

Cadastre 2014 in Practice – Activities of the Swiss Private Sector

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Key words: CADASTRE 2014, Private Sector, land administration system, regulating or restricting laws for the use of land.

ABSTRACT

At the Brighton congress in 1998, the FIG-Commission 7 presented "CADASTRE 2014 – A Vision for a Future Cadastral System". Inspired by this publication, the Swiss association of private surveyors established a working group to investigate the opportunities and possibilities for the private sector. It was recognized that if the visions – as formulated in CADASTRE 2014 – can be moved forward, they not only pose challenges, but offer huge opportunities for the profession itself. Cadastral surveyors can take the lead in becoming information service providers and even information brokers. Information technology, data modeling, as well as political and client-oriented thinking play a crucial role.

This article presents the activities of the working group so far, and projects some future results important for the development not only regarding the cadastre, but also the surveying profession. For example, the working group investigated some 300 to 400 Swiss laws on the Federal and cantonal level and was looking for articles regulating or restricting the use of land or other particulars with spatial reference. A data model prototype has been established to demonstrate the possibilities and effects of comprehensive and complete information systems to clients and politicians.

ZUSAMMENFASSUNG

Die FIG-Kommission 7 präsentierte 1998 am Kongress in Brighton "Kataster 2014 – Eine Vision für ein zukünftiges Katastersystem". Die Ingenieur Geometer Schweiz IGS nahmen diese Idee auf und entwarfen ein neue Dienstleistung: Die Flächenkarte als traditioneller Katasterauszug soll zum Katasterauszug 2014 erweitert werden. Die wesentliche Ergänzung ist die Auflistung aller öffentlich-rechtlichen Bestimmungen, die die Nutzung der aufgelisteten Parzelle einschränken.

Um die Idee zu präzisieren, wurde im Rahmen der IGS festgelegt, welche Gesetze für diese Dienstleistung berücksichtigt werden sollten. Das Waldgesetz und das Gesetz über den Erwerb von Grundstücken durch Personen im Ausland wurden ausgewählt und als Prototypen auf dem System C-Plan und Geomedia Professional (/a/m/t) einem breiten Publikum vorgeführt. Die Anwendungen stiessen auf grosses Interesse der Fachleute und Politiker und zeigte erstmals konkret den Nutzen von Catastre 2014. Der vorliegende Bericht legt ein geeignetes technisches Grundkonzept dar, mit welchem die Dienstleistung CATASTRE 2014

nachhaltig umgesetzt werden kann. Mit dessen Hilfe ist es künftig allen Geometern möglich, das Produkt Katasterauszug 2014 zu erstellen und anzubieten.

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1 INTRODUCTION

1.1 Initiatives in Switzerland

After the Brighton congress in 1998, Switzerland started with the realization of the project “CADASTRE 2014”. Both the private and the public sector actively undertook various efforts within this context. The current activities in both sectors are described in the following:

1.2 Activities of the public sector

Since the publication of the report “CADASTRE 2014” by the FIG-Commission 7 in 1998, several important steps have been taken on a federal level towards the implementation of a new cadastre system. The Federal Directorate of Cadastral Surveying has taken a leading role in this process. Furthermore, the contacts between land surveying offices and cadastrés have been intensified on the federal level and a constitutional amendment is being prepared. The new law intends to give the State the necessary competence to issue regulations regarding the harmonization of official information related to land administration.

A key-role for the CADASTRE 2014 plays the application of the model-based GeoLanguage INTERLIS, prescribed mandatory by the new legislation for the official surveying. This data-description Language proved to be very successful and allows a comprehensive integration of geodata, an efficient data-exchange with quality proofing and long term data storage. INTERLIS is used as the GeoLanguage for the National Spatial Data Infrastructure NSDI.

At the beginning of 2002, the Federal Directorate of Cadastral Surveying founded a Task Force “CADASTRE 2014”. The main goal of this group – which cooperates with the EGBA (Federal Office of Land Registration and Land Law), the cantons and surveying offices - is to examine all relevant legal and organizational matters, resulting from CADASTRE 2014. Simultaneously the Task Force coordinates and secures information regarding the project “CADASTRE 2014”. The Task Force is composed of State, Canton, private party, land register and counseling party, at parity with one member each.

Parallel to the developments described above, e-government and e-voting have also been consistently promoted by the public authorities in Switzerland. The digital signature and its legal acceptance, which have not been established yet, are the basis for any further steps in this direction. The project for the according constitutional amendment has now been submitted to a procedure of consultation (<http://e-gov.admin.ch>). Furthermore, each municipality should be able to display a short online presentation of its services and structures by the end of 2002. The close relationship between e-government and a digital cadastral reform should be perceived as an unique chance for this project. Unfortunately, this

implication has not been fully realized yet by all the authorities and must be explained consequently.

