National Report 2008/2009

Arbeitsgemeinschaft der Vermessungsverwaltungen
der Länder der Bundesrepublik Deutschland

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The basic legal division of competence has granted the German Federal States a clear mission for the official German surveying and mapping which, based on the federal state legal provisions, contains an infrastructure basic function with the collection, management and provision of geospatial reference data and products derived from these data. It was clear to all responsible parties from the beginning that there are thus significant requirements for the standardi-sation of the geospatial reference data and that this task represents a particular challenge for the federal states. Consequently, the collaboration was an essential fundamental concept which resulted in the formation of the Working Committee of the Surveying Authorities of the States of the Federal Republic of Germany (AdV) 60 years ago now. The AdV is the institution which has made coordinated collaboration possible and in fact not only between the federal states but also with the federal government. The current state of technology, the concentration on nationally important products and the involvement in new developments give the official German surveying and mapping decisive impulses for the future. The technical papers give a generalised digression about the topics which the official German surveying and mapping has dealt with conceptually in the implementation and realisations in the reporting period.

Under the conditions of digital geospatial reference data, geospatial data infrastructures, national or also European requirements (INSPIRE) for the geospatial reference data of the federal states, binding, joint and sustainable geospatial data management is required. The AdV has recognised this and set up a working group which develops proposals for extensive cooperation for the performance of common tasks. Such a cooperation for subareas already exists with the geodata centre, the SA*POS*® central office and the „Association for the distribution of house coordinates and house outlines“. They are showcase projects, core and examples for further measures.

With the gradual introduction of ETRS 89 and the UTM mapping as spatial reference, the official German surveying and mapping is consciously moving one step towards Europe. At the same time, the surveying and mapping is very closely linked with the global reference systems due to the widespread use of satellite geodetic methods in its practical activity. Dynamic processes in these reference systems finally have an effect on the results of the local surveys. Against this background, the official German surveying and mapping has also covered the whole of Germany with a modern network of 250 surveying points in a concerted action which are currently integrated in the Europe and global reference systems. The GNSS campaign in 2008 was the first national GNSS campaign since the measurements for DREF in 1991. In 2004, the AdV decided in Wismar to renew the German Height Reference System (DHHN) nationally in 2006 – 2011 and thus create the basis for the modern spatial reference. This is ensured by the GNSS campaign in 2008, the DHHN campaign in 2006 - 2011 and additional absolute gravity measurements. In this respect, the GNSS campaign represents a type of quantum leap in the German surveying and mapping: the birth of the „modern, future-oriented spatial reference“. After evaluation of the GNSS campaign in 2008, the 3D position with location, ellipsoid height, normal height and gravity are available for these points. The correct conclusions must be drawn from the results of these measurements and to react adequately with respect to the subordinate networks and the measurement methods used there.

One large, if not even the largest, project of the official German surveying and mapping is the implementation of the AAA model. A milestone has been set with each of the three A‘s which stand for AFIS® (Authorative Control Point Information System), ALKIS® (Authoritative Real Estate Cadastre Information System) and ATKIS® (Authoritative Topographic-Cartographic Information System). The data managed independently from each other by the state survey and the real estate cadastre are merged in a data model which satisfies the international requirements for standardisation.

The official German surveying and mapping is currently pressing ahead the stage of the actual realisations of ALKIS® in the federal states. It is particularly important thereby that the national standardisation of core data is ensured at the same time as the implementation of ALKIS®. ALKIS® also represents an important step for the distribution of the geospatial reference data and their integration in geospatial data infrastructures. INSPIRE has important requirements here which concern both the real estate cadastre as well as the provision of geo-topographic data.

The management and provision of the geo-topographic information meeting the requirements for Germany form another task focus for the official German surveying and mapping. The ATKIS® product family with the digital landscape models, terrain models, topographic maps and orthophotos forms the basis for this. The derivation of the DLM50.2 as basis for the provision of the DTK50 meeting the needs is the main focus of the activities. This map and also the DTK100 in the future will be managed and published as civil/military map books.The activities for the nationally standardised provision of orthophotos also warrant particular attention. The digital orthophotos throughout Germany have been compiled into one database for the first time which is designed for viewing-oriented applications.

With the networked standard ground value information system, the activities in the area of the provision of the house coordinates and house outlines, SA*POS*®, the geodata centre as central geospatial data service for the provision of national geo-topographic data and also the integration in projects of the economy and administration based on geospatial data, the official German surveying and mapping is approaching the users of its data.

These activities are actively supported by the Public Relations and Marketing task force. This task force has been set up in order to present the nationally important products of the official surveying and mapping positively to the public beyond the federal state boundaries and to increase the awareness and confidence in them. This should be achieved by national activities oriented to the general public. The reactions to the GNSS campaign throughout Germany confirm the national approach. The AdV expects important findings from the started periodic user survey about the user-oriented further development of the services provided by the official German surveying and mapping.

Hans Gerd Stoffel
President of AdV

1 Organisation and performance of tasks

In Germany, the Federal States assume responsibility for the performance of tasks in the official surveying and mapping. Since 1948, the specialist authorities of the Federal States and Federal Ministries of the Interior, Defence as well as for Traffic, Construction and City Development responsible for official surveying and mapping have been co-operating in the Working Committee of the Surveying Authorities of the States of the Federal Republic of Germany (AdV) in order to handle technical issues of fundamental and national importance. The German Geodetic Commission (DGK) as representative of geodetic education and research and the Working Committee for Sustainabble Rural Development (ArgeLandentwicklung) as government-state representation for the rural rearrangement has guest status in the AdV.

Surveying and mapping and cadastral authorities of the Federal States

In most of the Federal States, the specialist authorities responsible for surveying and mapping, cadastral and geographic information systems are assigned to the Ministry of the Interior of the respective Federal State. They have a two or three level administrative structure. The administration of topographic geospatial information lies in the area of responsibility of the respective state surveys. At regional level, there are also cadastral authorities for the real estate cadastre tasks and the provision of large-scale geospatial information. In the course of the administration reform, some Federal States have merged their State surveying authority and their cadastral authority into an integrated geoinformation authority and are making use of the synergy effects produced from this.

The range of services provided by the surveying and mapping and cadastral authorities includes:

- the comprehensive provision of spatial reference via reference networks in the Authoritative Control Point Information System(AFIS®), consisting on the one hand of terrestrial geodetic control points and their verification and on the other hand based on the satellite supported positioning service SA*POS*®,
- the storage of a wide area image of the Earth surface using geotopographic products in the Authoritative Topographic-Cartographic Information System (ATKIS®)
- using landscape and terrain models, the official topographic state maps and the aerial photographs,
- the wide area digital documentation of buildings and approx. 64 million cadastral parcels in the official real estate cadastre for ownership rights in the land register currently using the method of the ALK

and the ALB and in the future with the Authoritative Real Estate Cadastre Information System (ALKIS®) and

- the integration of the real estate cadastre and state survey in a geospatial reference data system.

Federal Agency for Cartography and Geodesy

Federal Agency for Cartography and Geodesy

The Federal Agency for Cartography and Geodesy (BKG) is a federal authority within the Federal Ministry of the Interior. In collabora-tion with the Federal States, the BKG fulfils the following tasks in the field of geographic information and geodesy:

- Provision and representation of current analogue and digital topographic-cartographic information as well as the advance-ment of the procedures and methods required for this purpose;
- Provision and updating of the geodetic reference networks of the Federal Republic of Germany including the required
- services pertaining to surveying and mapping as well as the theoretical services for the acquisition and processing of the measured data and the participation in bilateral and multila-teral work for determining and updating global reference systems,
- advancement of the implemented measuring and observation technology,
- representation of the interests of the Federal Republic of Germany in the field of geodesy and geographic information at an international level.

The Bundeswehr Geoinformation Service (BGIS)

Bundeswehr Geoinformation Service

The Bundeswehr Geoinformation Service (BGIS) is a specialty service represented within all parts of the German Federal Armed Forces. Technically the work is steered by the Bundeswehr Geoinformation Office (BGIO) that belongs to the Bundeswehr Joint Support Service and is also part of the research and development institutions of the Bundeswehr, so that under the slo-gan “Geographic information from one source” the geoscientific basis for deployment of the armed forces can be created and the fulfilment of all spatial reference tasks of the Bundeswehr can be guaranteed. The Bundeswehr Geoinformation Office (BGIO) closely collaborates with the surveying departments of the federal states and other federal authorities.

Federal Ministry for Transport, Construction and Urban Affairs (BMVBS)

WSV.de
Wasser- und Schifffahrtsverwaltung des Bundes

The BMVBS has been a member of the AdV since 1950. It has assigned the Federal Water and Shipping Authority (WSV) of the Federal Government as a specialist authority, which employs its own surveying personnel, with the operation and maintenance of the federal waterways stretching over 7,300 km. The surveying and mapping and real estate division has almost 500 employees. Throughout Germany, official surveying and mapping tasks are carried out that require close consultation with the AdV. The WSV maintains its own reference network (position and height control points) and is a constant user of the SA*POS*® stations. For the waterway network, a digital map book (1 : 2.000) is created and updated, the contents of which are used for advancement of the ATKIS® basic DLM. The BMVBS is represented in the AdV by the waterways and shipping division.

Organisation of AdV

The following graphic (Figure 1) shows the organisation of the AdV. Its organs are the Plenum and the President. The AdV uses the support of the working groups, the Task Force Public Relations and marketing and the management.

