

# **ICT Trends and Institutional Change With a Special Attention to the Land Administration Sector**

**Arco GROOTHEDDE, the Netherlands**

**Key words:** developments, ICT, government, european, strategy, land information, cadastre

## **SUMMARY**

First the paper deals with current societal and technological developments. On European and national governmental level programmes are set up to signal opportunities, set policies and propagate measures to capture the benefits of the technological developments like increased power of technology, increased possibilities to connect to all kinds of information, ubiquitous access, smart objects etc.

Aligning these technological developments with societal demands will lead to the development of governmental services via internet, the further development of key registers, more complete registers, easier access to (interconnected) governmental and business information (together with the discussion about free access), the development of webservices that will offer high quality services with respect to integration of (spatial) data etc.

Furthermore the position of the Netherlands Kadaster with respect to these developments will be discussed. The Netherlands Kadaster (which will be further referred to as the Kadaster) aims to realise the best possible performance of the current public duties and to realise a leading role in the evolution of the public duties in response to societal developments.

Ambitions with respect to improvements, renewal and future positioning will be described.

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## **1. INTRODUCTION**

This paper aims at discussing trends in modern society and how the Kadaster responds to that by redesigning its strategy.

At the moment the main tasks of the Kadaster are the Land Registration, Surveying, Mapping (Cadastral map and Topographic maps) and Land Consolidation. The ambition is to develop the best performance possible with respect to these duties. With respect to the evolution of public services, the quality of data and the new data that will be needed (like 3D-landinformation data), the co-ordination and co-operation that will be necessary to combine relevant landinformation the Kadaster wants to adopt a leading role.

## **2. THE ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGY**

Nowadays a quest is going on to merge innovative ICT-possibilities with societal, governmental and business needs. ICT offers a lot of new possibilities that can be used to improve the performance of governmental and business organisations with respect to education, safety, health care, international co-operation, economic efficiency (integrated value chains, business proces management, reduction of administrative overhead), prevention and detection of fraud and accident and disaster management.

ICT trends like ubiquitous access, smart objects, open source, increase of bandwidth and the development of standards for interoperability and data exchange will result in new business models. Options as increased location independancy, high quality online services based on immediate access to all required data, use of identified objects that are available for proces control, integration within business chains and governmental organisations (even cross border) and increased e-shopping open new perspectives in business, also in the land administration industry.

So new ICT-solutions can be used by the governmental organisations and business to support better functioning and in their services to citizens and customers. The governance aspect is of importance, ICT-possibilities should be aligned with business strategies with respect to continuity, improvement and renewal. Business strategies should be aware of ICT-solutions to timely prepare for the future.

## 2.1 Developments on European and Netherlands Governmental Level

On European level<sup>1</sup> and on national level<sup>2</sup> strategic frameworks are set up describing opportunities and policies to improve the effectivity and efficiency of the governmental institutions.

On European level the priorities are:

- the completion of a **Single European Information Space** which promotes an open and competitive internal market for information society and media;
- strengthening **Innovation and Investment** in ICT research to promote growth and more and better jobs;
- achieving an **Inclusive European Information Society** that promotes growth and jobs in a manner that is consistent with sustainable development and that prioritises better public services and quality of life.

With respect to the deployment of ICT objectives have been set to improve security and reliability of broadband electronic services, to create a better and smarter usage of ICT in the public domain and to improve interoperability.

Another issue on European level is the free access of data.

The Infrastructure for Spatial Information in the European Community (so called INSPIRE) is a European Commission proposal aiming to create a system for access to and exchange of spatial information needed to monitor the state of the environment, in particular the quality of air, water, soil and the countryside. At the July 2006 plenary session the European Parliament is scheduled to consider a third reading of legislation dealing with the issue of access to environmental data, specifically the application of the Aarhus convention to the EU institutions. The Parliament is aiming to reduce the obstacles (like financing, intellectual property rights ..) for data sharing within the public domain and to ensure free access to those data. According to the Committee free access of data should be without payment for citizens, not only for those searching the data but also for those consulting the data.

Cadastral and topographic data are considered to be relevant environmental data and in this way integrated in the discussion on free access to those data. The Kadaster has positive experiences with tariff based products (this also with respect to the information supply) and will introduce these experiences in the meetings on governmental level about this subject.

The Netherlands.

The ambition of the Dutch government is that, in 2007, 65% of the governmental services will be available via Internet (see hervormingsprogramma ... footnote 2).

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<sup>1</sup> Strategic framework: "i2010 – A European Information Society for growth and employment"

<sup>2</sup> Nationaal Hervormingsprogramma Nederland 2005-2008 in het kader van de Lissabonstrategie

Implementation measures are an improved usage of ICT (by the development of a system of key registers; the citizens and company id; a uniform authorisation for every citizen, electronic identity card, innovative ICT-solutions to solve problems in society related to traffic, education, safety and care etc), strengthening of the ICT-infrastructure (faster internet, more secure, reliable, standardised ICT-means) and international cooperation.

