

# **Land Use Control and Property Registration in Germany– Procedures, Interrelationships, IT Systems**

**Hartmut MÜLLER and Mirko SIEBOLD, Germany**

**Key words:** Spatial Information Management, Land-use Planning, IT Standards

## **SUMMARY**

The contribution will briefly outline the principles of land registration, of land-use planning and of real estate cadastre including their mutual interrelationship in Germany. The currently reached status of system development will be described. Special credit will be given to the development of IT standards. In Germany a countrywide operating system for land-use control is in use. Property information is held in two systems, namely in the German land registration system and in the real estate cadastre system. Spatial planning takes place at different public administration levels, namely at the national level, at the state level and at the municipal level. Local land-use planning processes at the municipal level start from the presetting given by superior national and regional planning specifications and finally result in legally binding land-use planning documents. Land-use planning, building construction activities and land parcel documentation (parcel location, parcel size, building location) are closely interrelated. Technical developments currently take place in all mentioned fields. Specific reference has to be given to ALKIS, the new German IT standard for the real estate cadastre system and to XPLANUNG, the new IT standard for urban land-use plans which is currently under development.

## **ZUSAMMENFASSUNG**

Der Beitrag beschreibt kurz die Grundlagen der Registrierung von Landeigentum, der räumlichen Planung und des Liegenschaftskatasters in Deutschland einschließlich ihrer gegenseitigen Beziehungen. Der derzeitige Stand der Systementwicklung wird beschrieben, insbesondere mit Blick auf die Entwicklung von IT Standards. In Deutschland besteht ein umfassendes System der Landesplanung, die Information zum Eigentum wird in zwei getrennten Systemen vorgehalten. Die räumliche Planung findet auf verschiedenen Verwaltungsebenen statt, nämlich auf der Bundesebene, der Landesebene und der kommunalen Ebene. Die kommunale Planung setzt auf den Vorgaben der höheren Ebenen auf und erzeugt im Endergebnis rechtlich bindende Planungsdokumente. Planung, Bautätigkeit und Liegenschaftsdokumentation hängen eng zusammen. Technische Entwicklungen finden zurzeit auf allen Gebieten statt. Speziell zu nennen sind ALKIS, der neue Standard für die Liegenschaftsdokumentation in Deutschland und XPLANUNG, der zurzeit in Entwicklung befindliche Standard für die kommunale Bauleitplanung.

# Land Use Control and Property Registration in Germany– Procedures, Interrelationships, IT Systems

Hartmut MÜLLER and Mirko SIEBOLD, Germany

## 1. PRINCIPLES AND LEVELS OF SPATIAL PLANNING IN THE FEDERAL REPUBLIC OF GERMANY

The basic rules of urban planning in the Federal Republic of Germany are defined in the Federal Building Code (Baugesetzbuch). According to the Code, the purpose of land-use plans is to support sustainable urban development and a socially equitable utilisation of land, and to contribute to securing a more humane environment and to protecting and developing natural life. More specifically, the preparation of land-use plans particularly has to cope with the following items:

- the general requirement for living and working conditions and the safety of the population,
- the housing requirements of the population,
- the social and cultural needs of the population,
- the preservation, renewal and development of existing local centres [Ortsteile] and to the shaping of the town- and landscape,
- the requirements relating to the preservation and maintenance of cultural heritage,
- the requirements of Churches and religious organisations,
- the requirements of environmental protection,
- economic requirements, with respect to medium-sized companies, the requirements of agriculture and forestry, of transport including local public transport, of the postal and telecommunications services, public utilities, and the protection of natural resources and the preservation, protection and creation of employment,
- defence and civil defence requirements,
- the results of other urban planning measures.

In the whole process of preparing land-use plans, public and private interests are to be duly weighed.

Procedures of urban land-use planning [Bauleitplanung] are defined in detail to prepare and control the use of land within a municipality, mainly for buildings. The results of urban land-use planning are documented at two different levels, namely in

- the preparatory land-use plan [Flächennutzungsplan] and in
- the legally binding land-use plan [Bebauungsplan].