Individual cantons

In the canton of Zurich, the legal aspects of an extended cadastral system are being closely examined. A systematic overview of all existing and possible registrations related to official survey, the land register, GIS and building regulations has been established. One of the topics of this overview is also to determine the parties which are competent to give information (and on what level of detail to give it), the authorized parties to receive this information and the conditions related to this information transfer. Portmann (2001)

In central Switzerland, 6 cantons have combined their efforts to create a model containing the data of all restrictions of public law. This group uses the guidelines of INSDOM and is financed through a pro-capita contribution for each inhabitant.

In the Principality of Liechtenstein, all legal domains containing restrictions of public law are being digitally registered and described in INTERLIS.

The Canton Basel-City has already created a data center called GIS-Competence Center. Basel now has an unique digital data-offer at its disposal. This data-bank is administrated through INTERLIS and can be called on within the intranet of the cantonal administration (approx. 5'000 connections). Herewith, Basel has already collected valuable experiences in regard of security aspects, legal security parameters and digital signatures.

1.3 Activities of the private sector

The approximately 350 self-employed surveyors in Switzerland are organized within the Association of the private licensed Surveyors of Switzerland (IGS), which is a sub-group of the Swiss Association of Surveying and rural Engineering.

IGS had an early start within the project "CADASTRE 2014". Already in 1998, Gabriele Calastri, member of the IGS board of directors and responsible for technical matters, initiated a first concept for the realization of CADASTRE 2014 in Switzerland. This concept was based on a brochure explaining the project CADASTRE 2014. IGS also financed the translation of the above-mentioned brochure into French and distributed it to all surveyors in Switzerland. On the occasion of the general assembly of all professional associations, the Geomatik Tag 2000 in Thun, Geomedia Professional (/a/m/t) was introduced to a larger public. The forest and river conservancy laws were presented as prototypes for the C-Plan system. Those applications interested many professionals and politicians and were able to demonstrate convincingly the possibilities of Catastre 2014. The presented models (entity relationship model and description of INTERLIS) are available online for all IGS members.

The strong interest shown for this reform, encouraged IGS to launch the project "Realization of CADASTRE 2014", which, inspite of its substantial budget of CHF 250'000.--, was adopted clearly by the members of IGS.

2 PROJECT “REALIZATION CADASTRE 2014”

2.1 Description of the project

“CADASTRE 2014” is not only a future aimed vision for a cadastral system, but also the basis for the strengthening of a profession. One of main goal of CADASTRE 2014 remains in a strong privatization of the future cadastral system (basic statement no. 5). Within international comparison, Switzerland is fairly close to this goal. The engineer-surveyors are in an ideal initial situation for an enlargement of their traditional activity (production of plans and maps) towards “data-processing” and “geographical information technology”. Indeed, they are in a unique, predestined position for the registration of geographical objects and their meaning within the structures of public legislation, thus being able to take the lead in becoming specialists for general land-related information.

The report of the FIG commission 7 defines “cadastre” as a structure containing details on private and public law, as well as general land information. Its meaning is only vaguely related with traditional land registry systems. The registers are operated by an administration (surveyor, survey/land-registry office, joint stock company with majority shareholding through public authorities).

The name “CADASTRE 2014” has been introduced in Switzerland to describe this system of independent information levels. IGS registered “CADASTRE 2014” as a protected trade mark and uses this designation to characterize and promote a new field of activities of IGS members. CADASTRE 2014 is also meant to support surveyors in becoming “information brokers”, thus demonstrating their capabilities in collecting, managing and distributing relevant data.

In a first step, those instruments will help in registering and propagating information regarding the public law restrictions on private land-ownership. This information will not have any legal validity but only a descriptive character. Realistically, the legal registration of boundaries following this new procedure should be possible within the next 8 to 12 years. Until then, the main aim of the engineer-surveyor is to position himself as a central supplier for all geographical information, thus securing the right of officially surveying, administrating and propagating all land-related information during the second phase.

The structures and models designed by surveyors for the information management within the project “CADASTRE 2014” are to be essential for future developments, forms of organization and work procedures relating to cadastral systems.

The legislative authorities will be supported by surveyors, administrating the data with the actual technology as objects with GIS instead of the classical tabular listing of information. Surveyors have the needed know-how for this procedure and already apply it successfully.