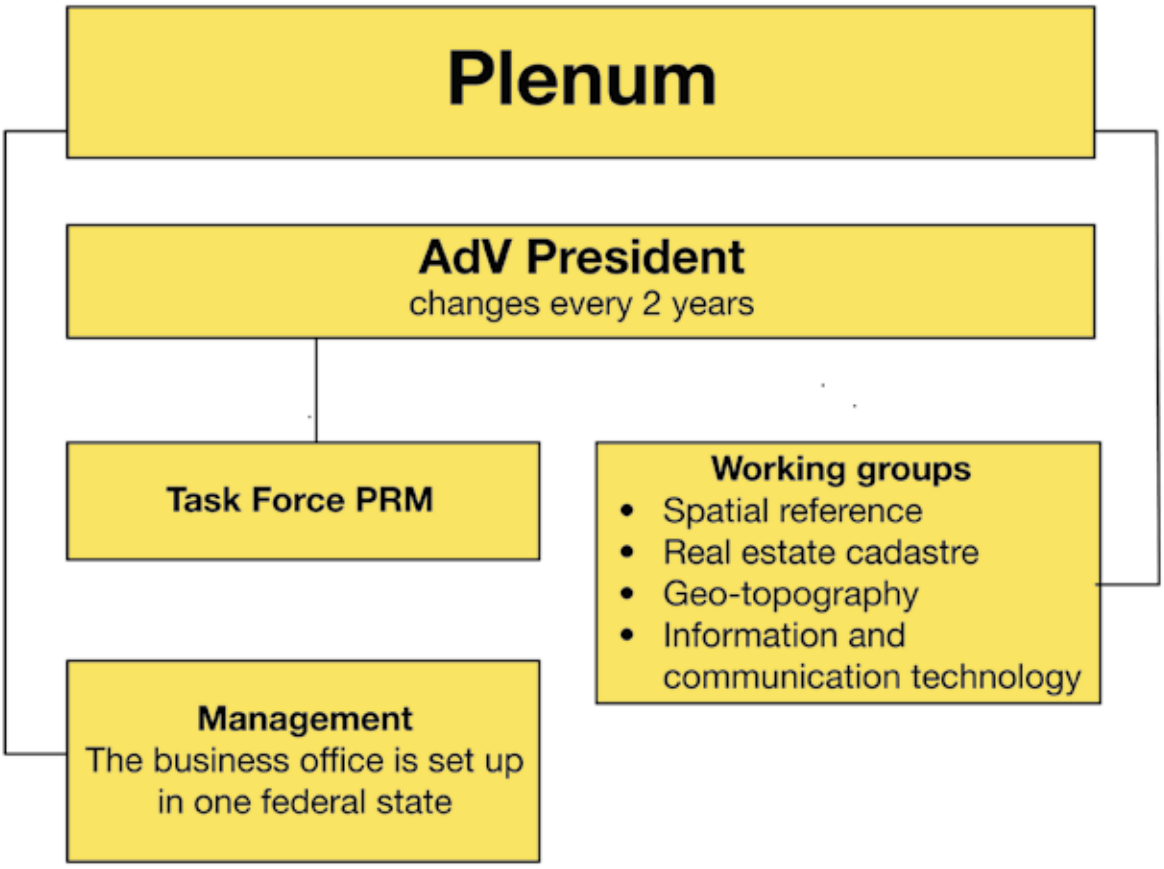

Fig. 1: Organisation of the AdV

Objectives and tasks of the AdV

The member authorities collaborate in the AdV to

- regulate technical matters of basic and national importance for the official surveying and mapping in a standardised way,
- to create a primary database of standardised fundamental geospatial reference data oriented to the requirements of the information society and
- to provide the infrastructure for the geospatial reference data as an important component, particularly for modern eGovernment architectures

In order to achieve these objectives, the AdV performs the following tasks:

- Creation and agreement of future-oriented joint concepts for the national standardisation of real estate cadastre, state surveys and the geospatial reference data information system according to the needs of politics, economy and administration,
- Advancement of the common execution of nationwide important plans,
- Moderation and coordination of the standardisation for the recording and management of the geospatial reference data and the access and sales methods,
- Support of the structure and further development of the national and European geospatial data infrastructure and the corresponding electronic services,
- Representation and presentation of the official German surveying and mapping to the outside world,
- Participation in international technical organisations for advancing the transfer of know-how,
- Collaboration with subject-related organisations and authorities as well as institutions of geodetic research and education and
- Agreement for issues of technical training.

Tasks of the AdV

Statistics for the official German surveying and mapping

State	Inhabtants in thousands	State area im km²	cadastral parcels in thousands	Number of authorities		ÖbVI
				State authorities (businesses)	Regional authorities	
Baden-Württemberg	10.750	35.751	8.890	1	44	158
Bavaria	12.520	70.552	11.546	1	51	-
Berlin	3.416	892	387	1	12	45
Brandenburg	2.536	29.478	3.057	1	18	161
Bremen	663	405	206	1	1	6
Hamburg	1.771	755	244	1	-	9
Hessen	6.073	21.115	4.964	1	7	89
Mecklenburg-Vorpommern	1.680	23.186	1.889	1	13	76
Lower Saxony	7.972	47.625	6.102	1	14	105
North Rhine-Westphalia	17.997	34.088	9.178	1	54	486
Rhineland-Palatinate	4.046	19.853	6.382	1	20	87
Saarland	1.037	2.570	1.302	1	-	11
Saxony	4.220	18.419	2.604	1	13	119
Saxony-Anhalt	2.412	20.448	2.625	1	-	56
Schleswig-Holstein	2.837	16.018	1.806	1	8	42
Thüringen	2.289	16.172	3.058	1	-	73
Germany total	**82.218**	**357.327**	**64.540**	**16**	**255**	**1.523**

Fig. 2: Statistical information

2 Spatial reference

All regional reference systems are based on international reference systems. The Federal States store their nationally standardised geodetic control framework in 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 users (e.g. cadastral offices) are provided with current and precise spatial reference in the European standardised reference system ETRS89 via the SA*POS*® stations. The stations of the GREF network which are integrated in the international reference system provide the linking.

Connection to the global reference systems

An essential cornerstone for the services of the International Association for Geodesy (IAG) and thus for the global, European and the German reference systems for position, height and gravity is the Wett-zell geodetic observatory of the BKG. The BKG has been operating this jointly with the Satellite Geodesy Research Facility of the Munich Technical University for more than 30 years.
The BKG maintains data and analysis centres for all geodetic observation technologies at the national, European and global levels and, since the year 2000, the central office of the International Earth Rotation and Reference System Service (IERS). The BKG is thus contributing to the global reference systems which are the basis, among other things, for the European and national position, height and gravity reference systems. Modern observation and evaluation approaches at national level are also used in the course of the continued development of the geodetic technology.
The national geodetic reference network (GREF) operated by the Federal Agency for Cartography and Geodesy consists of approx. 30 permanent stations of the Global Navigation Satellite System (GNSS) in Germany and neighbouring countries. In addition, a part of the stations belongs to the network of the global International GNSS Service (IGS network) and/or to the continental, European reference network „EUREF Permanent Network“ (EPN). Most of the GREF stations have an Internet connection so that their observation data are available in real time. For this purpose, the Federal Agency for Cartography and Geodesy operates the – not freely accessible – NTRIP Broadcaster *www.gref-ip.de* (Broadcaster of the Network Transport of RTCM via Internet Protocol), on which the observations are stored both in raw data as well as in the standardised RTCM format. Furthermore, two further NTRIP Casters are operated (www.igs-ip.net and www.euref-ip.net) on which the data streams of more than 200 global distributed IGS and EPN stations and some other GNSS permanent stations are provided. As well as the original observations, pseudo section corrections are calculated and also provided via the World Wide Web in the NTRIP format using networking software from a network solution for approx. 20 virtual stations which are evenly distributed across the Federal Republic of

Germany. Various networks are also evaluated, among others a (sub) network of the EPN comprising approx. 110 stations. Since the beginning of November 2006, the networks have been exclusively calculated using absolute antenna phase eccentricities (absolute PCV). Individual antenna calibrations are taken into account if present. The networks are calculated daily using the precise satellite orbit data, clocks and Earth rotation parameters of the IGS and merged into a weekly solution every seven days. The coordinates are provided in the IGS05 and in the ETRS89 systems as the result. The expansion of GREF also includes the combination of the geometric satellite positioning methods with physical methods of height determination and gravity measurements. GREF thus complies with the IAG concept of the Global Geodetic Observation System (GGOS) which provides linking of the geometric with and gravimetric observations.

Gravity field modelling

The *German Combined Quasigeoid 2005* (GCG05) was able to be extended by the evaluation of aerogravimetric aerial surveys around the area of the Southern Baltic Sea. For further improvement of the base data for the quasigeoid modelling, aerogravimetric aerial surveys in the area of the North Sea and in South Germany were organised and carried out in 2008 in collaboration with the Danish Space Centre (DNSC), the Georesearch Centre (GFZ) in Potsdam and the Federal Agency for Geosciences and the Federal Institute for Geosciences and Natural Resources (BGR). As well as the closing of existing gaps in the data (e.g. Lake Constance), the results should mainly provide the validation of the different gravity measurements in an area in which the differences in the two models (Institute for Earth Surveying of the Leibniz University, Hanover and the Federal Agency for Cartography and Geodesy) which are based on the GCG05 quasigeoid model are the greatest.
The GCG05 model was included in the product catalogue of the Federal Agency for Cartography and Geodesy in July 2008.