According to the Federal Building Code (Section 34), the normal case is that the erection of new buildings or the redesign of existing buildings is permissible within Built-Up Areas. Prerequisites to be fulfilled to get the building permit are, that in terms of the type and scale of use for building, the coverage type and the plot area to be built on, the building proposal

blends with the characteristic features of its immediate environment and the provision of local public infrastructure has been secured. The requirements of healthy living and working conditions must be satisfied; the overall appearance of the locality may not be impaired.

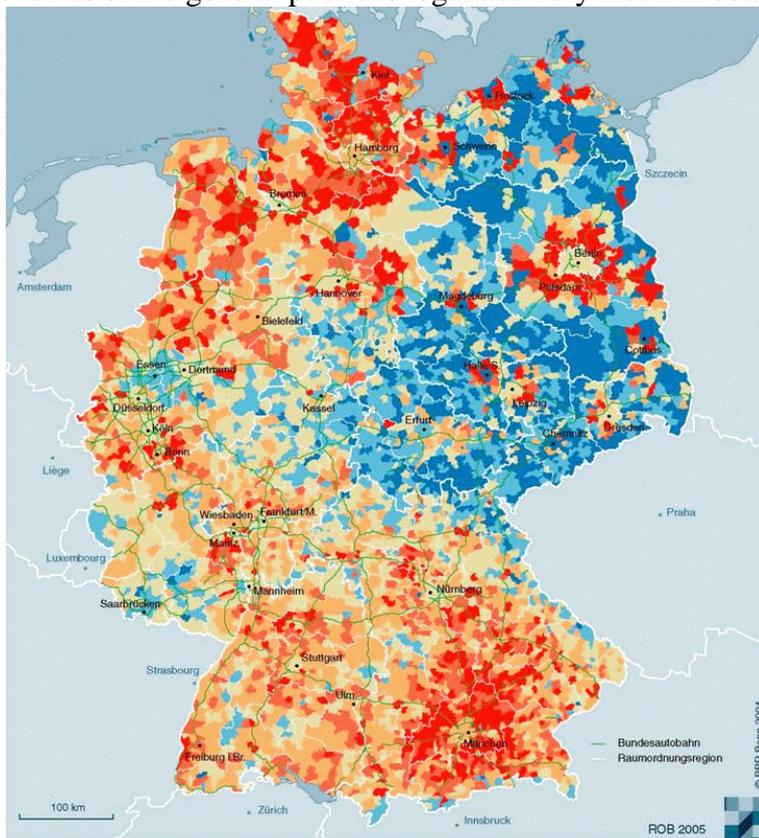
Spatial Planning level	Responsibility	Medium
Federation level Spatial planning	Federation (Federal Ministry for Transport, Construction and Housing)	Federal Regional Planning plan
Federal State level Regional planning	Federal States' Ministries, allocation according to federal state government plan	Federal State Development Plan
Federal State sublevel Regional planning	Federal States' Ministries, allocation according to federal state government plan, planning associations	Regional plan Scale 1/25.000, 1/50.000
Local level urban land-use planning - preparatory - legally binding	Municipalities	preparatory land-use plan scale 1/5000, 1/10000 legally binding land-use plan scale 1/500, 1/1000
Sectoral planning	Sectoral planning agencies for road construction, private enterprises etc.	Sketch planning and authorization planning

**Table 1** German Spatial Planning levels

In the same way the normal case is that Building in the Undesignated Outlying Area is prohibited. However, there are exceptions from this rule (Section 35), if, for instance, buildings will serve agricultural or forestry activities and occupies only a minor proportion of the total plot, if buildings will be dedicated to public supply of electricity, gas, telecommunications services, heat and water or for sewerage, if it is intended to be used for research and development into nuclear energy for peaceful purposes or for the treatment of radioactive waste, or for research, development or use of wind or water-powered energy sources.

The preparation of both kinds of land-use plans is in the responsibility of municipalities which, therefore, play the most important role in German land-use planning. The plans have to be created in line with the aims of comprehensive regional planning, which, on its part, has to follow the general planning rules as given at the Federation level by the Federal Regional Planning Act [Raumordnungsgesetz]. The Regional Planning Act contains the very general principles and overall concepts of spatial planning in the Federal Republic of Germany. At the Federation level mainly spatial planning reports are submitted (see Figure 1), whereas the more specific planning activities take place at the lower spatial planning levels.