## **2.2 Developments in Information and Communication Technology**

The processing power of chips continues to improve, this power will be used in increased bandwidth, ubiquitous access, smart objects, improved gathering and use of information on the web and other technical developments (wireless communication technologies, sensing technologies, Global Navigation Satellite Systems etc).

A specific consequence of the technological advancement is the worldwide expansion of the use of digital geographic data. This leads to renewed awareness on the applications of geographic data, on how objects relate spatially and on new possibilities in geographic information systems (like Google Earth; maps.com; Microsoft virtual earth etc etc).

The possibilities for online usage of geographic data for all kind of analysis within multiple disciplines are growing fast.

Based on advances in information technology, society's reliance on such functions is growing.

To enable the use of data from multiple national and international data-sources a worldwide structure for describing digital geographic data and services needs to be developed. The International Organisation for Standardisation (ISO) is aiming for this in a close partnership with other organisations such as the Open Geospatial Consortium and the Object Management Group. Based on the ISO standards for geographic information recently national profiles are realised for metadata and for services in the Netherlands. Further a national standard for the exchange of geodatasets based on a semantic model has been accepted and is under implementation. These national standards form a framework for discovery, exploitation and exploitation of resources in the Dutch Geospatial Data Infrastructure (GDI).

For cross-border access of geodata a European metadata profile based on ISO standards is developed, using the implementing rules of INSPIRE. A common metadata profile is implemented for the "X-border GDI" between Northrhine-Westphalia and the Netherlands.

The combination of these developments is a push in the developments of webservice.

Web services enable providers and consumers of services to be completely independent of one another's implemented technology and platforms. The main areas for Web services development include business process management, data-acquisition and on-line usage from multiple sources and e-commerce applications.

## 2.3 Developments at Customer(Group)s

Customers will benefit from all developments as described above. In general it can be stated that customers want high quality online services that are always available, offer the latest and most accurate information, have ease of use and are secure.

In relation to governmental organisations they prefer to provide their personal data only once and like to access all private information of themselves, their neighbourhood and laws and regulations. Those data should be available in an integrated way and should be visualised geographically.

Commercial business and governmental organisations will benefit in the same way. Information required for spatial planning, policy evaluation, planning and control in areas like health care, traffic and homeland security can be made available from different sources in an integrated way. This opens a wide perspective of applications like the online collection of data on public buildings, schools, hospitals, public forces, number of people etc within a disaster area.

## 2.4 Impact for the Kadaster

Overlooking the current developments in society and (Geo)-ICT a number of issues is of importance for the Kadaster.

### 2.4.1 Quality of Data

Quality improvement programmes with respect to geometry of the cadastral spatial data, subjectnames and easements are executed or being studied. The increasing multiple use of land will lead to a higher quality registration in which 3D-aspects of ownership rights will be registered and represented in a more comprehensive way.

### 2.4.2 Streamlining: Offering combined cadastral and other relevant land information

Overlooking the information requirements and needs in the real-estate market it can be observed that many sources are available. This offers co-ordination and co-operation opportunities to the Kadaster to realise value added benefits for its users.

Examples are:

### **The Cables and Pipelines information centre**

The Minister of Economic Affairs<sup>3</sup> announced the requirement to decrease the number of incidents with excavation works. Construction companies will be forced by law to report their intended excavation works at a digital desk, through which the utility companies are obliged to provide for accurate and up to date geo-information appropriately. So far this is done on a

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<sup>3</sup> Letter Dutch Minister Economic Affairs to the Parliament 23 November 2004

voluntary base. The Minister proposes to place the information desk within the Kadaster. Legislation has been prepared and submitted to the parliament.

### **Public-law restrictions**

Public law restrictions are set by several organisations. At the moment no certainty can be given to citizens and organisations on the completeness of public-law restrictions that are currently valid for a parcel of land.

Legislation providing for the provision of information about public-law restrictions has now been submitted in the form of the *Wet Kenbaarheid Publiekrechtelijke Beperkingen* ('Provision of Information on Public Restrictions concerning Land and Real Estate Act'); the implementation is scheduled for 2007<sup>4</sup>.

The Kadaster will present all public law restrictions valid on a parcel in its on-line informationsupply system.

### **Integration NAP/RD**

A further issue relates to the integration of the NAP ('Normaal Amsterdam Peil', the ordnance datum) and RD ('National Triangulation System') in a 3D reference frame. In view of the GPS developments a segregated availability of the NAP<sup>5</sup> and RD information (which has a long history in the Netherlands) was no longer of relevance, as a result of which an integrated website has been available since 1999<sup>6</sup>.