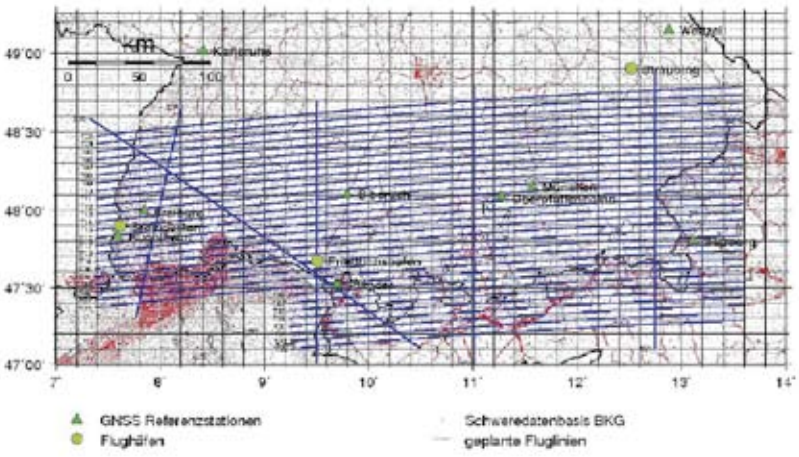

Fig. 3 Aerogravimetry campaign AlpinAero2008

NTRIP

Network Transport of RTCA via Internet Protokol

IAG

International Association of Geodesy

GGOS

Global Geodetic Observation System

Quasigeoid Modell

European Vertical Reference System (EVRS)

The data and research centre of the European Vertical Reference System (EVRS) completed the new EVRF07 realisations in the middle of 2008. The national levelling networks of 26 countries are included in the adjustment. Of these, 13 country networks have either been added as new to the network or updated by the addition of new measurement pockets. The EVRF07 is stored without constraints on 13 data points distributed across Europe. According to the definition of the EVRS and in accordance with the IAG resolution of 1983, a reduction (zero tide) has been applied to the levelling observations on account of the permanent tide effect. Using the NKG2005LU model of the post-glacial land uplift provided by the Nordic Geodetic Commission, all measured height differences in the validity range of the model have been reduced to the common Epoch 2000. This concerns the measurements of Finland, Norway, Sweden, Denmark, the Netherlands, Poland, Estonia, Latvia, Lithuania and the North of Germany.
The EVRF2007 was adopted as the new realisations of the EVRS at the EUREF symposium in Brussels in 2008 and recommended to the European Commission as the standardised height reference in Europe.
The final handover of the results to all participating countries was made at the end of 2008. In accordance with an agreement made at the EUREF symposium in Brussels in 2008, all equalised geopotential heights and normal heights of the EVRF2007 were made available to all participating countries.

From the sea to the Alps: The GNSS campaign in DHNN 2006-2011

In the Summer of 2008, the federal states and the Federal Agency for Cartography and Geodesy carried out the first nationally inclusive GNSS campaign since the GPS measurements for the German reference network in 1991.

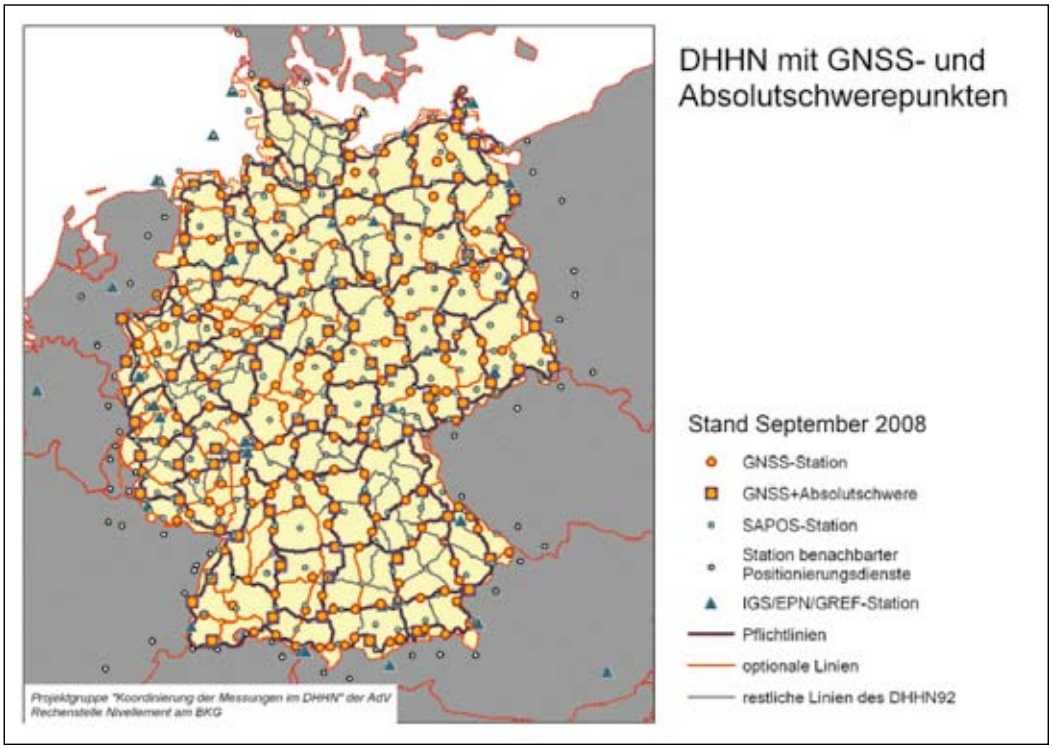

Fig. 4 German Height Reference System 2006-2011, status September 2008

At the halfway point of the implementation phase of the current renewal of the DHHN (German Height Reference System), this subproject is a milestone on the way to the integration of precision levelling, absolute gravimetry and satellite-supported position determination. The complete project pursues the following objectives in accordance with a basic resolution of the AdV from the year 2005:

- examination of the official height reference system for the purpose of covering height changes and stresses in the DHHN 92 (Diagnostics) with the option of implementing a new official height status,
- integration of the DHHN in a future, integrated spatial reference system,
- modelling of high precision geoid information for the further improvement of the satellite-supported official heights determination using SA*POS*® by the linking of levelling with GNSS measurements (GPS and Galileo systems) made at the same time and new Earth gravity field models (GRACE and GOCE missions) and
- creation of up to date principles for scientific work for the purpose of public services (recent crust movements).

More than 100 intensively prepared engineers, technicians and survey assistants observed 250 GNSS control points distributed in 34 survey sections in the complete Federal Republic of Germany between the end of May and the beginning of July 2008. The measurements standardised to a high degree were performed in three cycles of eleven days in a total of 18 twentyfour hour sessions. Due to an AdV press announcement, the campaign had large public awareness due to the involvement of the media right from the start. More than 100 press reports, web, radio and television articles were published in the Summer of 2008.
The central coordination of the campaign was implemented by a GNSS Task Force assigned by the Spatial Reference Working Group of the AdV. Innovative measures in comprehensive quality management both for the field surveys as well as for the prompt central processing ensured the high quality of the database. In fact, the originally intended integration of the Galileo European satellite navigation system could not be realised due to the current delays for the system installation, yet the GNSS data measured according to the state of the art already contain a considerable proportion of Russian GLONASS satellites. Merged, the comprehensive database of more than 100 Gigabytes has the potential to provide linking for the first time in the range of a few millimetres with the heights of the currently running levelling.
The surveying and mapping authorities of the federal states have been performing precision levelling for the renewal and repetition of approx. 22,000 km levelling lines of the DHHN 92.

GNSS

Global Navigation Satellite System

Fig. 5 GNSS measurement campaign 2008 in the press review

With the passing of the year 2008, half of the technical measurement implementation of the project over 10,000 km of digital high quality measured data is available on time so that the assigned data centres at the Cologne district government and at the Federal Agency for Cartography and Geodesy in Leipzig can form the first wide area loop closures.
As the third component, the Federal Agency for Cartography and Geodesy is starting a campaign in the Spring of 2009 for the measurement of the absolute gravity on 100 selected control points of the GNSS network. The basic objective of this stage of the project is to validate the national gravity basic data at selected control points in order to qualitatively support the further development of the GCG05. The ESA gravity field mission GOCE (Gravity Field and Steady-State Ocean Circulation Explorer) started at the beginning of 2009 finally supplements the internationally observed and previously possibly most comprehensive storage of the German state survey with its data to an integrated and standardised geodetic spatial reference.

Following the successful completion of the GNSS campaign in July 2008, both the data centres for the Landesvermessung und Geobasisinformation Niedersachsen (LGN) (Lower Saxony state survey and geospatial reference data) and the Federal Agency for Cartography and Geodesy in Frankfurt am Main are currently postprocessing the measured GNSS data in order to provide common high precision three-dimensional coordinates and thus precise height information.

Fig. 6 GNSS measurement campaign 2008, press conference in the field

3 Real estate cadastre

As an important integral part of the geospatial data infrastructure being prepared, the real estate cadastre must satisfy high requirements with regard to being up to date and completeness. The surveying and mapping authorities of the federal states are performing the accessibility and the provision of the official geospatial core data in accordance with the INSPIRE Directive of the EU. Different areas of activity result from this for the Real Estate Cadastre Working Group (AK LK).

Implementation of ALKIS®

Knowledge about the provision of geospatial data promotes their use and stimulates geobusiness. As well as the implementation of ALKIS®, this should also be supported by a metadata information system for the real estate cadastre and be made accessible using download and viewing services.
The implementation of ALKIS® should be completed in all federal states within the next two years so that ALKIS® is expected to be available covering the needs from 2011. Thereby, the implementation is being performed mainly on the basis of the GeoInfoDok 6.0 published in April 2008 (see www.adv-online.de) which takes account of the current ISO and OGC modelling standards. This is mainly demonstrated in the adaptation of the basic schema and the standard-based exchange interface NAS to ISO 19136 and the metadata coding according to ISO 19139.

Creation of a metadata information system

With respect to the metadata, the standard ISO 19115 specifies the metadata elements. The EU is making requirements with the INSPIRE Directive for the acquisition and provision of metadata whereby these must be made nationally accessible by the end of 2010. The AK LK will submit a proposal for nationally standardised management of metadata for the products available in the real estate cadastre. Dynamic metadata sets for provided digital data are the next step for strengthening customer-oriented management.

Establishment of a geospatial data infrastructure

The establishment of a geospatial data infrastructure is a basic objective of the INSPIRE Directive and thus one of the central concerns of the geoinformation authorities. The INSPIRE Consolidation Team is coordinating the development of the provisions for the implementation of the INSPIRE Directives. The AK LK is involved thereby in a statement for the modelling of the cadastral parcels.

Networked Standard Ground Values Information System (VBORIS)

The official valuation information determined by the expert committees for land parcel values should be provided standardised and compliant with GDI using the Networked Standard Ground Values Information System. A joint portal of the federal states (www.gutachterausschuesse-online.de) which connects the respective federal state portals has been set up in a first phase for the introduction and realisations of the Networked Standard Ground Values Information System decided on by the AdV.

