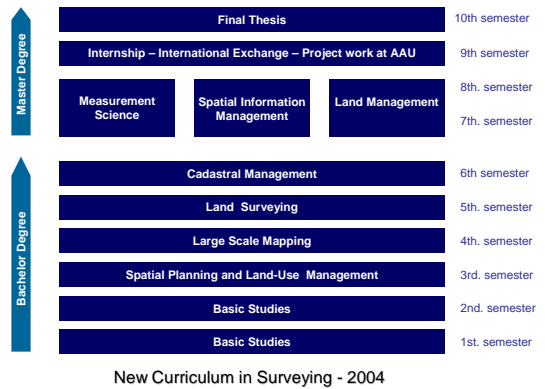
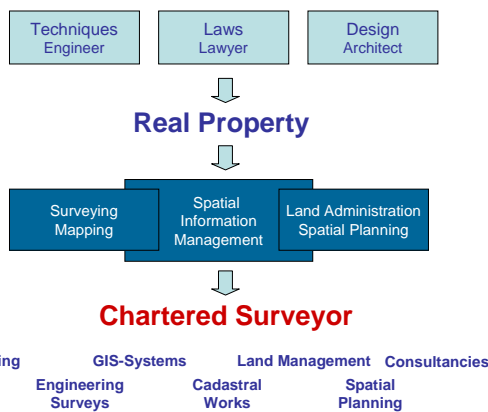


The Digital Cadastral Database and the Role of the Private Licensed Surveyors in Denmark

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Aalborg University, Denmark
Vice-President of FIG

CPD LECTURE
DUBLIN INSTITUTE OF TECHNOLOGY, 23 - 24 NOVEMBER 2005

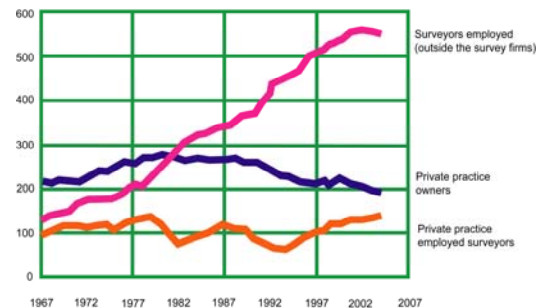
The Surveyors Profile



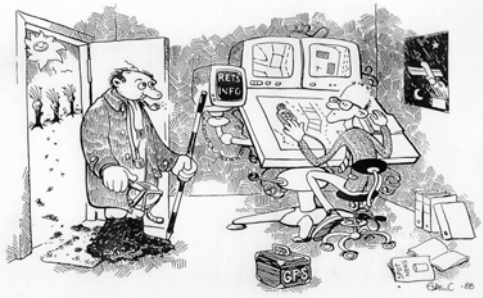
Employment Areas

	1987	1997	2004
• Private practice – owners	37	26	23
• Private practice – employed	15	12	15
• State government -Ministry of the Environment, KMS -Ministry of Transport -Aalborg University	15	19	18
• Counties and municipalities -Spatial planning -Land Management -Expropriation -GIS and mapping	17	26	28
• Private companies -Engineering companies -Mapping and GIS companies -Limited Companies	16	17	16
	100	100	100