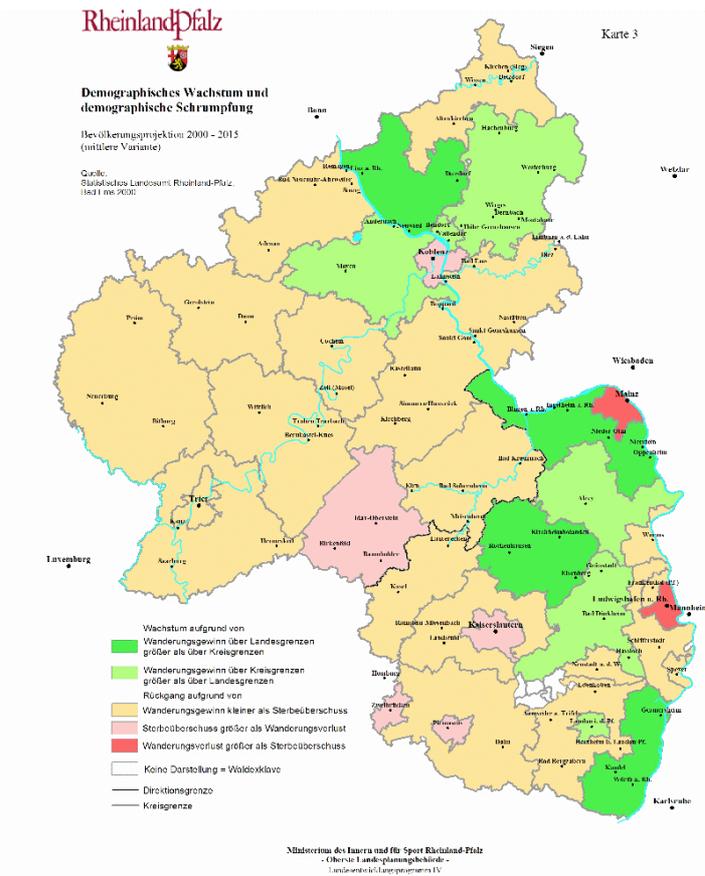
Table 1 presents the different spatial planning levels in the Federal Republic of Germany, the Federation level, the Federal State level and the Municipality level which is linked to the Federal State level via intermediate Regional Planning activities. Figure 1 to 4 show plans in the form in which they are created at the different planning levels. The binding character of planning specifications increases continuously from the top level to the bottom level. At the Federation level only the general strategies are defined, whereas the legally binding planning results are being produced at the local municipality level. Particularly for the planning steps resulting in legally binding requirements for buildings the participation of public agencies as well as of the general public is regulated very much in detail.



**Figure 1** Population development in the Federal Republic of Germany

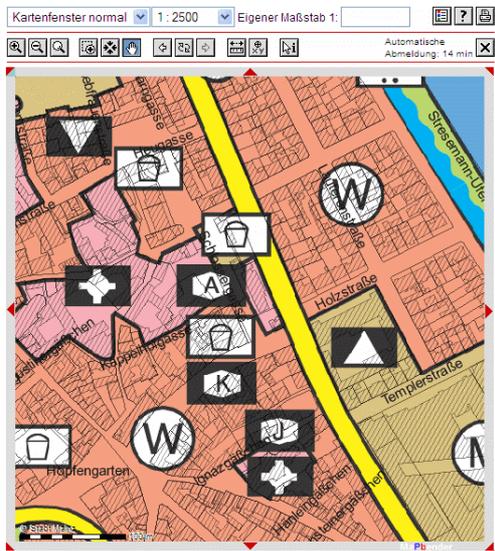
Source: Spatial Planning Report 2005, Federal Office for Building and Regional Planning (BBR)