#### **2.4.3 Key registers: the cadastre and topographic register as a key register in the information infrastructure**

The resolution of problems requires mostly more information than provided from one single data set, and this equally true for problems with a spatial concept. It is evident that this type of data provision is complex in case data is stored at a variety of locations and in data models specific to its application<sup>7</sup>. For this reason an effective infrastructure can be achieved solely by the use of authentic registers (or 'key registers') to store key data that is available for integration and multiple use. Various countries work on this subject<sup>8</sup>. The Streamlining Key Data Programme offers for the Netherlands the appropriate policy. The system of Key registers should among others result in authentic data, being collected and stored once, multiple use of this authentic data and in a clear and high quality of the data involved. This is to the benefit of efficient and effective performing authorities, and contributes to the

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<sup>4</sup> MBP 2006-2010, page. 25.

<sup>5</sup> A beneficial factor is that the NAP is extremely up to date following the completion of the 5<sup>th</sup> precise levelling, see R.E. Molendijk, *Het NAP: houvast in Nederland en Europa* 'The NAP: a reference point for the Netherlands and Europe', Geodesia 2000-9. The height data for all height benchmarks is adjusted since 1-1-2005 (Geo-Info, 2002-10)

<sup>6</sup> See articles including the article by N.J.M. van Eekelen and A.M. Troost, 'RD + NAP = 3D', Geodesia 1999-11

<sup>7</sup> For example, the Dutch Ministry of the Interior and Kingdom relations states that the authorities keep records of the same type personal data in at least 30,000 registers (Heemskerk, et al., 2001)

<sup>8</sup> Van der Molen P., 2004, *Good administration of land in Europe*, FIG/UN Aquascalientes

reduction of the administrative overhead in both the public and the business environment<sup>9</sup>. Legislation is currently being prepared for the confirmation of the designation of the following registers:

- Municipal Personal Records Database - Population Register (GBA)
- Cadastre (Parcels and Rights)
- Company Key Register (NHR; 'New Trade Register')
- Addresses
- Buildings<sup>10</sup>
- Topography (TOP10NL)

The current status of these key registers is as follows: the introduction of a register of addresses and buildings is being studied, the NHR and the *topographic key register (TOP10NL)* are being implemented, and the GBA and Cadastre are existing registers that will comply to the legislation (to be implemented in March 1, 2007) with respect to these key registers. In the summer of 2004 the Council of Ministers decided to introduce the *Basis Registratie Adressen* ('Addresses Key Register', BRA) and *Basis Gebouwen Registratie* ('Buildings Key Register', BGR)<sup>11</sup>, whereby endeavours shall be made to submit the legislation to the House of Representatives of the Parliament in 2007, and to complete the implementation in 2009<sup>12 13</sup>.

In addition, the Dutch Government has decided to introduce a unique public service number for each citizen (the 'burgerservicenummer' 'citizensservice-id') and to introduce a unique identification number for legal persons within the scope of the development of the Companies Key Register (what is referred to as the '*Bedrijvenservicenummer*' 'Companies Service Id').

The current system will be extended. The most important candidates for inclusion in the system is the "Large Scale Topographic Base Map of The Netherlands" (GBKN) and 'Underground Data and Information' (DINO).

#### 2.4.4 Cross border: the perspectives in the European Union.

As a direct consequence of the eContent Programme the Kadaster is participating in the European Land Information System EULIS project<sup>14</sup>, financed for 50% from EU funds. The INSPIRE project aims at coordination and co-operation between datasuppliers for the benefit of European policy aims (like environmental policy).

The kadaster is also involved in the cross-border project with respect to the implementation of a common metadata profile between Northrhine-Westphalia and the Netherlands.

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<sup>9</sup>Duivenboden, H. van, and Vries, M. de, 2003, 'Upstream: Chronicle of the Streamlining Key Data Programme', The Hague

<sup>10</sup> It would appear that the Dutch no longer use the term *gebouwen* ('buildings'), but instead refer to *panden en verblijfsobjecten* ('premises and residential properties') (Geo Info 2004-10 page 439)

<sup>11</sup> 11 June 2004, Parliamentary Documents, 2003-2004, 26.387 no. 22

<sup>12</sup> *Nieuwsbrief VROM Basisregistraties*, ('Key Registers Newsletter', Ministry of Housing, Spatial Planning and the Environment), April 2004, Number 3.

<sup>13</sup> This could possibly be one year earlier, in accordance with the Minister's wishes (VNG Magazine 10-9-2004)

<sup>14</sup> For information, see P. Laarakker and S. Gustafsson, 'EULIS-Ambitions, Bottlenecks and Policy Solutions for a European Land Information Service', FIG Paris, 13-17 April 2002.

### 3. GENERAL OBJECTIVES OF THE KADASTER

The Multi-annual Policy Plan 2006-2010<sup>15</sup> of the Kadaster specifies the strategic objectives, which apply for the plan period, namely:

- to secure the continuity of our public tasks and to continuously improve the quality and efficiency, this also in comparance with European cadastre organisations .
- Between now and 2010 we registrate and/or disclose all relevant geo- en landinformation in the Netherlands on, above and below ground level and we invest our knowledge and information in improvement and renewal of the public services (in this area) within the Netherlands and Europe.