Development in Employment Areas

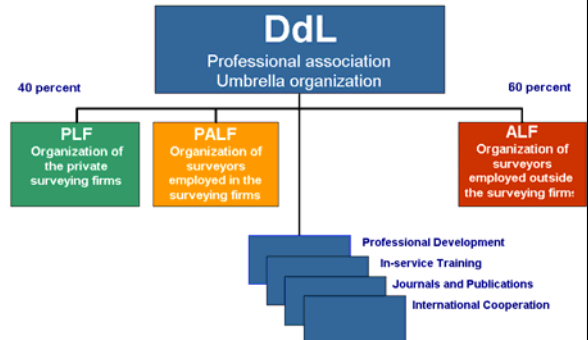


Yesterday, Today and Tomorrow

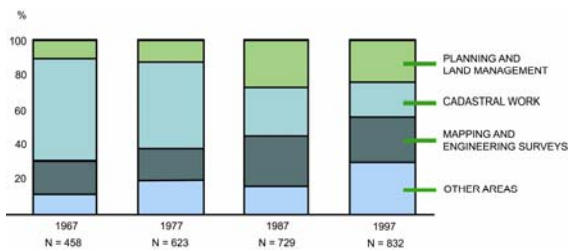


The Danish Association of Chartered Surveyors

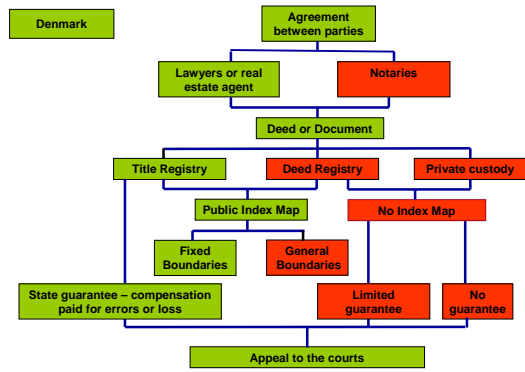
Political and Administrative Structure



... The only Constant is change



A Land Registration Route Map



Private Licensed Surveyors



Liberal profession (such as lawyers, veterinarians, etc.)

Licensed for boundary determination and cadastral work such as parcelling 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 Private Surveying Firms - Structure



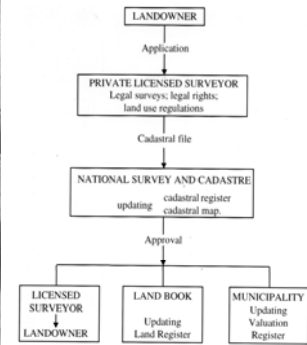
Private Surveying Firms	1987		1997		2002	
	Firms	Surv	Firms	Surv	Firms	Surv
Minor firms 1-3 surveyors	137	224	94	148	83	129
Major firms more than 3 surveyors	23	115	24	169	22	172
Total	160	379	118	317	105	301

The Tasks of the Private Surveying Firms



	Minor firms	Major firms	1997	1987
Cadastral work	48	40	43	40
Mapping	9	10	10	14
Eng. surveys	20	20	20	37
Consultancy	23	30	27	9
Total	100	100	100	100

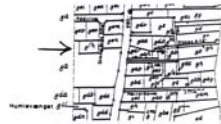
The Cadastral Process



The Cadastral System ...

CAD. NO.	AREA	WAY	NO OF PARCELS
8th	826m ²	0m ²	1

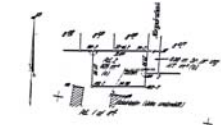
The Cadastral register identifies the land parcels by number and area



The Cadastral map identifies the land parcels geographically

CAD. NO.	OWNER	MORTGAGE	BASEMENT
8th	DATE	DATE	DATE
826m ²	DATE	DATE	DATE
	DATE	DATE	DATE
	DATE	DATE	DATE

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.

Subdivision and cadastral registration is needed prior to this process when purchasing a part of a property

CAD. NO.	OWNER	MORTGAGE	BASEMENT
8th	DATE	DATE	DATE
826m ²	DATE	DATE	DATE
	DATE	DATE	DATE
	DATE	DATE	DATE

CADASTRAL INFO | **TITLES**

SERVITUDES

MORTGAGES ON THE TRACK →

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 mortgage that relates to a part of an existing property
- Amalgamation of Properties
 - Legal rights of ownership and mortgage must 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

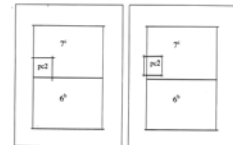
In the analogue map new boundaries were adjusted graphically to the position of existing mapped boundaries.

In the digital cadastral map any new cadastral measurement will be used for adjusting the position of the existing boundaries.

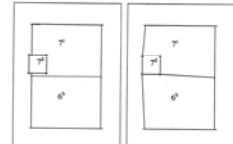
This will establish a process of continual improvement of the accuracy of the map - a dynamic system.

