The Digital Cadastral Database and the Role of the Private Licensed Surveyors in Denmark

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The Surveyors Profile

Techniques Engineer
Laws Lawyer
Design Architect

Real Property
Surveying Mapping
Spatial Information Management
Land Administration Spatial Planning

Chartered Surveyor
Mapping GIS-Systems Land Management Consultancies
Engineering Cadastre Works Spatial Planning

Employment Areas

<table>
<thead>
<tr>
<th>Employment Areas</th>
<th>1987</th>
<th>1997</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private practice – owners</td>
<td>37</td>
<td>26</td>
<td>23</td>
</tr>
<tr>
<td>Private practice – employed</td>
<td>15</td>
<td>12</td>
<td>15</td>
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<tr>
<td>State government - Ministry of the Environment, KMS - Ministry of Transport</td>
<td>15</td>
<td>19</td>
<td>18</td>
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<tr>
<td>Counties and municipalities</td>
<td>17</td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>- Spatial planning</td>
<td>- Cadastre Management</td>
<td>- Expropriation</td>
<td>- GIS and mapping</td>
</tr>
<tr>
<td>Private companies</td>
<td>16</td>
<td>17</td>
<td>16</td>
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<tr>
<td>- Engineering companies</td>
<td>- Mapping and GIS companies</td>
<td>- Limited Companies</td>
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</tbody>
</table>

Development in Employment Areas

Surveyors employed outside the survey firms
Yesterday, Today and Tomorrow

The only Constant is change

Agreement between parties
Notaries
Lawyers or real estate agent
Deed or Document
Title Registry
Private custody
Public Index Map
No Index Map
Limited guarantee
No guarantee
State guarantee - compensation paid for errors or loss
Appeal to the courts

The Private Surveying Firms - Structure

Private Surveying Firms

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Firms Surv</th>
<th>Minor firms 1-3 surveyors</th>
<th>Major firms more than 3 surveyors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>160</td>
<td>137</td>
<td>23</td>
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<tr>
<td>1997</td>
<td>379</td>
<td>224</td>
<td>115</td>
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<tr>
<td>2002</td>
<td>317</td>
<td>94</td>
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</tbody>
</table>

Private Licensed Surveyors

Liberal profession (such as lawyers, veterinarians, etc.)
Licensed for boundary determination and cadastral work such as parceling out
Work areas also include:
Mapping
Engineering surveys
GIS
Consultancy on real estate and land law issues
About 100 private surveying firms throughout the country

The Danish Association of Chartered Surveyors

Political and Administrative Structure

PLF Organization of the private surveying firms
PALF Organizations of surveyors employed in the surveying firms
ALF Organizations of surveyors employed outside the surveying firm

Professional Development
In-service Training
Journals and Publications
International Cooperation

A Land Registration Route Map

PLANNING AND URBAN PLANNING
CADASTRAL WORK
MAPPING AND ENGINEERING SURVEYS
DEED REGISTRY
PRIVATE CUSTODY
PRIVATE LANDOWNER
PUBLIC INDEX MAP
LIMITED GUARANTEE
PRIVATE LANDOWNER
### The Tasks of the Private Surveying Firms

<table>
<thead>
<tr>
<th></th>
<th>Minor firms</th>
<th>Major firms</th>
<th>1997</th>
<th>1987</th>
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<tbody>
<tr>
<td>Cadastral work</td>
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<td>40</td>
<td>43</td>
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<tr>
<td>Mapping</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>14</td>
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<tr>
<td>Eng. surveys</td>
<td>20</td>
<td>20</td>
<td>20</td>
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<tr>
<td>Consultancy</td>
<td>23</td>
<td>30</td>
<td>27</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

### The Cadastral Process

#### The Cadastral System...
- The Cadastral register identifies the land parcels by number and area.
- The Cadastral map identifies the land parcels geographically.
- The Land Book secures the legal rights based on the cadastral identification.
- The cadastral measurements identify the position of the property boundaries.

#### The Land Transfer Process - The Land Book
1. Agreement between the parties - a real estate agent may be involved. The signed agreement is legally binding between the parties.
2. A deed is drafted and signed by the parties and witnesses - a lawyer may be involved. The deed refers to the cadastral identification.
3. The deed is checked and entered in the land book at the local district court. The title is thereby secured against legal claims from any third parties.