2.2 Objectives

The main objective of this project is the development of the product “**Cadastre extract C2014**”:

In addition to the task of official survey, the surveyor administrates land-related legal information. The “Cadastre extract C2014” represents a list and/or extract of a plan indicating the restrictions of public law for any given lot. The fore-mentioned list or extract is presented in an uniform format with logo.

The service **Cadastre extract C2014** is sold by the surveyor to interested parties. Clients are mainly the public administration, public utilities, supply and disposal companies, notaries, land owners, parties willing to construct, banks, insurance companies, real estate companies, administrations, architects, planers etc.

2.3 Procedure

A swift realization of C2014 requires the availability of various means and tools, as well as an efficient marketing and promotion. The most important instruments are presented hereafter:

list of laws

- basic technical concept
- specimen form and plans
- C2014 as trade mark
- participation in the 100th anniversary of the SVVK
- stickers for letters/correspondence
- model community
- press-conference
- website

List of laws

In a first step, a list of all federal laws containing geographically relevant legal statements was established. This list then determined the sequence of the legal adaptation to the new cadastre system.

Basic technical concept

Due to the rapid development of Interlis2, the 2year concept had to be revised and adapted to the possibilities of new programming languages. This resulted in the basic technical concept (details in chapter 3).

Specimen forms and plans

Specimen forms, giving a clear overview of all public law restrictions and edited in the 3 most used national languages, were the first product of C2014. Those specimen forms with their common logo are held in a unique format throughout Switzerland. Great importance has been attached to the fact, that the same forms – with the trade mark CADASTRE 2014 - should be used by all interested parties (software producers, surveyors etc.). The idea is to

establish a “Unité de doctrine” which gives the product “CADASTRE 2014” a commonly known and used name.

C2014 as trade mark

The new logo intends to simply and effectively draw the attention of potential users on this new activity.

Participation in the 100th anniversary of the SVVK

This year, the SVVK will be celebrating its 100th anniversary. This special occasion will be used to promote the project C2014 with the slogan “C2014 – what you always wanted to know about your property, but didn’t dare to ask where to get the information”. The promotion of C2014 will be planned in cooperation with the PR-groups of the various professional associations attending the anniversary festivities.

Stickers for letters/correspondence

Every IGS member applies a sticker with the logo on all envelopes and is committed to use the official logo on all correspondence.

Model community

IGS first establishes three model communities, one in each linguistic region (German, French and Italian). Almost every community law is based on cantonal and federal law, which are formulated in a general manner, according to the principle of federalism. Therefore, community laws often have to define cantonal and federal laws more precisely or even complete them. In order to create legal models for communities which are not situated in cantons with the above-mentioned model communities, a model-law has been created for all 26 cantons in Switzerland. Only the laws regarding land-use planning and construction have been specified for the each community. This enables each community to easily adapt the laws specified for the model communities to its own requirements.

Press conference

A press conference, involving TV and radio stations, is scheduled for the end of April 2002. On this occasion, the first 30 laws will be presented to a larger public.

Website

General information, model communities, and various downloads can be found online. Thanks to specimen forms and XML-technology (INTERLIS2) any interested user or member can retrieve relevant information at low costs and without any language problems.

2.4 Project-Team

The central project-team consists of 2 members of the IGS board of directors and the technical delegate of IGS.

The following persons can be called on as external advisors or communicators with relevant authorities:

- J.Kaufmann: originator of the “vision C2014” and expert in international and Swiss structures
 - a delegate of the Federal Directorate of Cadastral Surveying V+D
 - a delegate of the Federal Office of Land Registration and Land Law (GBA)
 - a delegate of the conference of cantonal surveying offices (KKVA)
- The project is under the overall supervision of IGS.

3 CURRENT STATUS OF THE REALIZATION "CATASTRE 2014 IGS"

3.1 Basic technical concept

In order to implement the service vision “CADASTRE 2014” a basic technical concept first had to be established. This also implies a solid concept, largely immune to future technical changes. The characteristics of such a structure can be formulated as follows:

- independency of given systems or concepts
- modifications of related laws should not require any basic structural adaptations: as federal, cantonal and community laws will almost certainly have to be adapted, the data-structure must present a certain autonomy in regard to such modifications
- the concept must support the given federal structures: every federal law implies an equal legislation on cantonal level and on community level, often in a more precise and specific formulation (e.g. building regulations)
- the service C2014 offered by IGS must be adaptable and extendable: new laws or aspects may have to be inserted at some later point. Furthermore, any enlargements within the service offers of a community should not require any modifications of the concept.