Quelle: BBR (2005): Raumordnungsbericht 2005. Berichte Bd. 21, Bonn, Seite 31



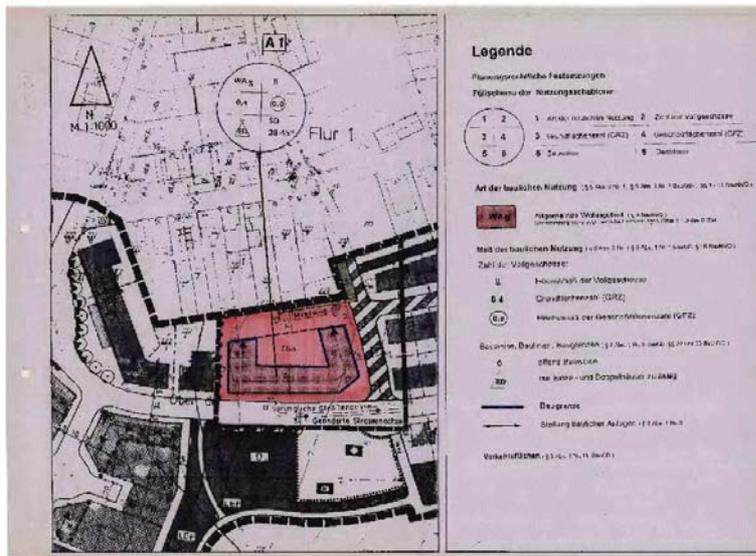
**Figure 2** Population development in German Federal State Rhineland-Palatinate

Source: Federal State Development Plan Rhineland-Palatinate, Federal State Ministry of the Interior and of Sports



**Figure 3** Preparatory land-use plan, extract

Source: City of Mainz



**Figure 4** Legally binding land-use plan, extract

Source: City of Mainz

## 2. REALLOCATION OF LAND

### 2.1 Reallocation Process

Within the area covered by a binding land-use plan, land can be reorganised through reallocation to create plots suitable in terms of location, shape and size. To implement the binding land-use plan the municipality has to perform reallocation of land. The municipality may transfer the preparation of the decisions to be made within the reallocation procedure and any land survey and cadastral tasks required for the implementation of reallocation to publicly appointed surveyors.

Involved in the process of reallocation are the owners of the properties located within the reallocation area, the holders of a title entered or not in the land register, the municipality, public agencies, particularly those charged with the provision of local public infrastructure. The reallocation process starts with the production of an as-built map and an inventory of the plots contained within the area for reallocation. The map shows the current position and shape of plots within the reallocation area with building lines, and identifies the owners. The inventory states for each plot the registered owners, the description given in the land register and the land survey register, the size and use for plots as indicated in the land survey register [Liegenschaftskataster] with street names and house numbers, and the charges and restrictions registered in the land register.

The complete reallocation mass is calculated by adding the area of all plots located within the area for reallocation. From this number those spaces dedicated in the binding land-use plan to public infrastructure, like local roads, paths, for public open spaces and for collecting roads, spaces for car-parking, public green spaces including children's playgrounds, for purification and overflow basins for rainwater have to be subtracted. The remaining mass constitutes the redistribution mass [Verteilungsmasse]. Calculation of the share of the redistribution mass

due to each property owner involved is to be based on either the relative size or the relative value of the former plots prior to reallocation.

The final reallocation plan is to be prepared following a resolution and after discussion with property owners. The plan must indicate the new utilisation proposed, stating all actual and legal changes. The form and contents of the reallocation plan must be suitable for adoption within the land survey register. The reallocation plan comprises the reallocation map and the reallocation inventory.

## **2.2 Rectification of Public Registers**

The results of the reallocation process are forwarded to the land registry office [Grundbuchamt] and to the office responsible for keeping the land survey register where the changes in the land register and in the land survey register are recorded.