From the middle of 2009, standard ground values from a total of ten federal states will be accessible via the joint portal; the Networked Standard Ground Values Information System will then be implemented in compliance with GDI based on the AdV modelling by six federal states (Bavaria, Brandenberg, Hamburg, North Rhine Westphalia, Rhineland Palatinate and Thüringen). North Rhine Westphalia is also providing other land parcel market data online as well as standard ground values.

Real Estate Map Viewing Service

The real estate map should also be included in the viewing services provided by some federal states. A legend based on the GeoInfoDok will be produced for this. Among other things, the accessibility to geospatial data required in the INSPIRE Directive will be ensured with the viewing services.

VBORIS

Networked Standard Ground Values Information System

House coordinates and house outlines

The national marketing of real estate cadastre products is performed using the Association for the Distribution of House Coordinates and House Outlines (GVHH). Using the central provision, it was easily possible to provide the national house coordinates in the course of the census preparation. Customers with national enquiries also benefit from this efficient type of provision. The expansion of the product range by the house outlines also provides further increased attractiveness of the product.

Agreement of the data across state boundaries

A seamless presentation of spatial reference objects in the real estate map in the area of the federal state boundaries is important. With increasing geospatial data usage spanning state boundaries, this also strengthens the customer orientation. In order to meet this requirement, the AdV has decided on a realisations of the presentation of the seamless transition of geospatial data objects in the real estate map.
The agreement of the remaining federal state boundaries is being further pursued from the experiences of a pilot project for the mutual agreement of the presentation of the state boundary between Baden-Württemberg and Bavaria. Methods are also specified using which the data of the real estate cadastre can be harmonised with the data of the ATKIS® basic DLM. The need for action is determined jointly with the Geotopography Working Group and the time forecasts for the national agreement are estimated.

GIW flagship project „GeoPlanning“

In the framework of the flagship projects of the Commission for the Geoinformation Industry (GIW Commission), the AK LK is participating in the „GeoPlanning“ flagship project. The objectives of this project are the mutual exchange of geoinformation of supply and disposal companies and the geoinformation authorities as well as prompt and as efficient as possible documentation of the geospatial data in new building areas. Thus, reliable decision bases should be provided for the real estate and insurance sector. The required geospatial data are determined for this, their quality and accuracy are established and the provision is agreed and cooperation models for regulating the collaboration of the parties involved are produced. The implementation should initially be performed as an example in some selected regions in order to reach a model solution which can be used as an orientation aid in similar cases.

Collaboration with other authorities and agencies

As well as the participation in the Interfaces Working Group of the Government-States Commission for Data Processing and Rationalisation in the Judiciary, the AdV is supporting the Working Committee of the Federal Government and the Federal States for Sustainable Rural Development (ArgeLandentwicklung) in developing and establishing the Rural Development Technical Information System (LEFIS). This is used for the purpose of continuous data transfer between land register, state development and real estate cadastre and thus simple and efficient access to and exchange of data. The principles and concepts decided on for this are based on the realisations of the AAA models.

Legislation and its implementation

With the revision of the ground evaluation law and the reform of inheritance tax law, additional tasks are linked with the real estate cadastre. In the area of ground evaluation, the position and designation of the ground profiles must be managed as other additional tasks in the real estate cadastre.
For the inheritance tax reform, the changes in the value determination section of the building law have mainly had effects on the tasks of the real estate cadastre and the expert committees. Thus, according to the new regulations, standard ground value zones must be formed, standard ground values must be determined every two years and notified to the responsible tax offices. The need for action is currently being determined.

4 Geo-topography

With the Authoritative Topographic-Cartographic Information System (ATKIS®) , the surveying and mapping authorities of the federal states are managing the descriptive landscape (topographic) geospatial reference data in the Digital Landscape Models, Digital Terrain Models, Digital Topographic Maps and Digital Orthophotos product groups. Up to dateness in the subyear range and for the complete database for essential topographic objects is ensured using cyclical updating. The focuses are the update meeting the requirements of the data inventories taking account of the requirements from INSPIRE and the migration of ATKIS® to the AFIS®-ALKIS®-ATKIS® data model.

Digital landscape models

A basic task of the surveying and mapping authorities is the establishment and the up to date management of the Digital Basic Landscape Model (Basic-DLM) as the geo-topographic data basis for the establishment and management of many different types of technical information systems in the administration and economy. The ATKIS® basic DLM database is also the basis for the derivation of the small scale ATKIS® DLM50, DLM250 and DLM1000 digital landscape models and for the derivation of official digital topographic maps. The ATKIS® Basic-DLM is being set up gradually, is currently 98% available nationally in its 3rd stage and will be completely useable from the end of 2009 with more than 120 topographic objects.

The prerequisites have been created with the „ATKIS® Generalisation“ joint project to be able to derive the DLM50.1 with automation support from the Basic-DLM using model generalisation. With this geo-topographic database which has been available since the end of 2006, a digital landscape model meeting the needs and standardised for Germany is ready which shows a more simple structure and a lower amount of data as compared with the Basic DLM so that it is particularly suitable as basis for computer supported analyses and for Location Based Services (LBS) or for the calculation of routes and for applications which need a national geo-topographic database. The „ATKIS® Generalisation“ project continues with the objective, starting from the DLM50.1, to derive the DL50.2 by the end of 2009 using automation-supported, cartographic generalisation as the data basis for the final production of the DTK50.

The DLM250 and the DLM1000 processed in the Federal Agency for Cartography and Geodesy are available in the first realisations phase covering the needs and are updated annually. The content will be continuously extended for the production of the EuroGeographics products, EuroRegionalMap (scale 1:250 000) and

EuroGlobalMap (scale 1:1 000 000) and for the integration of technical data at the European level (main user: European Commission).

Implementation of the continuous object structuring of the real estate cadastre and topography data as part of the AFIS®-ALKIS®-ATKIS® concept is crucial to the further development of the digital landscape model as part of the ATKIS® project. The feature catalogues for all ATKIS® DLMs in the complete documentation of the AFIS®-ALKIS®-ATKIS® project, the GeoInfoDok, are available for the ATKIS® technical concept.

GeoInfoDok

Digital terrain models

In parallel with the digital landscape models, the surveying and mapping authorities are managing digital terrain models (ATKIS® DGM) with different precision which are available to the administration and economy as an integral part of the geo-topographic data basis for the establishment and management of many different types of technical information systems. As well as regularly distributed geodetic points, the digital terrain models usually contain vector structure elements in the form of terrain form lines and particular terrain points (Figures 7 and 8). For the ATKIS® technical concept within the scope of the AFIS®-ALKIS®-ATKIS® concept, the DGM feature catalogue is also available in the GeoInfoDok.
As a result of the computerised merger of the digital terrain models of the surveying and mapping authorities in the Federal Agency for Cartography and Geodesy, an homogeneous DGM-Germany with a terrain-type dependant height accuracy of ± 1 to ± 3 m and a grid width of 25 m is available for the Federal Republic of Germany which is provided by the geodata centre of the Federal Agency for Cartography and Geodesy jointly with the federal states. The objective of the federal states is to qualitatively further develop their GM data inventories and, among other things, and to align them with the requirements for flood water protection.

ATKIS®- DGM

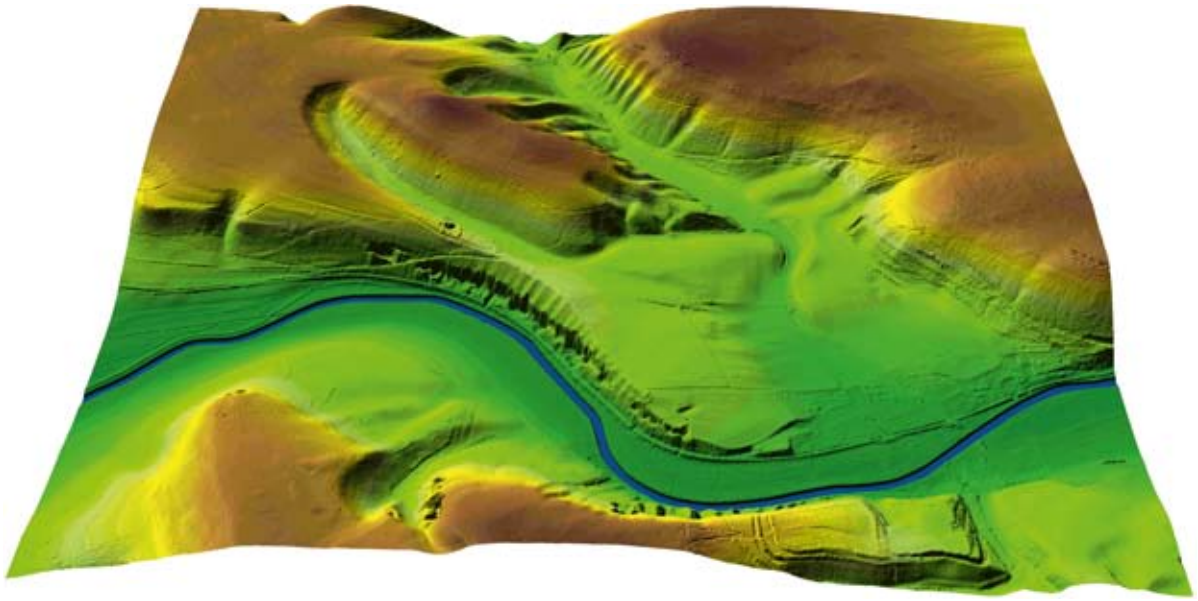

Fig. 7 ATKIS® DGM as 3D perspective view in pseudo colour coding (Section Wangen Mittelberg)