Related to these strategic objectives operational objectives are set.

The operational objectives are *secured continuity* (first part of first strategic objective); *improvement* (second part of first strategic objective) and *renewal* (second strategic objective).

For the plan period 2006-2011 some of the operational objectives are:

<i>Secure continuity</i>
<ul style="list-style-type: none"> <li>• Comply to internal quality criteria : elapse time of the processing of parcel subdivisions and quality of object references</li> <li>• Improve Topographic products the quality level as described in the law</li> </ul>
<i>Continuous improvement</i>
<ul style="list-style-type: none"> <li>• Realisation of nationwide public registers</li> <li>• Development of a chip-based system for branding of ships</li> <li>• Area selections to select cadastral and topographic information and digitaly secured extracts via Kadaster-on-line</li> <li>• One online interface to the outside world: uniform access/MyKadaster</li> <li>• Information supply via mobile equipment</li> <li>• further development of objectoriented productrange TOPxxNL</li> <li>• <i>Customer satisfaction</i>: extend online opening hours, improved billing information; adapt products RD to customer wishes</li> <li>• <i>Efficiency</i>: 50% of all deeds delivered electronically; development of automated conveyancing and processing of deeds;</li> </ul>
<i>Renewal</i>
<p><i>3D-registration</i></p> <ul style="list-style-type: none"> <li>• establish the cadastral registration of networks;</li> <li>• investigate 3D-requirements and possibilities</li> </ul> <p><i>Centre for a range of key registers</i></p> <ul style="list-style-type: none"> <li>• implement legal regulations with respect to the key register Cadastre and Topography</li> <li>• connect mortgagesubjects to municipal persons registration (the key register for natural persons) and to the key register of companies</li> <li>• position maps as a source for the geometry in the buildingsregister and position the Kadaster as nationwide accesspoint to the buildings and addresses register</li> <li>• key register ships and aircrafts</li> </ul> <p><i>Optimise informationsupply to the real-estate market</i></p> <ul style="list-style-type: none"> <li>• establish the consequences of law on public restrictions</li> <li>• start cleaning up the registration of easements</li> </ul>

<sup>15</sup> Multi-annual Policy Plan 2006-2010 page 17, 20

- investigate the feasibility of the 'landinformationportal'  
*Converting/adjusting topographic and other spatial datasets*
- investigate the feasibility to introduce objectorientation for the large scale topographic base map
- work out a scaleless and seamless topographic registration
- work on the integration with other geographic registrations: NWB, AHN, NAP  
*prominent partner for the EU*
- implement EULIS
- participate in specifications INSPIRE

### 3.1 Realised Objectives

In the years 2005, 2006 a number of important improvements are realised.

- extended opening hours of online services<sup>16</sup> (to 22\*7 ; january 1, 2006. In july 2006 a further extention to 23\*7 hours is realised).
- the service to the notary to deliver deeds to the Kadaster electronically, an important quality and efficiency improvement,
- nationwide registration of (natural) persons, an important quality improvement (so far one person owning lands in different provinces could occur with different spellde names)
- nationwide inquiry possibility for (natural) persons
- nationwide public registers
- connection to the EULIS-portal
- extended use of GPS in standard surveying

### 3.2 Goals and Clients

Land registration is not an end in itself<sup>17</sup>. The land register and cadastre serves to further the improvement of the legal certainty of landownership, the regulation of the real-estate market, land tax, spatial planning and development, and the management of natural resources, etc. This implies that a land register and cadastre is operated for its users, and that a long-term strategy will also need to find its justification in serving the users' interest, whereby the law – as is always the case – stipulates a minimum performance. The clients' demands represent the external orientation of the strategy. The manner in which the clients' demands are recognised, weighted and interpreted in terms of specific actions is an internal issue to be addressed. It should be noted that this is not based on client research. Some client-demands related to future developments cannot be expected to be know in all its consequences by those clients. This means the organisation needs to take the responsibility for this assessment – an assessment which will call on the Kadaster's empathic capabilities, and on its entrepreneurship. In relation to this it is also difficult to indicate 'Who has need of the Kadaster's external knowledge role'. The Kadaster needs to determine itself what influence the agency wishes to exert on developments in the societal field in which it operates. It should be noted that introducing a further distinction between the categories of clients

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<sup>16</sup> Client satisfaction survey, Research International, 2004

<sup>17</sup> This is also evident from the definition as given in the UN Guidelines for Land Administration 1996, which states that 'land administration is the process of determining, recording and disseminating of information regarding ownership, value and use of land, when implementing land management policies', indicating that the objective is determined by the procedure used for 'land management': consequently this is where the clients are to be found.

(market segmentation: public-sector market, professional-sector market, private-sector market etc) can be of assistance in the prioritisation of the strategic objectives.