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



A. Existing digital cadastral map. Subdivision of a new parcel is to be carried out.



B. The legal survey of the boundary points of the new parcel are measured directly in the map.



C. This result of an updating process is not acceptable and not legally correct.



D. This result of an updating process is legally acceptable but not graphically correct.

The Digital Cadastral Map

- a legal map tailored for integrated land administration

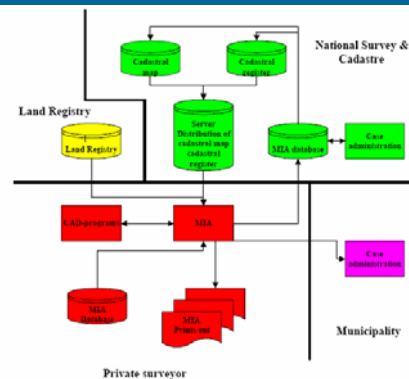
Strengths:

- Countrywide; based on the national grid
- Metadata
- Dynamic updating and upgrading

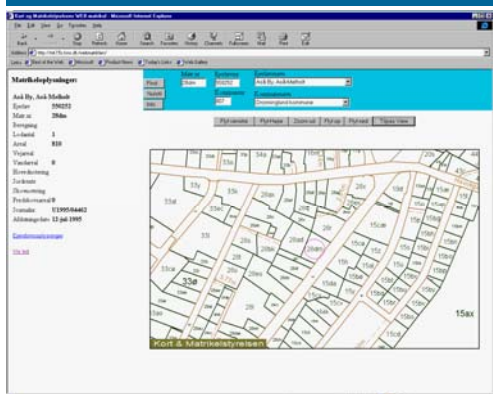
Weaknesses:

- 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



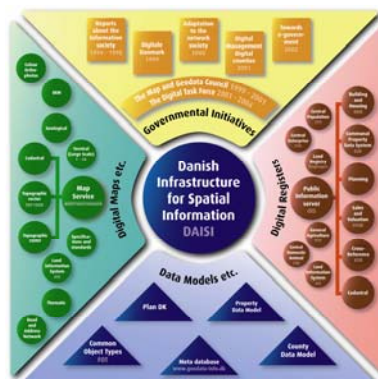
The Web-Cadastre



The Spatial Information Infrastructure

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

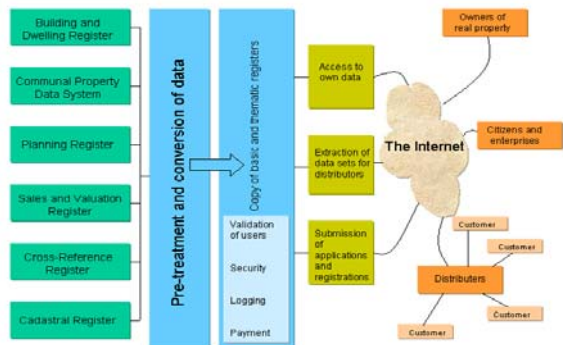
Local authorities and utilities produce large scale top maps on demand. Available on the municipal web services



Digital registers 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.

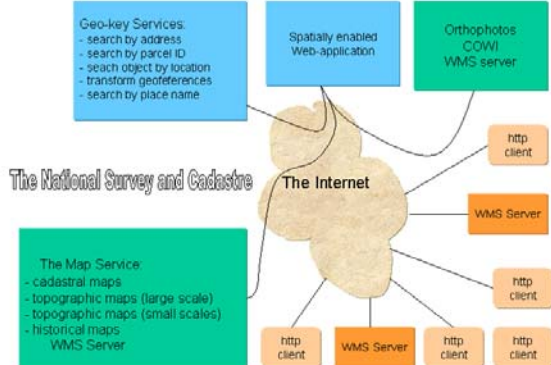
The Public Information Server



The Public Information Server



The Map Service



The Planning Information Service



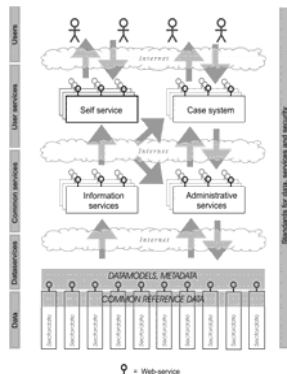
County Administration Web Service Showing the various land-use restrictions



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 secure 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

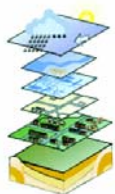


There is a need to improve the accuracy of the cadastral maps (by upgrading) to obtain better consistency with the large scale topographic maps.

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.