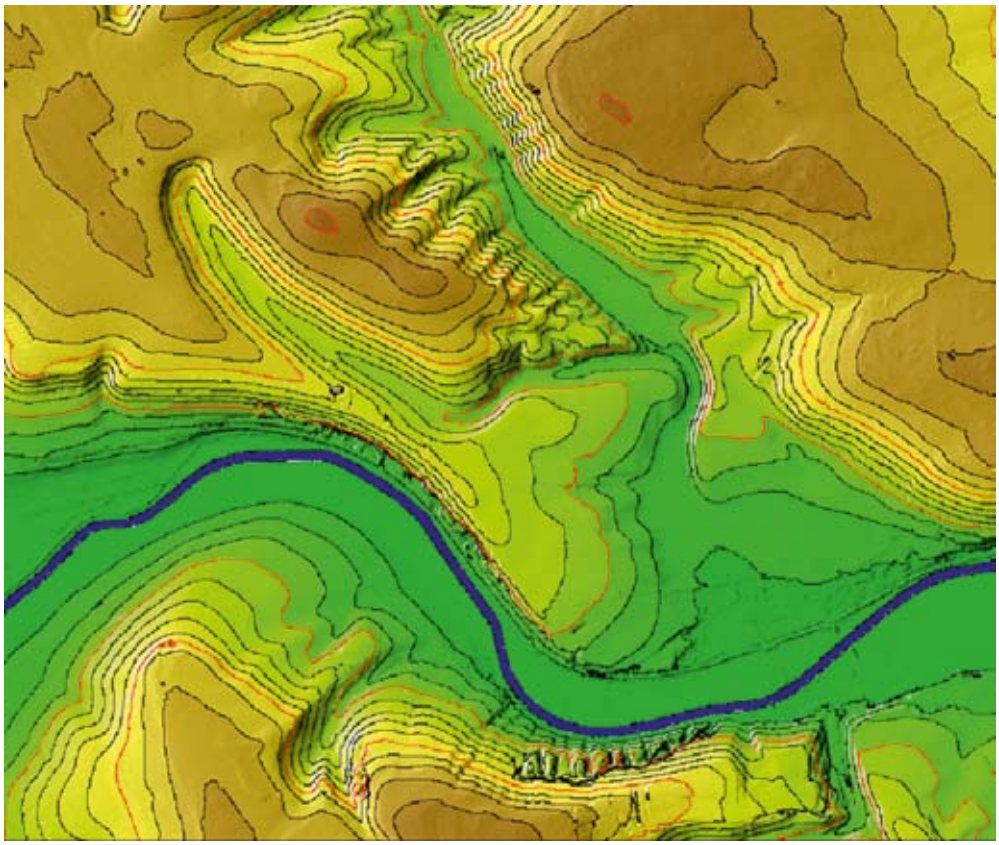

Fig. 8 ATKIS® DGM with isolines as ZCode/Shade view in pseudo colour coding (Section Wangen Mittelberg)

Digital topographic maps

Based on the available digital landscape and terrain models, the surveying and mapping authorities have started the derivation of the topographic map books based on new map graphics, documented in the ATKIS® portrayal catalogues. Digital topographic maps (ATKIS® DTK) already cover increasingly wider areas in the range of the surveying and mapping authorities. The DTK10, DTK25 and DTK50 meeting the needs are available for the first federal states. The DTK1000, published by the Federal Agency for Cartography and Geodesy, is also available. Processes for an as much as possible automation supported cartographic generalisation of the different map books still have to be further developed so that a significantly more efficient derivation from the digital landscape and terrain models can be achieved in the future.

The surveying and mapping authorities have agreed with the Federal Ministry of Defence for the DTK50 and DTK100 that these topographic map books will be managed and published as joint civil/military map books. Figures 9 and 10 give a first impression of the DTK100 civil/military map book.

Fig. 9 ATKIS® DTK100 title seam of the map sheet C5130 Erfurt

For the ATKIS® technical concept within the scope of the AFIS®-ALKIS®-ATKIS® concept, the ATKIS® feature catalogue is available in the GeoInfoDok.

Until the topographic map books to be created on the basis of the ATKIS® portrayal catalogues are available, the Federal Government and federal states will update the conventional topographic map books within the required scope and keep them ready for printing and store them as raster data record for diverse applications. With a CD-ROM series published for the whole of Germany, the federal government and federal states are jointly presenting the raster-formatted topographic map 1:50 000 and the topographic overview maps 1:200 000, 1:500 000 and 1:1 000 000 with the names „Top50“ and „Top200“. In the meantime, Version 5 of this CD-ROM series is available.

Fig. 10 ATKIS® DTK100 section from the map sheet C5134 Jena

Digital orthophotos

The digital orthophotos (DOP) product group rounds off the ATKIS® concept. Due to the image-based documentation of the landscape, DOP are designed for viewing-oriented applications. With the provision of DOP, the AdV is pursuing the objective of maintaining the aerial photographs of the topographic state recording as another integral part of the geo-topographic data basis for further uses.
With the specification of standards for DOP products and the management of metadata, the prerequisi-tes for the establishment of nationally standardised DOP data products have been created. At the geodata centre of the Federal Agency for Cartography and Geodesy, the DOP of the surveying and mapping authorities of the federal states are merged into a DOP Germany online database and provided with a ground resolution of currently 40 cm. DOP are already available with a ground resolution of 20 cm for the first federal states. The DOP Germany is expected to show this data quality for the entire territory of Germany in 2011 (Figures 11 and 12).

Fig. 11 ATKIS® DOP section Augsburg with ground resolution 40 cm

The implementation of digital aerial photograph camera systems is also putting new requirements on the surveying and mapping authorities. As well as issues of quality requirements for digital aerial photography and the data transfer and evaluation, surveying and mapping authorities are addressing 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 due to the high efficiency of the multichannel recording of the digital aerial photograph

cameras and with the addition of the infrared channel produces a linking of requirements from surveying and mapping, forestry and environmental authorities in the aerial photography plans of the federal states. Furthermore, new possibilities for three dimensional recording of topographic geospatial reference data in the form of digital surface models (Figure 13) are provided by the combination of digital aerial photograph camera and laser scanner.

Fig. 12 ATKIS® DOP section Augsburg with ground resolution 20 cm

Fig. 13 DOM as 3D perspective view in pseudo colour coding (Section Wangen Mittelberg)

Toponymy

In collaboration with the Permanent Committee for Geographic Names (StAGN), the Federal Agency for Cartography and Geodesy provides a standardised (gazetteer) service which provides the toponymy (GN-DE) from the vector data of the DLM 250/1000, VG250 and GN250/1000 products. The GN-DE database is available as a standardised Web Feature Service (WFS) according to the specification of the Open Geospatial Consortium (OGC) at the geodata centre of the Federal Agency for Cartography and Geodesy.

STAGN

Permanent Committee for Geographic Names

5 Information and communication technology

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 the maintenance and further development of the AFIS®-ALKIS®-ATKIS® (AAA) concept for the modelling of the geoinformation from the official surveying and mapping and in the IT coordination of the GDI activities for the AdV at national level.

AAA model

The AAA basic schema forms the basis for the technical application schema for modelling the AFIS®, ALKIS® and ATKIS® objects and for data exchange. Being a neutral entity, other technical information systems can use the classes defined in the AAA basic schema for their own modelling. The software scripts of third parties based on the modelling are available for supporting wide use of the AAA model in technical information systems.

The AAA basic schema and the standard-based exchange interface NAS have been adapted to international standards (ISO 19136, GML 3.2). In the course of this, the documentation for modelling the geo-information of the official surveying and mapping (GeoInfoDok) has been updated in the version 6.0.

The AdV has declared the GeoInfoDok 6.0 as the AdV reference version. This reference version is valid at least until all federal states have completed the migration to this version for AFIS®, ALKIS® and ATKIS®.

Registries

For supporting applications based on GeoInfoDok, it is necessary on the one hand to make the GeoInfoDok resources available via formal mechanisms, so-called registries, and on the other hand to publish their availability and status using these registries.

In the course of a pilot project, the establishment of registries using the coordinate reference systems used in AAA data as an example has been implemented as a prototype. Based on the perceptions gained from this pilot project, a concept for establishing other GeoInfoDoK registries as integrated GDI components is currently being developed. Primarily, the registry prototype with respect to the object identifiers of the AAA objects is being further developed.

With the successful establishment of registries for applications based on GeoInfoDok, requirements from INSPIRE and from GDI-DE will be satisfied by the surveying and mapping authority: the interoperability of inter-organisational processes will be significantly improved.

Registries

AdV WMS Profile

The AdV WMS Profile has been approved in order to harmonise and further extend the web-based provision of the geospatial reference data meeting the needs as the basis of the GDI in Germany. With this, an as standardised as possible and provision meeting the needs of topographic maps and orthophotos from the AdV member authorities should be achieved on the World Wide Web.

The AdV WMS Profile is based on the part of GDI-DE as standard approved application profile WMS-DE and using these specifications defines a series of other characteristics as mandatory for the AdV member authorities.

AdV-WMS-Profile

Other AdV Profiles for consistent harmonisation of the provision of web-basis geospatial reference data and geospatial services are planned.

6 Task Force Public Relations and Marketing

All spatial referenced 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 descripti-ons 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 and services for the state, economy, science and society, the surveying and mapping authorities of all federal states are legally obliged to collect, manage and provide geospatial reference data.

Requirements

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, up to date and high quality provision and make it accessible to the „geodata market" and the interested public. As well as the traditional print media, the use of digital geospatial reference data in the administration and economy is becoming more and more widespread. The surveying and mapping authorities are taking account of this development with usage-oriented changes in the data provision: As well as data output to data carriers, web-based data provisions have become de facto standards. Using geoportals, geo-services and geoviewers, the surveying and mapping authorities provide digital data inventories with different characteristics for searching, viewing and for downloading as well as technical aids. The meta information system provides information about availability, features and contact persons of the products.

In order to make a nationally standardised product range possible, the distribution points are networked and their provision is standardised. Currently, certain product groups are provided nationally and harmonised using three central distribution points: the Association for the Distribution of House Coordinates and House Outlines (GVHH), the SAPOS central office and the geodata centre of the Federal Agency for Cartography and Geodesy which also provides the institutions of the federal government with geospatial reference data.