#### **4 SCOPE OF THE PROPOSITION 'THE KADASTER IN 5 YEARS' TIME'**

Besides the strategic and operational objectives that are set for a five year plan period the Kadaster will need to review all developments and its goals for the longer term in order to continue to justify its existence during the following 10 to 20 years.

As a result of this panoramic perspective the Kadaster recognises the following mainstreams of developments:

- positioning of the Kadaster within e-Government initiatives
- further application of ICT in data-exchange with customers (e.g. data conveyancing)
- further application of ICT in (modernising of) workprocesses (2006-2010)
- expansion the frontiers and markets (2006-2015)

The remainder of this paper reviews the arguments for the adoption of this approach.

The review of these following phases is accompanied by a discussion of issues that can promote and ensure for the achievement of the expansion of the frontiers. In so doing the Kadaster's innovative capacities will become more apparent, and the agency's external knowledge role will be made more explicit – or, in other words, a powerful Kadaster will play a pioneering role with respect to significant societal developments within its field of operations.

Self-evidently, all these developments are without prejudice to the first of the current strategic objectives, namely 'doing your job well', which remains a *conditio-sine-qua-non*. However, within this context the manner in which society develops will determine the requirements to be met by 'doing your job well'. Consequently this objective also possesses a dynamic dimension.

#### **5 STRATEGIC IMPLICATIONS OF SOCIETAL DEVELOPMENTS**

The developments outlined above will have an impact on the Kadaster's strategy. The following sections review each of these developments in terms of strategy. Section 6 will contain a reformulated long term strategy for the Kadaster based on the developments signalled below.

##### **5.1 The Impact of the Provision of Truthful Data**

The discussion of the legal nature of the land register is of relevance to the provision of truthful data<sup>18</sup>. Moreover the relevance is further increased in view of the Kadaster's

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<sup>18</sup> This discussion is not new: it was recently conducted in the *Naar een meer positief stelsel van grondboekhouding* ('En route to a more positive system of land bookkeeping') (Kluwer, 2003) consultative report submitted to the Vereniging Burgerlijk Recht ('Private Law Association'), with contributions from Professor J. de Jong, mr H. Ploeger, Professor A.A. van Velten, and mr J.A. Zevenbergen. The principal choice for the continuation of the negative system was made by Parliament in 1961 following a question from Meijers. However, the House of Representatives of the Parliament did request an improved position for acquirers

endeavour to make use of the Internet as the primary channel for the provision of information; non-professionals, in particular, will consult solely the land register and cadastral maps, and will not consult the public register (the contents of which is available on-line already). The elevation of the land register and cadastre to the status of key registers will also play a role, since pursuant to this status their users will need to be able to assume that the data is correct. Consequently there is reason for the agency to give serious consideration to the extent of its ability to guarantee that the information recorded in its registers is correct and fully in line with legal reality<sup>19</sup>. Self-evidently this will involve a fundamental amendment of the Netherlands Civil Code (Article 3:89) and of the Cadastre Act, since the issue involves the improvement of the legal significance attached to the land register. At present the Civil Code contains no such provisions; solely the Cadastre Act includes the necessary provisions<sup>20</sup>. The necessity of reviewing the position of the cadastral map in the event of an amendment of the system<sup>21</sup> is related to this. Professor J. de Jong<sup>22</sup> made some suggestions for a situation in which no major amendments are required, such as an amendment of Article 3:88 Civil Code (consequences of the agency to dispose of property), articles 3:19 and 3:20 Civil Code (powers of the custodian of the public registers) and Chapter 3.1.2 Civil Code (designation of the land register as a public register). Concluding the Kadaster would improve its position by at least investigating and possibly endeavouring to ensure for an evolution to a system with positive legal effect<sup>23</sup>.

## 5.2 The Impact of the Multiple Use of Land

The multiple use of land can adopt a variety of forms:

- above ground (for example, apartments, superficies, viaducts, transmission structures)
- at ground level (for example, different uses of the land at different times)
- below ground (for example, tunnels, roads, pipes, utility structures)
- over the course of time: time-sharing ownership constructions.

Recent publications indicate that the registration of 3D objects is not of a simple nature<sup>24</sup>. This is in part due to the definition of landownership in the Netherlands Civil Code: although the real world object certainly does have a 3D component this is bound to the ownership of the parcel of land. The Netherlands Civil Code does not provide for the ownership of a 3D volume as an autonomous object that can be the subject of rights. This concept of ownership is reflected by current land register practice, in which 2D records are made of the geometry of cadastral parcels. J. Stoter<sup>25</sup> indicates a migratory route the Kadaster could adopt in the event

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in good faith (since included in the Netherlands Civil Code, under Article 3:88). The Royal Committees of 1867, 1887 and 1906 had previously concluded that a replacement of the negative system could not be recommended (see Van Riessen, *Het Kadaster*, recently published by the Netherlands Kadaster, 2004).