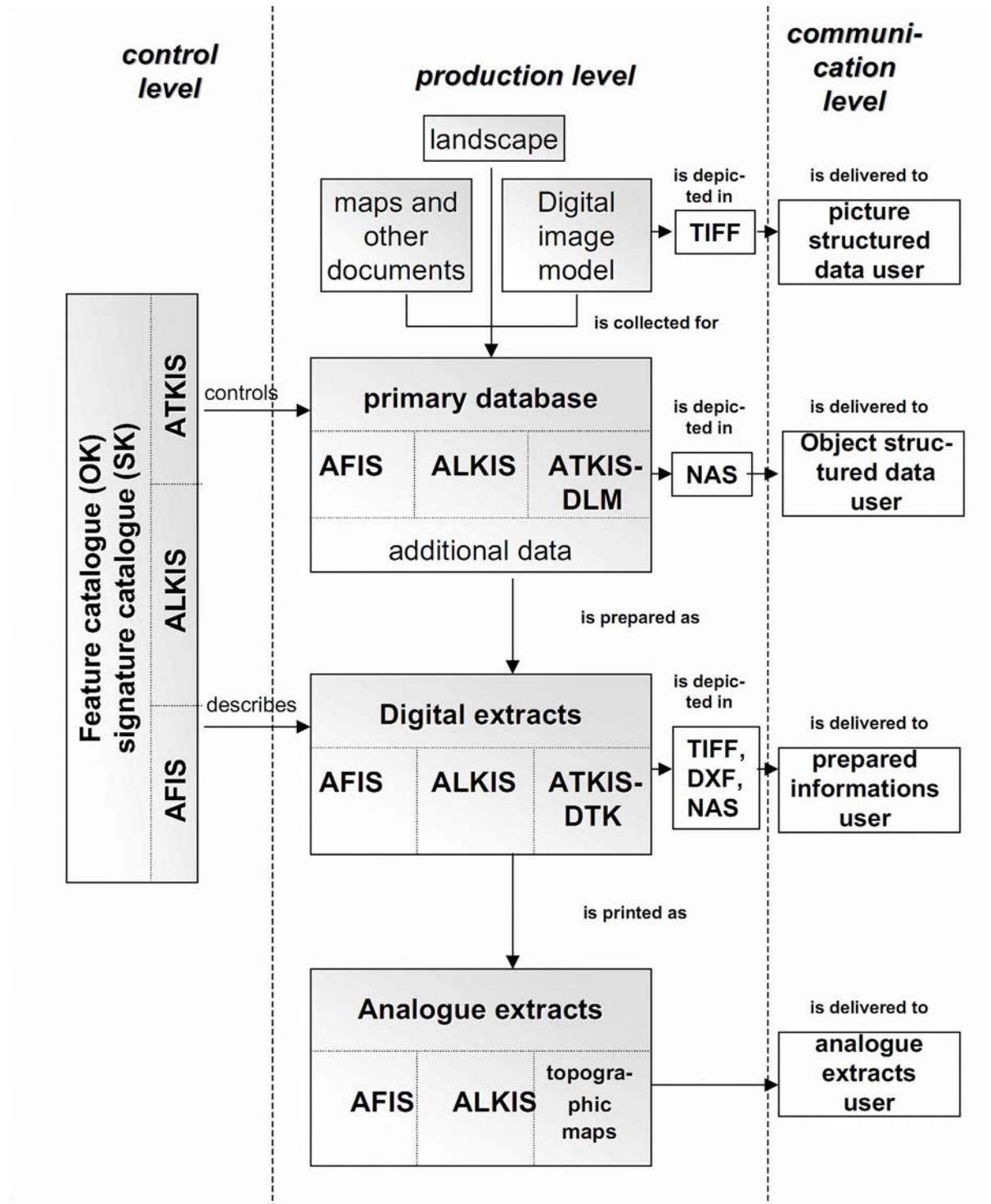
## **2.3 Provision of Local Public Infrastructure**

Municipalities have to provide for the local public infrastructure and for road access. Regularly, the municipalities by contract delegate the provision of local public infrastructure to a third party. Charges are collected for the provision of local public infrastructure, like public roads, paths and public spaces, parks and green spaces and so on. The charges have to cover the costs for the acquisition and preparation of spaces for local public infrastructure; the initial construction including installations for drainage and illumination and the adoption of existing structures as part of the municipal local public infrastructure. At least 10 per cent of the legitimate charges for land improvements are to be borne by the municipality. Charges for a unit of local public infrastructure are spread over the plots serviced by this infrastructure. The criteria, which also may be linked, for allocating charges are the type and extent of use for building or otherwise, plot area and the width of the plot adjacent to the infrastructure facility, like a public road, for instance.

# **3. TECHNICAL DEVELOPMENTS**

## **3.1 Digital Formats of Spatial Basic Data in Germany**

The surveying, mapping, and cadastral authorities of the Federal States of Germany provide for the fundamental data for spatial referencing (Spatial Basic Data) to support public, industrial and private users. Up to now the Spatial Basic Data are recorded and provided in different digital formats, namely the data of the real estate cadastre in the ALK (Automated Real Estate Map) and ALB (Automated Real Estate Register) formats, the topographic data in the ATKIS (Official Topographic Cartographic Information System) format. Other digital database inventories are also available, e.g. digital orthophotos, raster data of the topographical maps and digital elevation models.