With the objective of always achieving the optimum satisfaction of the national requirements and standardising the product provision in the official surveying and mapping, the Task Force Public Relations and

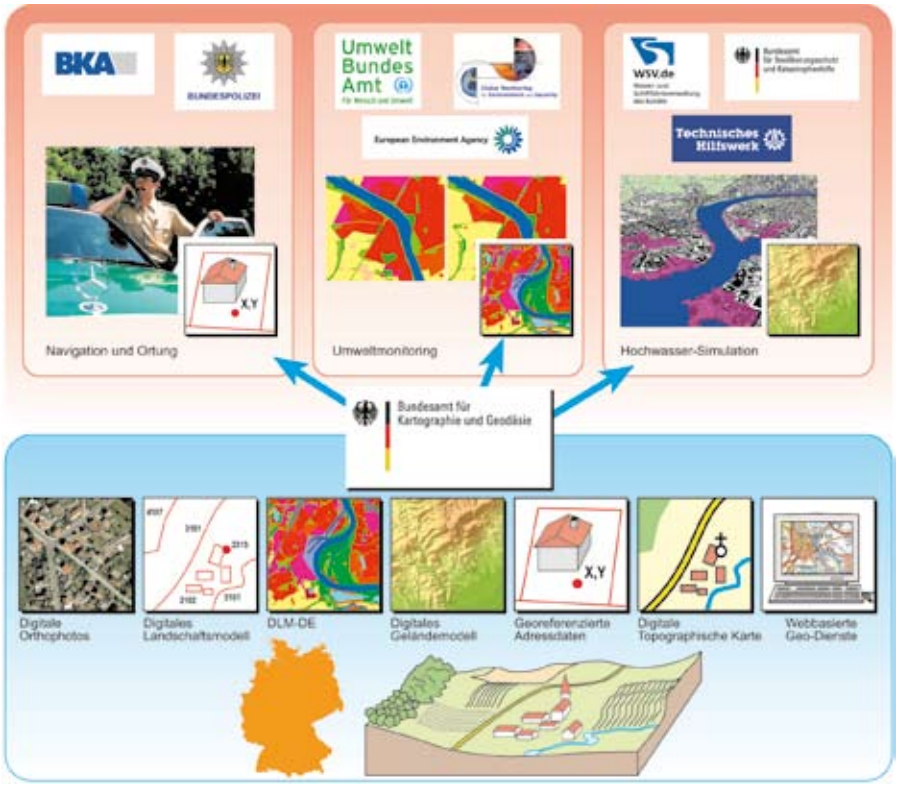

Fig. 14 Central provision of geospatial reference data to the institutions of the federal govern-ment by the geodata centre of the Federal Agency for Cartography and Geodesy.

Marketing (TF PRM) of the AdV performs the operational PRM tasks for the nationally available range of geospatial reference data with the involvement of the member authorities and the working groups of the AdV. In doing so, the following subject areas must be covered:

- collection and documentation of the requirements of the state and society for the collaboration; their matching with the geo-spatial reference data available (requirements survey and requi-rements analysis)
- maintenance of the licence and fee models and model licence agreements as well as execution of example licencing for the use of the geospatial reference data and services (conditions and distribution policy),
- support of activities for the performance of a strategic and technical infrastructure for the provision and usage of geo-spatial reference data,
- carrying out actions for information about the availability and usability of the geospatial reference data and services (product-information) and
- carrying out actions for the (positive) perception of the official German surveying and mapping and its national provision of geospatial reference data (image maintenance).

Services

Requirements survey and requirements analysis

In order to achieve optimum distribution of the geospatial reference data products, these must be produced and provided in the course of the official actions of the surveying and mapping authorities user and purpose oriented. In order to obtain the necessary information about the need and requirements of the users for the geospatial reference data (product, intended use, product satisfaction), the provision conditions and product information (information and contact paths to the surveying and mapping authorities), the TF PRM has jointly developed a concept with the central distribution points for the execution and analysis of the regular user surveys in the central distribution points. The rotational survey was started in the Spring 2009; the first results can be used in the AdV to check the provision, the service and the product information for orientation to the requirements.

The Deutsche Dachverband für Geoinformation e.V, (DDGI), in accordance with its self-conception, is working towards a general improvement of the availability and usability 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. 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 the updating of the supply of geospatial reference data from the official German surveying and mapping.

Licence and fees model

For the regulation of the usage rights in relation to the national provision of the geospatial reference data and services, a standardised licence and fees model is needed which is sufficient for the current requirements, is as simple and clear as possible and regulates the usage of all currently provided ge-ospatial reference data products and services. The AdV approved the AdV Fees Guideline which satis-fies these requirements in December 2007. It applies to the output of geospatial reference data beyond the state border and products derived from these (e.g. house coordinates) by the central distribution points. Furthermore, the federal states are requested to apply the rates of the fees structure for the formulation of state-specific scales of fees and for the establishment of the fees for state-specific outputs of geospatial reference data. In order to guarantee a standardised and proper design of the AdV fees guideline, the TF PRM produces recommended actions and further develops, if necessary, the licence and fees model according to the requirements of the AdV and in consultation with the working groups.

Model licence agreements

Against the background that the national provision of geospatial reference data and services continues to be standardised and that the association of the surveying and mapping authorities with its national provision of geospatial reference data is perceived more and more as an association of providers, the TF PRM has updated the standardised model licence agreements and the General Terms and Conditions of Business and Usage (AGNB) and published these on the World Wide Web at www.adv-online.de . They are used in the central distribution points and recommended for the internal federal state licencing. A small sample contract with reduced content is currently being developed which should be provided for simple application cases of geoproduct licencing.

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 geospatial reference data market. 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). For example, in order to increase the general awareness of the available orthophotos (DOP-D) meeting the needs for Germany, the national advertising campaign for DOP-D will be carried out in 2009 with original press information and own website with links to distribution points. Flanking this, the DOP-D Viewer should be activated for a limited period.

Public relations work, trade fairs and exhibitions

In the course of the development of geospatial data infrastructures in the Federal Republic of Germany, the AdV is endeavouring to raise the level of awareness for the products (geospatial reference data) of the surveying and mapping authorities of the federal states. As in previous years, the official German surveying and mapping, represented by the AdV, was present at the INTERGEO® 2008 international leading trade fair for surveying and mapping in Bremen - (Figure 15) . and was represented with exhibition stands at other trade fairs. Apart from the presentation of the products and services of the official German surveying and mapping, accompanying presentations and discussion forums also took place.

Fig. 15 Joint stand of the AdV at INTERGEO® 2008 in Bremen

7 Involvement in national and international organisations

Participation in the framework of the GDI-DE

The Geospatial Data Infrastructure Germany (GDI-DE) is a joint initiative of the federal government, federal states and local councils which should ensure a networked use of geo-information without missing links for the administration, the economy and the citizens. As well as its own national strategy for the implementation of a GDI which is closely linked with the eGovernment initiatives of the federal government and federal states, the GDI-DE also coordinates and implements the European requirements from the INSPIRE initiative for the establishment of a European geospatial data infrastructure. The AdV is actively participating in the establishment and expansion of the GDI-DE.

Strategies for provision of the geospatial reference data in compliance with GDI

Geospatial reference data are used as the basis for the presentation and evaluation of all spatially-referenced technical subjects. Therefore, an interdisciplinary GDI without geospatial reference data is unimaginable. The AdV has been working intensively for a long time on a GDI-compliant, provision of the geospatial reference data satisfying the user requirements by the federal states. Among other things, this includes providing the geospatial reference data using standards-compliant services, for example using Web Map Service (WMS) or Web Feature Service (WFS).

In collaboration with the GDI-DE, the WMS-DE Profile V.1.0 which the federal states should use as a service in the future for the visualisation of their geospatial reference data and the WFS-G Profile (Gazetteer Service) which makes possible a standard-compliant provision of the house coordinates of the federal states have been specified and approved by the AdV in the meantime. The federal states are currently implementing WFS-G; in the future, using this should create the possibility for the central office of the Association for Distribution of the House Coordinates and House Outlines to access all house coordinates of the federal states decentrally in order to always provide up to the minute house coordinates for user requests.

GDI-DE

The networking of metadata databases should be performed nationally using the Catalogue Service Web (CSW) (AP ISO 2.0) by means of which the individual metadata catalogues of the federal states should be integrated in the Geodata Catalogue Germany of the GDI-DE. Currently, this service is being adapted with respect to metadata to the requirements from the Regulation (EC) No. 1205/2008 for carrying out the INSPIRE Directive in order to be able to comply with the obligations from INSPIRE.

Suitable applications must initially be specified for the use of other WFS within the GDI-DE. A WFS makes it possible, in accordance with its characteristics, to access vector databases in a specified way. With the GeoInfoDok and the NAS, the AdV has developed a specification of its geospatial reference data meeting international standards which are an essential requirement for the design and development of standards-compliant services. The project group „GDI Standards“ of the AdV maintains and updates the GeoInfoDok and also therequirements with respect to the geospatial data infrastructure and therefore closely collaborates in various model projects and working groups with the GDI-DE.

INSPIRE

The European INSPIRE Directive which also defines new requirements for the provision of the geospatial reference data has a decisive influence on the standards-compliant provision of the geospatial reference data. The AdV has actively accompanied and designed the development process of the INSPIRE Directive, particularly the implementation of the Directive using the implementation provisions specified by the European Commission. The provisions for the implementation of INSPIRE will mainly develop as EU Directives with direct binding effect for the member states. In partnership with the GDI-DE, the AdV is drafting nationally agreed action strategies for the implementation of INSPIRE.

Model projects in cooperation with the GDI-DE

Various model projects for the sustainable establishment of a geospatial data infrastructure in Germany are currently being worked on and supported inside the AdV. The model project *Conservation Area Information* of the GDI-DE provides a clear example of how the nationally standardised provision of the geospatial reference data can be performed. The standardised provision of conservation area information meeting the requirements could be achieved by the project based on the geospatial reference data for the Federal Republic of Germany provided by the WMS service. It is planned to expand the model project for the use of WFS and the application of standardised visualisation requirements using Styled Layer Descriptor (SLD).