<sup>19</sup> Whereby the great deal of attention the Netherlands Kadaster devotes to quality management and the agency's ISO certification are both beneficial factors.

<sup>20</sup> Cadastre Act; Article 3, par. 1, under b.

<sup>21</sup> Cadaster Act, Article 1, par. 1, under c

<sup>22</sup> In the same consultative report, page 8 ff.

<sup>23</sup> The cost incurred by members of the public for the entire process of the transfer of real estate is a macro factor of importance to the decision-making. These costs should not increase.

<sup>24</sup> See the proceedings of a workshop 'on 3D Cadastres', P.J.M. van Oosterom, J.E. Stoter, and E.M.Fendel (Ed.), 2001

<sup>25</sup> J.E. Stoter, 2004, '3D Cadastres', dissertation, Delft University of Technology, page 291-292, as well as J.Stoter and M.Salzmann in *Geodesia*, 2002-3 *Op naar een 3D Kadaster ?* ('En route to a 3D Cadastre?') and *Met het Kadaster de Ruimte in ?* ('Cadastre into Space?') in *Geo-Info 2004*, Volume 1, No. 9.

that a legal definition of a 3D parcel proves to be a bridge too far<sup>26</sup>. She refers to this as a 'hybrid 3D Cadastre' that retains the land parcel as the legal object, but which nevertheless makes 3D records of the geometry.

A 3D survey will also need to offer a solution for the urgent societal problem relating to information about the location of underground cables and pipelines, especially since networks of cables and pipelines have proven to be a subject of rights<sup>27</sup>.

A new strategy for the Kadaster will require an evolution towards a 3D system in both a legal and geometric sense.<sup>28</sup>

### 5.3 The impact of Key Registers

Legislation for the designation of the land register as an key register is currently in preparation. Legislation is being submitted to the parliament (march 2006) and endeavours are being made to realise an implementation date of march 1, 2007<sup>29</sup>. The municipalities have been designated as the authentic source for addresses and buildings. Experience acquired with the Municipal Personal Records Database (the population register, which can not yet be consulted on-line)<sup>30</sup> indicates that the Kadaster could play a role in rendering these addresses and buildings accessible at a national level, even though the municipalities remain the owner of the source. The Kadaster's justification for this approach is based on one of the agency's core competences, i.e. its skills in the management and maintenance of national databases with an extremely high update frequency.

It will be the Kadaster's strategy to play a leading role in the system of key registers.

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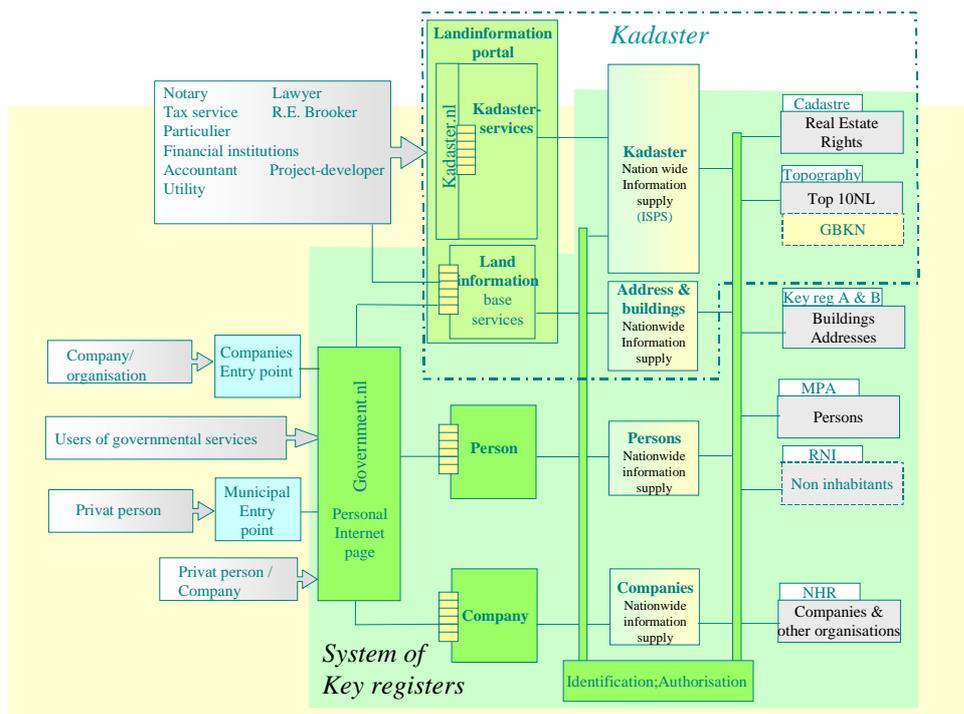
<sup>26</sup> Z.Klaasse, in *Ondergronds Bouwen* ('Building Underground'), Geodesia 1998-11, proposed that an endeavour should in any case be made to identify underground structure with unique land registry codes, in combination with restricted rights to the relevant land parcels above those structures. This should be feasible in the KVS ('Kadaster Landinformation System').

