its regular tasks of providing basic topographic data on the complete area of Germany.

EuroGeographics is strongly engaged in the setup of a geodata infrastructure for Europe (ESDI) within the framework of the INSPIRE Project running under the DG Environment and the DG EUROSTAT, and is meanwhile considered by the EU COMMISSION as the organisation responsible for and supervising the geospatial basic data of ESDI.

In the autumn of 2002 the 2nd General Meeting of EuroGeographics will take place in Frankfurt am Main. BKG will be responsible for the organisation and holding of this event and will be assisted by the state survey administration of Hesse and the AdV administrative office.

Further, the President of BKG is co-ordinating the Research and Development (R&D Forum), whose objective consists in making the various research and development projects of the individual national survey administrations more transparent, and also to co-ordinate the necessary technological developments for the structuring, updating, and distribution of ESDI. For this purpose ERDIN (European Research and Development Information Network) is presently installed.

Permanent Inter-Departmental Committee for Geoinformation (IMAGI)

In order to improve co-ordination of geoinformation within the Federal administration, already 1998 the IMAGI, (**www.imagi.de**) was founded, with BKG being in overall charge. In accordance with the resolution of the German Bundestag of 14 January 2001 IMAGI continues its successful coordinative and conceptional work towards an efficient management of geodata by the Federation.

Harmonisation of the access to the evidence and records of geodata of the Federation through the metadata system GeoMis.Bund has in a first step already been implemented serving as a prototype. On the other side, GeoMis.Bund will be an integral part of the GeoPortal.Bund, serving as interface between the national geodata infrastructure and the user. Moreover, IMAGI is elaborating a clear and user-friendly pricing and licensing scheme for the use of geospatial data of the Federation.

The IMAGI administrative office has issued a leaflet titled "Geoinformation and a Modern Administration”, which comprehensively informs about the subjects geoinformation, definition of central terms with numerous illustrative examples, current resolutions in this matter by the Federal Government, the German Bundestag, IMAGI, as well a list of many addresses and technical references. This leaflet, which was presented to the public at the Bonn Congress "Geoinformation Economy”, in February 2002, has also been distributed by the AdV and the state administrations. This Congress was held jointly by the Federal Ministry of the Interior, the state of North-Rhine–Westphalia, and the initi@tive D21 with the co-operation of CeGi (Centre for Geoinformation GmbH), and was arranged with the objective of pushing forward the market development in the geoinformation economic sector.

Geospatial Data Infrastructure in Germany (GDI)

- Excerpt from the policy paper of the AdV-

Introduction

Information about the national territory and its resources is part of the nature of a state. The understanding of the citizens regarding connections in state and society assumes that this information is accessible and usable for them.

Many of this information creates a benefit only by its assignment to a defined location or a defined area or with direct spatial reference. In this way aggregated data are described as geospatial data. By the functionalities of geographic information systems (GIS), as selections, analyses and syntheses of the data contents being available digitally, it is possible to get specific or problem solution oriented geoinformation.

The surveying authorities of the states of the Federal Republic of Germany have a data stock at their dipposal describing real estates and landscape of the whole territory, which is mostly available digitally. It offers traditionally and admittedly the basis for spatial related decision-making and data services.

Not least against the backdrop of this the surveying authorities are interested in creating a reference model for a complete geospatial data system in Germany with a promising future. They are ready to contribute their share for an operating geospatial data infrastructure.

Geospatial data infrastructure means the technological, political and institutional activities which ensure that methods, data, technologies, standards, financial and personnel resources are available to the production and application of geoinformation according to the needs of the economy.

It is the aim of a national geospatial data infrastructure to make the digital geoinformation, existing in many fields of public and economic acting in Germany, available via internet services. This includes that both data stocks are described by metadata and data can be selected from distributed data stocks as well as the desired geoinformation can be transmitted to the user via an network based on internet technologies and standardised interactions.

The presented paper explains the position of AdV to the lay-out of a national geospatial data infrastructure.

Chapter 2 "aspects and components" gives a summary of GDI and explains essential term required for understanding.

Chapter 3 "geospatial data market" emphasises the importance of the public geospatial data as assets and explains the market situation.

Chapter 4 "internet based business models for GDI" describes the relevant business ideas for geospatial data and geospatial data services and develops business models important for practice.

Chapter 5 "strategy and activities to realise GDI" contains concrete suggestions for the realisation of the business models developed for the GDI.

Chapter 6 "contribution of the surveying authorities of the states to the consolidation of the geospatial data infrastructure in Germany" formulates principles the work of the surveying and mapping authorities shall orientate itself on establishing a geospatial data infrastructure in Germany.

The entire policy paper has been published in the "Zeitschrift für Vermessungswesen (ZfV)", issue 2/2002. It is also available for download on **www.adv-online.de/veroeffentlichungen**.

Official Surveying and Mapping

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