### Boundary determination
- **Monopoly for the Private Licensed Surveyors** - According the Surveyors’ Act
- **Process**
  - Comparing the cadastral information to physical conditions, fences...
  - If discrepancies: the surveyor must involve the landowners and clear up the reason.
- **Adverse possession**
  - 20 years of possession leads to a proscriptive right: legal ownership.
- **Boundary disputes**
  - The landowners must apply to a licensed surveyor, acting as a judge.
  - Formal process involving the landowners to achieve an agreement.
  - If agreement can not be reached - the case goes to court.
  - Around 40 cases per year, less than 5 cases goes to court.

### Types of Cadastral Work
- **Parcelling Out**
  - Subdivision of existing properties.
  - Cadastral registration (subdivision) is necessary prior to entering any deeds or mortgages that relates to a part of an existing property.
- **Amalgamation of Properties**
  - Legal rights of ownership and mortgage must be arranged prior to cadastral registration.
- **Area transfer between properties**
  - The legal rights of ownership and mortgage must be arranged prior to cadastral registration.
- **Rectification**
  - Errors, natural boundaries, adverse possession, rights of way.
Cadastral Reform - The Digital Cadastral Map

Conversion from analogue to digital in a two stage process:

1. Control points and connected cadastral surveys form a “skeleton map” (urban 40%, rural 20%)
2. Digitising and fitting in the rest by transformation using the digital topographic map as control.

The Digital Cadastral Map - from analogue to digital

An analogue cadastral map from 1983 updated over about 100 years. The map is an “island map” and is not linked to the national grid.

The same area as a print of the digital cadastral map 1993. The map is linked to the national grid and shows only the current cadastral situation.

The boundary points shown by circles are established in the map using control points and legal survey measurements.

The Digital Cadastral Map – the basic layer

The cadastral layer presents the basic information on land rights to be combined with digital topographic maps or orthophotos showing the use of land.

Some discrepancies between the cadastral registration and the physical boundaries may appear. This can be solved only through the process of boundary determination.

The Digital Cadastral Map - updating and upgrading

In the analogue map new boundaries were adjusted graphically to the position of existing mapped boundaries.

In the digital cadastral map any new cadastral measurement will be used for adjusting the position of the existing boundaries. This will establish a process of continual improvement of the accuracy of the map - a dynamic system.

The system, however, calls for an educated use of the map.

There is a need to improve the accuracy for achieving better consistency with the large scale topo maps.

The Digital Cadastral Map - a legal map tailored for integrated land administration

Strengths:
• Countrywide; based on the national grid
• Metadata
• Dynamic updating and upgrading

Weaknesses:
• Accuracy varies
• Tension between the (legal) cadastral map and the (physical) topographic map
• Demand for an educated use - understanding the nature and the origin of the cadastral map

The Cadastral Information and Updating System
The Web-Cadastre

The Spatial Information Infrastructure

NSC produce the national map and digital top maps 1:10,000 (TOP10DK). Available through the map service.

Local authorities and utilities produce large scale topographic maps. Available on the municipal web services.

Digital registers are available through the public information server. Cross-reference register ensures accessibility.

Geocoded addresses in combination with the central population register ensures the link between people and land.

The Public Information Server

The Map Service

The Planning Information Service
**County Administration Web Service**
Showing the various land-use restrictions

**The Municipal Web Service**
Different kind of maps, plans, and GIS analysis

**The Service –Oriented IT Architecture**

Users: All kind
User services: Self services collect and organise data from different sources for specific purposes. Case systems design and support the processes in government administration.
Common services: Information services support the distribution of data. Administrative services assure the process of access to and updating of the data.
Data services: Provide functionality for distribution and administration.
Data: Official (authentic) governmental registers and map databases.
- Quality, authenticity, and actuality
- Flexibility and accessibility
- Standardisation

**The Accuracy of the Cadastral Map**
A call for the educated use of the map

There is a need to improve the accuracy of the cadastral maps (by upgrading) to obtain better consistency with the large scale topographic maps.

**The Multipurpose Cadastre**

Should the cadastre host the land-use regulations?
- Today: Yes
- In the future: No!

Currently, the cadastre is hosting a few land-use regulations such as the coastal protection zone, the dunes protection zone, and soil contaminated areas. From a legal as well as an administrative point view this is very problematic.

In the future, using the service oriented IT-architecture, the cadastre will still be the basic (authentic) layer of registration. But the registration will be the responsibility of the various governmental authorities.

This, again, calls for an educated use of the map to ensure consistency between the cadastral information and land-use restrictions.