<sup>27</sup> Within this context De Haan advocates collaboration between the Netherlands Kadaster, municipalities, and KLICs ('Cable and Pipe Information Centres'), (Geo-Info 2004-10)

<sup>28</sup> The Kadaster has since applied for a subsidy within the scope of *Ruimte voor Geoinformatie* ('Space for Geoinformation') for the purposes of 3D modelling (Nieuwsbrief, Geodata, No. 18. Sept. 2004)

<sup>29</sup> MBP 2006-2010 page 21

<sup>30</sup> Since 1 November 2004 the GBA can be accessed on line, however not for spontaneous data supply.



**Figure 1:** A landscape: the system of key registers and the kadaster landinformation portal

#### 5.4 Impact of a more Complete Register

The Kadaster will need to review the extent to which supplementary relevant data could be included in the land register<sup>31</sup> and cadastre, or integrated within the scope of an information infrastructure. The easement register will in any case need to have been implemented in 2009. It should be noted that this can be regarded as overdue maintenance.

The one-stop shopping model<sup>32</sup> is equally applicable to both the registers resting with third parties and the Kadaster's internal databases<sup>33</sup>.

The Kadaster should play a pioneering role in this field.

#### 5.5 Impact of a Role in the Chain

The Kadaster can play a leading directive role in the organisation of the provision of this information to the market players, whereby consideration will need to be given to the cooperation with some registers within the context of digital availability and fast accessibility. Some land registries in other countries have developed into information-

<sup>31</sup> Article 3:17, par. 2, of the Netherlands Civil Code stipulates that the registration of tenancy and farm-lease contracts and the accruing personal rights is possible solely by means of extraordinary statutory provisions. Within the context of an infrastructure collaboration with existing data administrators with respect to tenancies and farm leases is possibly a preferable approach.

<sup>32</sup> Principle of the Kadaster's marketing policy.

<sup>33</sup> Within this context the *Cadastre On Line* system could play the role of a 'landinformation portal' in serving the entire rented sector or the commercial real-estate market via partnerships with, for example, Huurmet. This could possibly result in a GIS centre of expertise for the public-housing sector, according to the department Kadaster (in charge with value added product development).

managers of a variety of government registers<sup>34</sup>. The Kadaster should play a leading role in the organisation of the chain's needs for information.

## 5.6 Impact on Topographic and Geographic Information

The Kadaster can acquire a good position by the provision of a series of topographic and geographic products that possess an internal consistency and are indispensable to third parties within the context of spatial planning, land use, management, and maintenance. For this reason the cadastral map, the Large Scale Topographic Base Map GBKN<sup>35</sup> and Topographic Key Register will need to be object-oriented and maintained mutually consistent by means of dataset integration using ontologies<sup>36</sup>. Advanced detection of changes, for example using satellite images<sup>37</sup> followed by the processing of the changes in all datasets ('change propagation') will then become a feasible proposition<sup>38</sup>. The assumption of the management of, for example, the *Algemeen Hoogtebestand Nederland* ('General Elevation Dataset of the Netherlands', AHN) and the *Nationaal Wegen Bestand* ('National Road Database', NWB<sup>39</sup>) indispensable to dynamic traffic management would be compatible with this. The integration of the National Triangulation (RD) and National Ordnance Datum (NAP) in a 3D reference frame would result in a pivotal role in the geometric infrastructure, inclusive of elevations.

## 5.7 Impact of the European Union

The operationalisation of EULIS will be an issue in the coming years. The current project will result in a prototype; now it will be necessary to decide whether this system should in fact go on the air as a fully-fledged European land-information service. The Kadaster can play a substantial role in this development<sup>40</sup> on the basis of efforts to achieve a certain degree of harmonisation of real-estate law, inclusive of issues relating to the register and the cadastre and, in particular, the legal significance. In a communal market in which persons, goods and capital are deemed to be able to move in freedom it will be necessary, in analogy with national economies, to ensure that the cost of human-interaction transactions (or, in other words, 'commerce') is kept as low as possible – in this instance, to the benefit of a powerful Europe. Sweden took the initiative for EULIS.

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<sup>34</sup> Such as the Service New Brunswick Canada, the State Enterprise Centre, and the Register Vilnius Lithuania, see the FIG International Seminar on e-Land Administration held in Innsbruck, June 2004, papers presented by Mary Ogilvy and Kestutis Sabaliauskas respectively.

<sup>35</sup> In addition, the existence of the GBKN also lays appropriate foundations for a possible central pipe register (P de Haan, in Geo-Info 2004-10)

<sup>36</sup> Dissertation, Uitermark, as well as P.J.M. van Oosterom in *Topografische Bestandsintegratie met ontologieën* ('Topographic database integration using ontologies') in Geodesia, 2002-10 and 11 respectively.