The Networked Standard Ground Values Information System (VBORIS) has emerged from the development work of the AdV and has been adopted for practical testing and implementation as a model project of the GDI-DE. The objective is to develop a nationally standardised GDI-compliant solution for the provision of official value determination information of the Expert Committees for Land Parcel Values in the states of the Federal Republic of Germany on the World Wide Web. In the meantime, a central information system platform (www.gutachterausschuesse-online.de) has been activated which links all existing standard ground values information systems of the federal states with each other. The GDI-compliant provision of the standard ground values on the federal states side is currently being implemented. The objective is to make the standard ground values useable not only in the provided federal state portals but also interoperably for other applications. In this way, it is envisaged to present the standard ground values centrally in one application for the entire territory of the Federal Republic of Germany. In doing so, the constant development and maintenance process will be taken over by the AdV. This plan also receives national support from the eGovernment Deutschland-Online initiative.

The AdV model project „Networked Metadata Information System“ has already been successfully completed by means of which a central access to the existing metadata catalogues for geospatial reference data of the federal states has been made possible. The implementation provisions with respect to the metadata for the implementation of the INSPIRE Directive have come into force as an EU Directive in the meantime. They specify concrete content and technical requirements for the Europe-wide provision of metadata for specified geodata topics. The GDI-DE is currently implementing these requirements in a model project „Geodata Catalogue DE“, using which the central, Germany-wide standardised and GDI and INSPIRE compliant provision of metadata should be achieved. The Geodata Catalogue DE is achieved using a networking of existing metadata catalogues based on services. The AdV is incorporating its experience for the establishment of the AdV metadata catalogue in this model project whereby it participates directly in the GDI-DE model project and the associated „Metadata“ working group.

The AdV has developed a technical concept in direct relation to the GeoInfoDok for the establishment of a „registry“ for coordinates systems (CRS) which aims to achieve a machine readable description of the coordinates systems used in the AAA data. Linked with this is a central provision of generally applicable coordinates transformations for the entire territory of the Federal Republic of Germany and specified subareas which should be performed GDI-compliant and based on services. The GDI-DE has integrated the idea of a central registry in the GDI-DE architecture concept and set up a corresponding model project „Registry“ with an associated working group. This model project focuses on the central description of coordinates systems and coordinates transformation as well as other content within a GDI suitable for registries. In close cooperation with the AdV, the GDI-DE is further developing the registry based on the software components for coordinates systems and transformations already realised as prototypes by the AdV.

Participation in Deutschland-Online and GIW Commission

The AdV is supporting and participating in the geospatial data plans of Deutschland-Online and various flagship projects of the GIW Commission. The Deutschland-Online „Geospatial Data Plan“ pursues the objective of harmonising the heterogeneous geoinformation landscape in Germany. The federal government and federal states have approved a Deutschland-Online Action Plan for this in which the Geospatial Data Plan has been adopted with the core areas of projects, standardisation and market development. The gazetteer for house coordinates, Networked Standard Ground Values Information System (VBORIS) and „XPlanung“ (XPlanning) are the current projects.

The Commission for the Geoinformation Industry (GIW Commission) is pursuing the objective with its flagship projects such as, e.g. GeoRisk and GeoResource, of also making the official geospatial data available for the economy. In the already completed „Standardised use of digital official geospatial data for the economy“ flagship project, the AdV has jointly developed model licence agreements for the use of geospatial reference data and geotechnical data and geoservices with the GIW Commission and made these available for all interested parties.

8 Involvement in national and international organisations

EuroGeographics

EuroGeographics, the association of the national authorities for geodesy, cartography and real state cadastre office has set itself the primary objective of setting up the reference data (geodetic reference networks and geospatial reference data) for a European geospatial data infrastructure and creating its interoperability. EuroGeographics has set up a programme for this purpose with the intention of advancing the harmonisation of the specification of data and services needed for the European geospatial data infrastructure and thereby also supporting and preparing the later implementation of the EU INSPIRE Directive. The programme is being actively implemented by various expert groups (see www.eurogeographics.org/eng/05_groups.asp) in which experts from the Federal Agency for Cartography and Geodesy and from the federal states are also participating.
In the context of EuroGeographics, the Federal Agency for Cartography and Geodesy mainly participated in the production of the products **EuroBoundaryMap** (EBM, previously SABE (Seamless Administrative Boundaries of Europe)) and **EuroDEM** as project manager, **EuroGlobalMap** (EGM) as regional coordinator and **EuroRegionalMap** (ERM) as partner. The Federal Agency for Cartography and Geodesy is also represented in the working groups of the project **State Boundaries of Europe** (SBE, previously EuroBoundaries).
EuroBoundaryMap, a Europe-wide vector data set of the administrative boundaries of the federal sta-tes to the local council level was first published in 1993 based on a specification developed in the Fede-ral Agency for Cartography and Geodesy and has been continuously updated since then by the Federal Agency for Cartography and Geodesy based on the data provided by the European countries involved. All previous versions were provided in the application scale 1: 100 000 and in various GIS formats. With the EuroBoundaryMap 2004/NUTS version, the product has been converted to the geodatabase database format and various adjustments and improvements in the data model were performed at the same time, mainly with respect to harmonisation with the ERM and EGM specifications. Since then, the ERM has contained a reference to the NUTS classification updated by the European Commission and/or Eurostat in January 2004 for the local administrative units of all EU countries whereby the interoperability between this Europe-wide geographic database of administrative units and statistical information is guaranteed. All new product variants are produced in addition to the state output for each scale as so-called „Full Europe“ versions (all countries in one feature type class). In the context of the licence agreement concluded in 2005 between the European Commission/Eurostat and EuroGeographics for the provision of a Europe-wide geographic database of the administrative regions and statistical territory units, the Federal Agency for Cartography and Geodesy produced product versions for the annual EBM updates on behalf of EuroGeographics which correspond to the

contractual requirements of Eurostat. In the reporting period, the database with effective date of 01/01/2008 was completed, taking account of the updated NUTS classification, as Version EBM 3.0 and delivered ontime to Eurostat. This product version EBM v3.0 has been confirmed by Eurostat in the meantime and the contract between Eurostat and EuroGeographics for the updating of EBM has been extended by another year. As well as the provision of data and metadata, the Federal Agency for Cartography and Geodesy also provides technical support, a current user manual and a specimen data record for download from the EuroGeographics website at http://www.eurogeographics.org/eng/04_sabe.asp.

EuroBoundaryMap

EuroDEM is a medium resolution digital terrain model of Europe whose establishment was resolved by EuroGeographics in the year 2007 and whose realisations has been successfully completed by the Federal Agency for Cartography and Geodesy until May 2008. The terrain model covers the territory of the 27 EU member states and other countries. The data record which was designed for a scale range of 1: 50 000 to 1: 100 000 describes the height of the Earth surface of Europe. The product shows the following specifications:

EuroDEM

- Height accuracy: 8-10 metres
- Grid width: 2 arc seconds (~ 60 metres)
- merged from the data inventories of the national catography authorities of Europe
- harmonised at the country boundaries

The Federal Agency for Cartography and Geodesy continues to provide EuroGeographics as product manager for the EuroDEM product. No updates of the product are currently planned, however an improvement of the resolution and the height accuracy will be pursued in the long term.

EuroRegionalMap

The products **EuroRegionalMap** (ERM) and **EuroGlobalMap** (EGM), two digital topographic data sets in the scales 1:250 000 and 1: 1 000 000, have also been significantly improved in recent years with considerable support of the Federal Agency for Cartography and Geodesy (harmonisation of the specifications, conversion to the geodatabase database format). The Federal Agency for Cartography and Geodesy is involved in the respective technical teams under the management of the respective project managers IGN Belgium (ERM) and National Land Survey Finland (EGM). The new versions of ERM (v3.0) and EGM (v2.2) have been produced in the reporting period. Qualitative improvements have been made for both products. ERM has also been completely updated. An also updated version of EGM (v3.9) should be completed by June 2009. The improvements in content and functionality for ERM and EGM correspond to the user requirements, particularly those of Eurostat as there are also contracts between Eurostat and EuroGeographics for these data sets which were also

EuroGlobalMap

extended at the end of 2008. As well as the European Commission / Eurostat, the European Environmental Authority is also showing great interest in the products from EuroGeographics. The European Environment Agency (EEA) published a call for tenders in February 2009 for the licencing of pan-European datasets and an associated product support service. The Federal Agency for Cartography and Geodesy was involved in the preparations for the tender by EuroGeographics and its partners.
The activity in the project **State Boundaries of Europe** (SBE) in the reporting period concentrated on the improvement and final approval of the data model for the exact position acquisition of the state boundaries. This data model was also extended by one component which includes the modelling of topographic objects linked with the boundary (so-called Connecting Points) for the support of edge adjustment beyond state boundaries. The establishment of a Maritime Boundaries sub-working group which started its work at the beginning of 2009 was also decided in 2008.
The 8th general meeting of EuroGeographics took place in Sibiú, Romania in the Autumn of 2008. The discussions of the representatives of 42 member organisations concentrated on the strategy and further development of EuroGeographics and on the involvement in European programmes and initiatives such as INSPIRE, GMES and GEOSS.
ESDIN (**E**uropean **S**patial **D**ata **I**nfrastructure **N**etwork) is a new project promoted by the EU in the framework of its eContentplus programme in which not less than 18 institutions as well as the Federal Agency for Cartography and Geodesy are participating. The project has the objective of merging geospatial data with different resolutions for some INSPIRE subject areas by the development of web-based services. The implementation of such services based on distributed software and hardware architecture should facilitate the merging of „interoperable“ data in a particularly cost-efficient and effective way. The Federal Agency for Cartography and Geodesy is using its expertise in several work packages, is also leading the work package „ExM Data Specification (medium / small scale)“ and is involved as a data supplier in testing the specifications and implementations (Figure 16).