**Figure 5** AFIS-ALKIS-ATKIS Reference model (Source: AdV, 2004)

Recently, the existing concepts to hold digital Spatial Basic data were modified. In the future, the existing information systems ALK and ALB will be integrated into one information

system ALKIS (Official Real Estate Cadastre Information System). The data models, contents and semantics were harmonized with ATKIS, the information system which holds small scale topographic data. The Digital Terrain Models (DGM) are integrated in the new data model, as well. Digital Orthophotos (DOP) currently are not yet a part of the new common application schema, but were incorporated into the overall documentation. Information on control stations is modelled in an own information system called Official Geodetic Control Station Information System (AFIS) with a separate feature catalogue. The projects AFIS, ALKIS and ATKIS are associated with each other in a common AFIS, ALKIS and ATKIS reference model (Figure 5). The common application schema provides for the recording and management of metadata and quality data in accordance with the ISO specifications. The feature catalogues of the real estate cadastre and the topographic state survey were semantically harmonised. Harmonisation is based on the previous catalogues (specimen-OBAB, list of application types, ATKIS-OK).

### **3.2 E-Government Initiatives in Germany**

The economic success of a county intertwines with the efficiency of its public administration. E-Government has the potential to considerably improve the efficiency of administration processes. Horizontal and vertical integration of administration processes where different administration agencies are involved is difficult at the moment because of many heterogeneous IT systems driven at the Federation level, at the Federation States level comprising 16 states, at the County level comprising more than 300 counties and at the Municipality level comprising more than 13.000 municipalities. Actually, in Germany several initiatives are in progress to improve the integrated electronic support of workflows. BundOnline 2005 (Federation Online) intends to adapt all suitable services at the Federation level to IT processing, Deutschland-Online (Germany Online) targets at the vertical integration of processes at the Federation level, the Federal State level and the Municipality level. The initiative MEDIA@Komm-Transfer focuses on the horizontal dissemination of E-Government specifications at the Municipality level.

Urban land-use planning associates with an extensive exchange of plans and maps between many different partners in many different planning steps (see description above). Missing IT standards for digital data exchange and visualisation of land-use plans hinder the installation of electronic services, which otherwise can support very efficiently the approval, change and use of land-use plans via Internet. The project XPLANUNG intends to develop data models, exchange formats and visualisation standards which shall be the IT basis for future services to particularly enable access to the preparatory and the legally binding land-use plans via Internet. The work to be done with regard to semantic and cartographic modelling of the features occurring in land-use plans bases upon the existing regulations like the Federal Building Code and the regulation for the cartographic symbols to be used in the land-use plans [Planzeichenverordnung]. The object model will be described in the UML Unified Modelling Language. The data exchange format will be defined in XML/GML notation and will be closely linked to the ALKIS specification, the new real estate digital standard (see above).

## 4. CONCLUSIONS

This contribution presents strategies on how to build up an efficient Spatial Data Infrastructure under the specific conditions as given by the German political system of federalism. Federalism in Germany goes along with a high number of diversified administration units all owing a different degree of autonomy at different administration levels. In the context of Spatial Information Management the fields of spatial planning, of land registry and of real estate cadastre play a major role and have to be interlinked. Currently in Germany several initiatives seek to support the integration of spatial information management including spatial data processing in the named fields. Many IT standards were developed and meanwhile were adopted by many institutions. The adoption of IT standards is a driving force for the implementation of SDIs and will continue to play this role in the near future.