<sup>37</sup> See, for example, T.J.M. van der Ven and R. Beek, 2003, *Mutaties opsporen per satelliet* ('Detection of changes using satellites'), Geodesia 2003-10, who consider the use of satellites to identify changes for the GBKN a feasible proposition.

<sup>38</sup> The Kadaster has since applied for a subsidy within the scope of *Ruimte voor Geoinformatie* ('Space for Geoinformation') for the purposes of change detection (Nieuwsbrief, Geodata, No. 18, Sept. 2004).

<sup>39</sup> Within this context it is beneficial that the NWB is harmonised with the Top10V, see J.P.M.M. Vis, *Nationaal Wegenbestand NWB van de Algemene Verkeersdienst AVD* ('The National Road Database of the General Traffic Service AVD'), in Geodesia, 1998-10, who states that both datasets are linked with respect to background objects.

<sup>40</sup> The KOL could possibly play a role as a 'landinformation portal' here.

## 5.8 Impact of Rural Planning

The application of land consolidation (land development) in the Netherlands is encountering the same kind of situation as in the neighbouring countries<sup>41</sup> – this traditional spatial planning instrument is under pressure. However, it is generally recognised that the mechanism of re-allocation of real rights is and remains suitable for the improvement of societal spatial functions; moreover it can also make land available for the necessary public objectives, an approach which is preferable above expropriation.

For this reason the cadastral planning instruments will need to develop into an extremely flexible system of options capable of accommodating the various societal spatial needs, irrespective of the origins of those needs<sup>42</sup>. Whilst doing so the Kadaster will simultaneously need to develop an appropriate feeling for societal spatial developments and the requisite instruments.

## 6 STRATEGIC OBJECTIVES

On the basis of the above it is no more than logical to reformulate the current strategic objectives in the following terms:

- The best possible performance of the current public duties.
- The promotion of innovation and knowledge for the adoption of a leading role in the evolution of the public duties in response to societal developments.

Consequently on the basis of a modernisation of the operations which pushes back the frontiers and ensures for the Kadaster's acquisition of a powerful position the strategic sub-objectives can be summarised as follows:

- The investigation regarding evolution towards a (more) positive land registration system.
- The introduction of a 3D land register (inclusive of networks, buildings etc)
- The ambition to adopt the role as a centre for a range of key registers
- The provision of a more complete insight into the private-law and public-law status of registered property, inclusive of the relevant juristic facts.
- The acquisition of a substantial role in the organisation of the information needs of the chain in the real-estate market.
- The provision of an appropriately-linked set of topographic and geographic datasets which are object-oriented and mutually consistent with respect to changes.
- The fulfilment of a pivotal role in the geometric infrastructure (x, y and z)
- The role as a prominent partner for the EU in the harmonisation of registered-property law, land registration, and cadastres.
- The development of flexible land-planning instruments suitable for use for a variety of societal spatial objectives.

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<sup>41</sup> A symposium 'on Modern Land Consolidation' at Clermont Ferrand, September 2004, revealed that rural planning increasingly needs to seek its justification in objectives outside the agricultural sector (Proceedings FIG, to be published), and that consequently a wide range of instruments will be required than those currently usually made available in the relevant legislation.

<sup>42</sup> Endeavouring to obtain a role in the provision of geographic information in this sector would not appear to be an option, in view of the activities of the Government Service for Land and Water Management (DLG) in this area, which even extend to the supply of a GIS for the State's real-estate management (VI Matix, October 2004)

## 7 CONCLUSIONS

The only constant factor is change! Various developments are signalled and the Kadaster has set impressive ambitions and goals for the coming years.

In this ICT-developments are a driving and enabling factor. It will be important to align business strategy and ICT-possibilities. The future will be shaped by business strategies and the enabling factor, that should be recognised in time, will be ICT.

The Kadaster must demonstrate leadership to fulfil its ambitions.

I believe there are excellent prospects for the Kadaster. The developments in the position of the Kadaster during the past years have been quite well; this is also apparent from the various investigations into the Kadaster's role. This is the inspiration that drives the strategic objectives of the Kadaster.

The justification of the investments in the developments outlined above will need to be found in the benefits society can enjoy by virtue of an efficient and effective Kadaster<sup>43, 44</sup>.

## BIOGRAPHICAL NOTES

Since 1st May 2004 **Arco Groothedde** is a member of the Executive Board of the Netherlands Kadaster. Earlier he was Division Manager registration and Information at the National Office for Road Traffic (RDW).

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<sup>43</sup> For a rough calculation of the macro-economic effect of an appropriate land register see 'Some Macroeconomic Aspects of Land Ownership', FIG Marrakech, in which it is calculated that in the Netherlands landownership makes a contribution of 8.1% to the GNP, of which 5.9% results from the legal certainty of that ownership.

<sup>44</sup> The Doing Business Report of the World Bank 2005 might be helpful by rating land administration systems on necessary steps to register, time involved, and cost as a % of the value of the property.