3.2 Possible solutions

Any system based on the structures of CADASTRE 2014 must be able to differentiate between unspecific legislative regulations and geometrical objects reflecting the actual legislation. As those “coded” objects are described in the cadastre, they will subsequently be named “cadastre objects”. Legislative regulations and cadastre objects stand in a close relationship. E.g. a parcel is affected by legal restrictions regarding residential zones, even if it is only partially situated in the boundaries of the before mentioned zone (typically, residential zones are legislated in the building regulations of the community and the canton). This fact does not necessarily have to be defined as an explicit characteristic of the parcel, but is rather to be seen as a product of the comparison between the geometry of the parcel and the overall geometry of the residential zone. As the same legislative regulations are applied for equal types of zones, the relation between a given zone and the corresponding legislative element does not have to be described individually for each object within a defined zone. Therefore it is sufficient to define the object through the type of zone and its related legislation.

The structure of CADASTRE 2014 is aimed towards a generalized, but in every case relevant information. Detailed legislative information can be verified in the relevant law texts and

should not be involved in the implementation process of CADASTRE 2014 (adaptation of laws and cadastre objects).

The following gives a detailed overview of the adaptation of laws and cadastre objects, and of the relationship between legal regulations and cadastre objects. A diagram also shows one of the possibilities of information evaluation using the CADASTRE 2014 system.

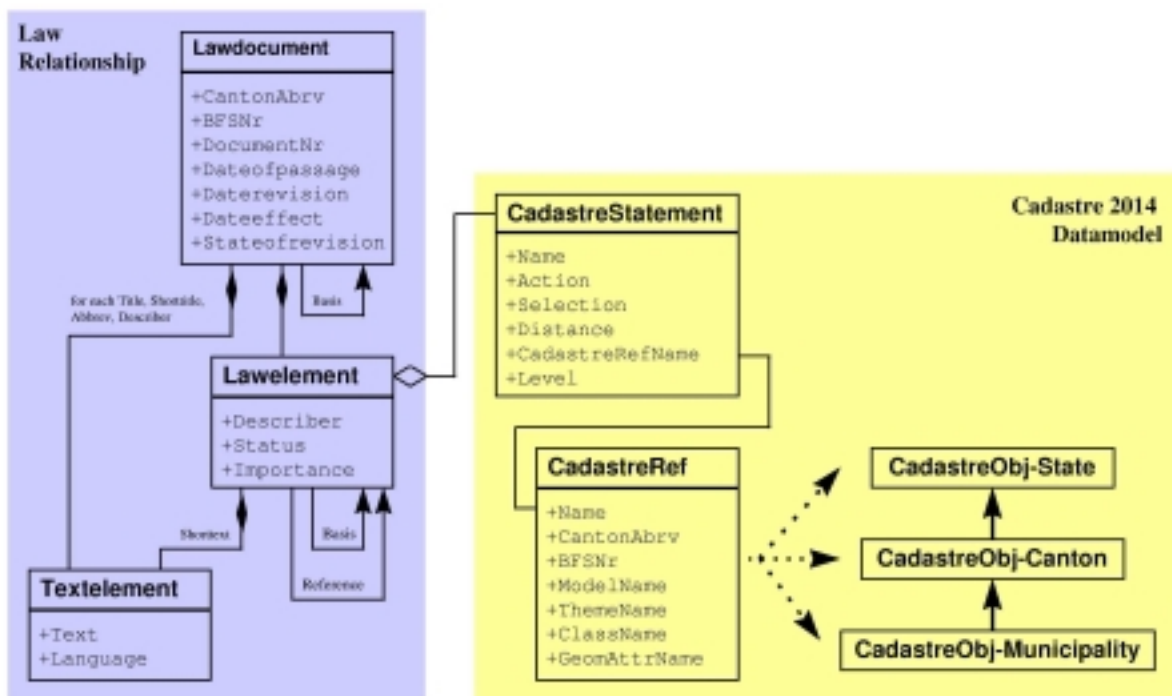
3.3 Legal regulations

The legal connections can be described in INTERLIS. CADASTRE 2014 is not mainly a legal information system, therefore the data-model regarding legal regulations should be kept on a simplified level.

In addition of the actual laws, decrees and technical directives or even court decisions can be equally important. The model therefore uses the general term of legal document which takes in consideration all the above-mentioned aspects.

Typically, a legal document contains individual sub-regulations, e.g. articles, clauses, paragraphs, extracts etc., for which the model uses the term legal element.

For the textual short-version of the legal element, the model uses the term textual element. This element is language-related.



3.4 Cadastre objects

The cadastre object can be understood as a “coded” geographical boundary, which is reflected in the cadastre as attribute data. A cadastre object viewed in the original model of official survey can be a parcel, or a residential zone in the model of land-use planning.