## REFERENCES

- AdV, Working Committee of the Surveying Authorities of the States of the Federal Republic of Germany (2004): Documentation on the Modelling of Geoinformation of Official Surveying and Mapping in Germany (GeoInfoDok), Version 3.0. Edited by the AdV working groups Geo-Topography, Information and Communication Technology, Real Estate Cadastre, Spatial Referencing, Bonn, April 1, 2004
- Deutschland-Online (2003): Report on co-operation in eGovernment between the federal government, the governments of the federal states and the municipalities, <http://www.deutschland-online.de/Englisch/Dokumente/Report%20on%20Deutschland-Online%20-%2018.12.2003v1.pdf>
- Düren, Ulrich and Seifert, Markus (2006): The German AAA Model, a new approach to spatial information management. EuroSDR Workshop “Feature/Object Data Models”, 24<sup>th</sup> and 25<sup>th</sup> April, 2006, Landesamt für Vermessung und Geoinformation, Munich, Germany, [http://www.eurosdrr.net/workshops/models\\_2006/Presentations/3a\\_Seiffert&Duren\\_AA%20Model.pdf](http://www.eurosdrr.net/workshops/models_2006/Presentations/3a_Seiffert&Duren_AA%20Model.pdf)
- Federal Building Code (Baugesetzbuch, BauGB), Online version <http://www.iuscomp.org/gla/statutes/BauGB.htm>
- Federal Ministry of Economics and Labour and Federal Ministry of Education and Research (2004): Information Society Germany 2006, Action Programme by the Federal Government, <http://www.bmwi.de/English/Redaktion/Pdf/information-society-2006,property=pdf,bereich=bmwi,sprache=en,rwb=true.pdf>
- Federal Ministry of the Interior (2006): BundOnline 2005 Final Report – Current Status and Outlook, [http://www.kbst.bund.de/nn\\_945224/SharedDocs/Publikationen/Oeffentlichkeitsarbeit/Umsetzungsplan/current\\_20status\\_20and\\_20outlook\\_\\_2006,templateId=raw,property=publicationFile.pdf/current%20status%20and%20outlook\\_2006.pdf](http://www.kbst.bund.de/nn_945224/SharedDocs/Publikationen/Oeffentlichkeitsarbeit/Umsetzungsplan/current_20status_20and_20outlook__2006,templateId=raw,property=publicationFile.pdf/current%20status%20and%20outlook_2006.pdf)

Federal Ministry of Transport, Building and Urban Affairs, <http://www.bmvbs.de/en>  
Lutter, Horst (2006): BBR Submits Spatial Planning Report 2005. Federal Office for Building and Regional Planning (BBR),  
[http://www.bbr.bund.de/nn\\_22548/DE/ForschenBeraten/Raumordnung/RaumentwicklungDeutschland/Raumordnungsberichte/ROB2005/ROB2005\\_\\_kurz\\_\\_engl,templateId=raw,property=publicationFile.doc/ROB2005\\_kurz\\_engl.doc](http://www.bbr.bund.de/nn_22548/DE/ForschenBeraten/Raumordnung/RaumentwicklungDeutschland/Raumordnungsberichte/ROB2005/ROB2005__kurz__engl,templateId=raw,property=publicationFile.doc/ROB2005_kurz_engl.doc)  
OGC – Open Geospatial Consortium, Inc. (2004): GML - the Geography Markup Language, <http://www.opengis.net/gml/>  
XPLANUNG (2006): Forschungszentrum Karlsruhe Institute for Applied Computer Science, <http://www.iai.fzk.de/projekte/geoinf/XPlanung/index.html>

## BIOGRAPHICAL NOTES

**Hartmut Müller** got his diploma and doctoral degree at Karlsruhe University. After 8 years of research he turned into the marketing and software development departments of international enterprises for 6 years. Since 1991 he has been working as a professor at Mainz University of Applied sciences. Since 1998 he has been a member of the board of i3mainz, Institute for Spatial Information and Surveying Technology. In the DVW – German Association of Geodesy, Geoinformation and Land Management he is the chair of working group 2 -Geoinformation and Geodata Management.

**Mirko Siebold** got his diploma and Master of Engineering degree at Mainz University of Applied Sciences. Currently he is working as a scientific co-worker at i3mainz, Institute for Spatial Information and Surveying Technology at Mainz University of Applied Sciences.

## CONTACTS

Prof. Dr.-Ing. Hartmut Müller  
Mainz University of Applied Sciences  
Holzstraße 36  
D-55116 Mainz  
GERMANY  
Tel. + 49 6131 2859 674  
Fax + 49 6131 2859 699  
E-mail: [mueller@geoinform.fh-mainz.de](mailto:mueller@geoinform.fh-mainz.de)  
Web site: <http://www.i3mainz.fh-mainz.de>