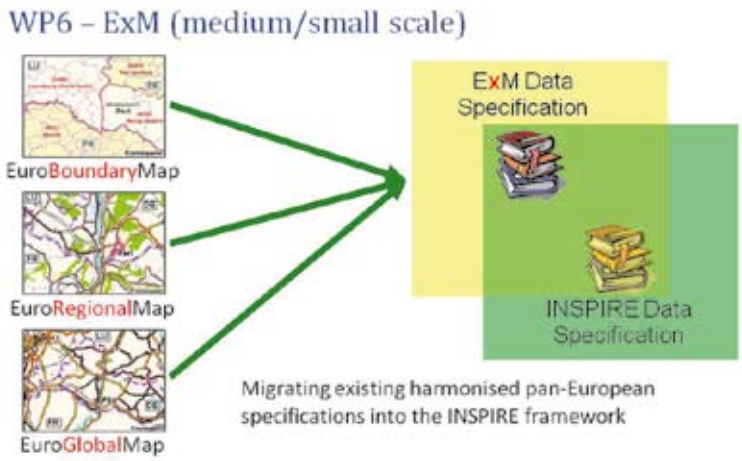

Fig. 16 ESDIN: Migration of EuroGeographics specifications to INSPIRE

European infrastructure for geographic name data – EuroGeoNames (EGN)

The project EuroGeoNames (EGN) - with the Federal Agency for Cartography and Geodesy as project initiator and coordinator - has been carried out by an international consortium which includes new part-ners from the economy, research and public administration from five countries (Austria, Germany, the Netherlands, Slovenia, Great Britain) and EuroGeographics. National surveying and mapping authorities from a further 15 countries (Cyprus, the Czech Republic, Spain, Finland, France, Hungary, Lithuania, Latvia, Estonia, the Netherlands, Belgium, Greece, Norway, Slovakia and Turkey) as so-called „reference group“ are the potential data providers which have already declared the provision of their national geographic names databases for the project. The data storage and updating continues to re-main the sole responsibility of the countries which have acquired the data.

In the period of the EU-promoted project running time (September 2006 until February 2009), a web services infrastructure for official geographic names data in Europe has been established in collaboration with the reference group. Thereby, the official names data stored decentrally in the EU countries have been linked with each other using so-called „Web Feature Services (WFS)“ and are searchable. Furthermore, geographic names in recognised minority languages (e.g. Sorbian and Friesian in Germany) are taken into account.
The total financial budget of the project was EUR 1.8 million whereby 50% of the costs were promoted by the EU in the framework of the eContentplus programme.

Approximately 60 participants from 30 organisations met on February 5, 2009 in Brussels for the Euro-GeoNames closing event. The main objective of the EGN final workshop was to present the results of the AU-promoted project running time and to announce the functionality of the EGN architecture to other potential data providers and users. Potential data providers should also discuss which steps are necessary in order to connect to the EGN infrastructure.

Some countries such as Slovenia, Latvia, the Netherlands, Austria, Lithuania, Norway and Germany have already completed the EGN implementation. Other countries such as Belgium, Hungary, Cyprus, Estonia, Finland, the Czech Republic, Spain, Greece and France will complete the implementation either before the end of the AU-promoted running time or by the end of 2009.
The EGN project coordination was handed over to EuroGeographics in the Spring of 2009. The objective of the then following „Implementation Phase 2009 - 2012“ is the connection of at least „EU27“.

Synergies to INSPIRE were presented during the EGN final workshop. EGN provides an INSPIRE-compatible gazetteer service for Europe. It was also clear that the EGN infrastructure generally from a technology viewpoint provides a very good basis for the implementation of web services in the context of INSPIRE. Figure 17 shows the overview of the current status of the EGN implementation in the partner countries.
Information about the previous workshops and for the complete EuroGeoNames project can be found at: www.eurogeonames.com

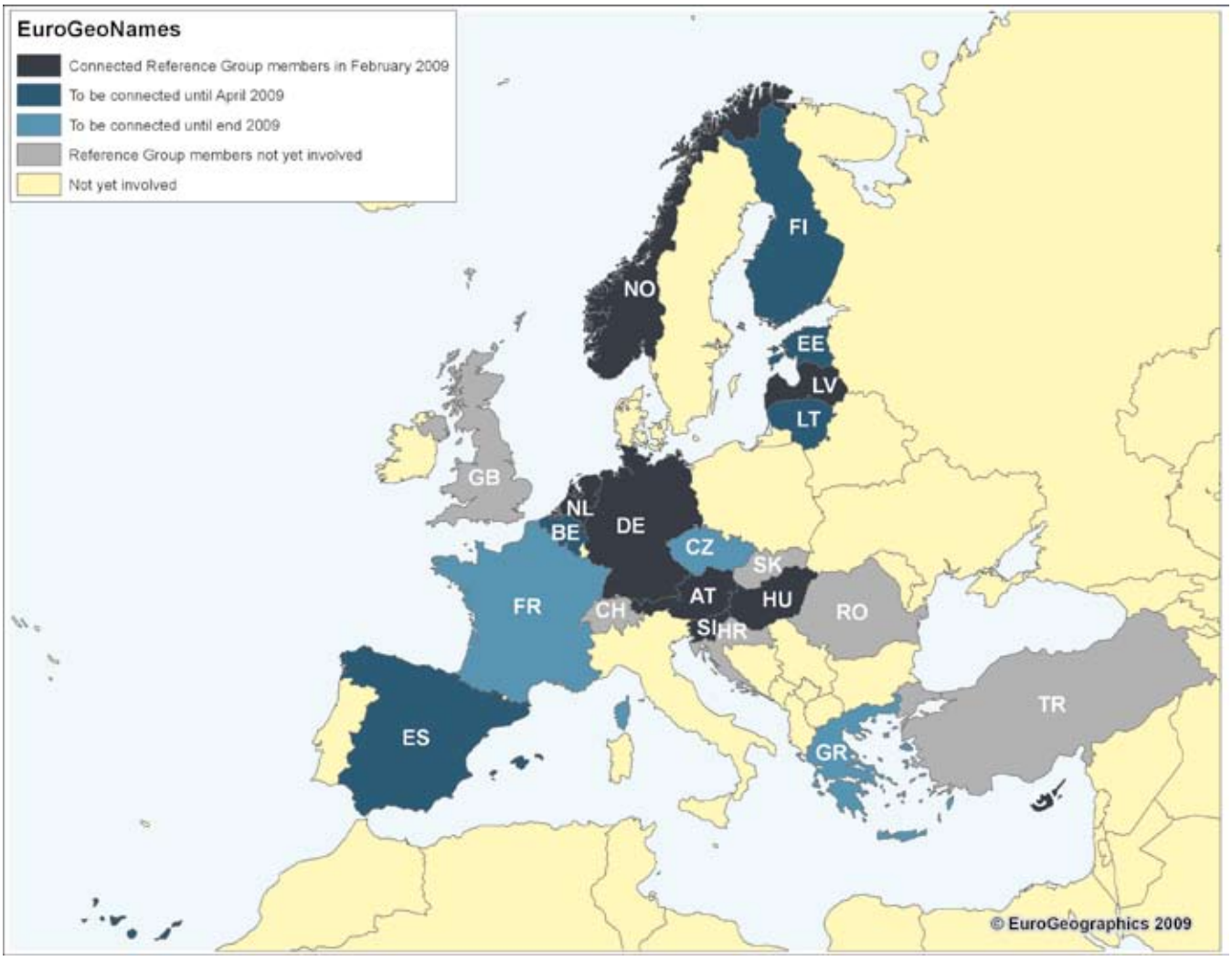

Fig. 16 Detailed overview of the current status of the EGN implementation in the partner countries.

Open Geospatial Consortium (OGC)

OGC

The *Standards Working Group (SWG) ebRIM RegRep* which should develop an OGC Registry Service Specification was formed at the December 2008 meeting of the OGC in Valencia. Based on the OASIS Standard *ebXML RegRep* and the *OGC CSW-ebRIM Registry Service*, the designed registry concept in ISO 19135 „Geographic Information--Procedures for item registration“ for supporting the registration, the management and the query of registered geoinformation should be implemented. This OGC task was initiated by the Defence Geospatial Information Working Group (DGIWG) and a framework for a standardised registry service has been created with this specification.
The AdV continues to support this development direction because a consistent continuation and embedding of the running prototype work for the registries of the AdV based on the GeoInfoDok (starting with coordinates reference systems and object identifiers)by the AdV project group GDI Standards will be performed here as they are also planned by GDI-DE and within INSPIRE.
It is this ensured that the AdV developments will be integrated without contradictions both for GDI-DE as well as within INSPIRE.

Working Party on Land Administration (WPLA)

WPLA

Also during the previous reporting period, the AdV was making an active contribution to the activities of the Working Party on Land Administration of the United Nations Economic Commission for Europe. The AdV representative was elected Chairman of the WPLA in November 2007 for the official term until the middle of 2009. As well as the regular WPLA Workshops held twice a year, a number of other activities are carried out and supported by the AdV. These activities focus on a number of studies regarding fun-damental and current specialist subjects of land registration and the real estate cadastre. These are handled by the relevant Working Groups (Task Forces).

Permanent Committee on Cadastre (PCC)

During the presidency of Slovenia in the first half of 2008, a Memorandum of Understanding between the PCC and EuroGeographics was signed in order to bundle the common activities for the cadastral office area in Europe.

As France which should have also taken over the presidency in the PCC due to the EU Council presidency in the EU did not consider itself able to, Italy took over this role for the 2nd half year. A workshop for the subject „Cadastral information system: A resource for land management policies“ took place in December 2008 at the conclusion of the Italian presidency. In this context, a book with information about the cadastre in Belgium, Germany, Italy, Austria, Sweden, Slovakia, Spain, the Czech Republic and Hungary was also published.

The Czech Republic took over the presidency of the PCC on January 1, 2009 and will hand it over to Sweden at the general meeting in June in Prague. The series about the cadastral office in Europe will be continued with another six articles about the cadastral office in Finland, Greece, Poland, Slovenia, Hungary and Cyprus. It is expected that the joint working group of PCC and EuroGeographics will con-tinue the successful collaboration for the development of a contribution for the implementation guideli-nes of INSPIRE for the cadastral parcel in 2009 and in 2010 for data from the Appendixes II and III which refer to cadastral offices. The AdV will be represented in the expert group by the Secretary General.

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