Normally, a given theme is first adapted on a federal level. The theme is then defined more precisely within the boundaries of the cantonal legislation. In some cases (e.g. in relation with land-use planning and construction regulations of communities) the specific modeling of the theme has to be taken a step further. Furthermore, cadastre objects have a specific name on any given level (federal, cantonal and communal).

As INTERLIS2 is now only in the initial phase, and the consequent modeling beyond the official survey is largely non-existent at this point, actual data has not been processed in the required form yet. Nevertheless, this does not exclude the use of the presented concept. In case of a data transfer problem, the system developer must describe how the actual models have to be interpreted within the structure of INTERLIS2.

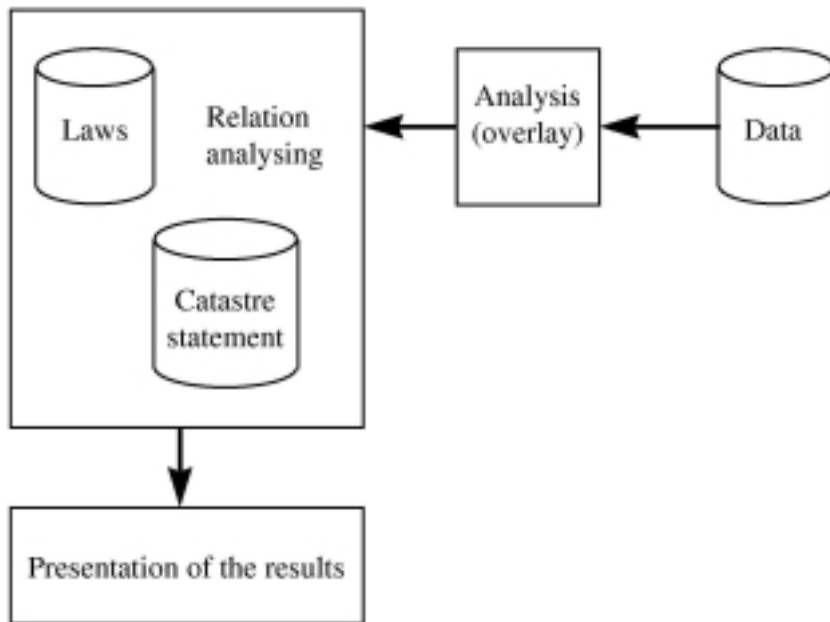
3.5 Cadastral statement

The cadastral statement typically describes the geometrical relation between a parcel and other cadastre objects. The cadastral statement can also formulate conditions restricting the cadastre objects. For example, the fulfillment of a regulation regarding construction intervals can be visualized through the geometrical sectioning of a parcel and the simultaneous enlargement (width of the construction interval) of the neighboring cadastral object.

The cadastral statement is the resulting intersection (output) of the geometrical evaluation and describes, which lots have a spacial intersection with objects relating to restrictions of public law.

3.6 Evaluating C2014

A given parcel for which all related regulations have to be examined, is always assigned to a specific community, and the community belongs to exactly one canton. Therefore, canton and community are predefined for every cadastre extract. This cadastral statement is then processed in a standard form for the evaluation of all related legal aspects. The purpose of this evaluation is to present every relevant legal element in a hierarchical form.



The main advantage of the procedure explained above is the use of already existing data; this also implies that no specific data has to be collected and processed in order to use the system CADASTRE 2014.

The chosen solution enables a distribution on three specific software levels:

- a first level which processes the textual data (especially the needed intersections between the parcel and the relevant objects of public law restrictions).
- a second level which compiles the legal elements in relation with the relevant restrictions of public law.
- and a third level which presents all the legal components in the required form.

4 SUMMARY

With the project “Realization CADASTRE 2014” the professional association IGS has taken an important initiative, which also gives its members the necessary instruments to definitively realize the “vision CADASTRE 2014”. The aforementioned tools, linked with farsighted adaptations of the federal law can give the service “CADASTRE 2014” its definitive foundation as a qualitatively high-standing and innovative service.

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BIOGRAPHICAL NOTES

Peter Dütschler: graduated from the Swiss Federal Institute of Technology (ETH) in Zurich in 1991 and earned the Swiss license for licensed land surveyor in 1997. Since 1997, he runs his own surveying office, Dütschler & Naegeli in Thun, together with his partner Christoph Naegeli. The office with 18 employees is specialized in cadastral and engineer-surveying, gis, online-map-systems and consulting. Since 2001, he is the technical deputy of the organization of the private licensed Surveyors of Switzerland IGS. Together with Gabriele Calastri he is responsible for the realization of the project CADASTRE 2014 of the IGS.