



## WORLD OF 3D CADASTRE

How is the development in the world of cadastre towards more than two dimensions?

This presentation will give some details on both cadastre and dimensions and show some examples from various countries

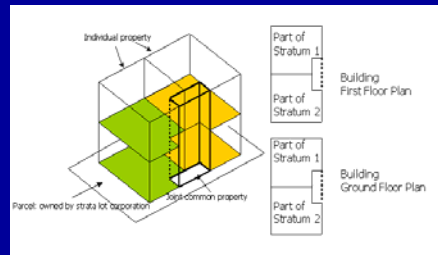
Tor Valstad, City of Oslo, Norway

## 3D CADASTRES IN THE WORLD

- **No country in the world has a complete solution for 3D cadastral registration**

But some countries have passed laws that make it possible to create specific "3D parcels".

The need to create properties in strata in our crowded cities is definitely present



Example of 3D-drawing in strata title (by courtesy of Michael Barry).

FIG - 06.05.2009 Eilat

3

## WHAT IS A CADASTRE

**Cadastre is a methodically arranged public inventory of data concerning properties within a certain country or district, based on a survey of their boundaries**



FIG - 06.05.2009 Eilat

4

## CADASTRE OF UTILITIES?

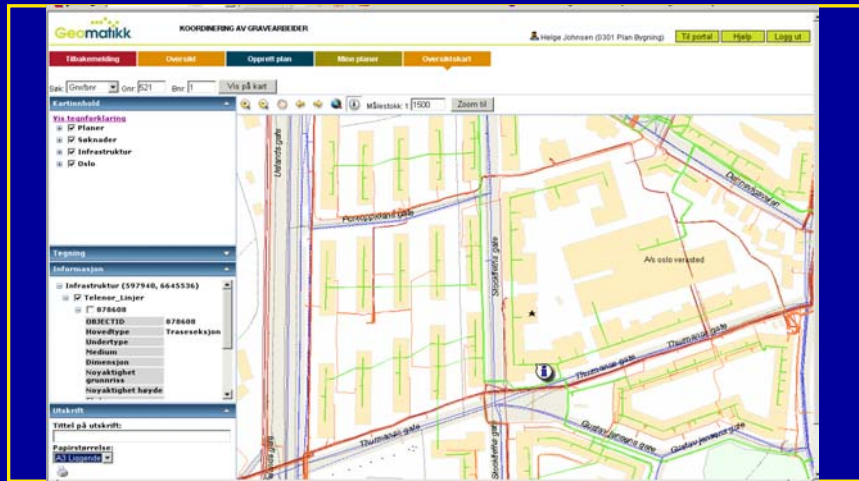


FIG - 06.05.2009 Eilat

5

## MORE THAN 3 DIMENSIONS?

Although very few countries have a 3D cadastre there is talk about a 4D cadastre or even a multidimensional cadastre. The idea is to introduce time in the cadastre.

The fourth dimension used in the theory of relativity is a spatial and not a temporal dimension.



2009 is the year of Astronomy!

FIG - 06.05.2009 Eilat

6

## 3D CADASTRE IN AUSTRALIA

Queensland has for the last 10 years allowed volumetric subdivisions. Queensland started early to create 3D parcels, but according to Ken Michael the system could be improved further.

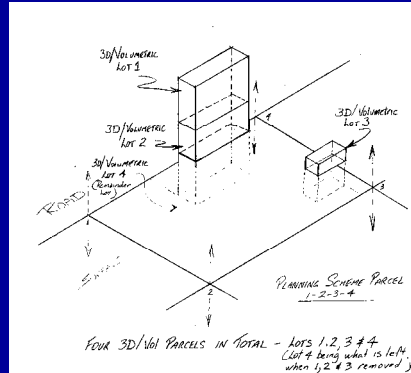


FIG - 06.05.2009 Eilat

7

## 3D CADASTRES IN SWEDEN

- Sweden introduced a new type of property called 3D-property in 2004
- The idea was that you could separate the residential part of the buildings from the lower commercial part
- It is also possible to create bridges, tunnels and caverns as 3D-properties

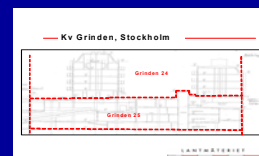


FIG - 06.05.2009 Eilat

8

## 3D CADASTRE IN SWEDEN

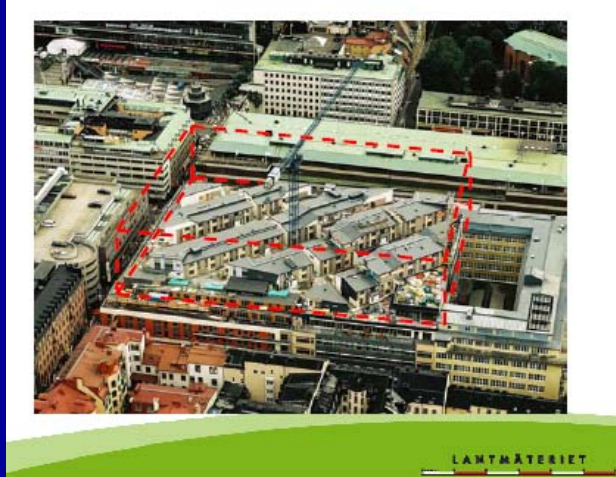


FIG - 06.05.2009 Eilat

9

## 3D CADASTRES IN TURKEY

**Cevdet C. Aydin**

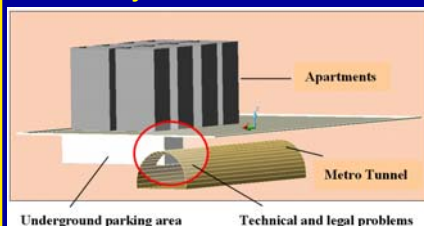


Figure 6 Shops underneath the road in Hepbekirler municipality.



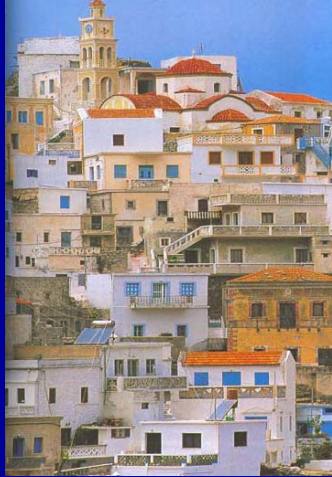
Lack of information and maps caused in 2006 in Istanbul a serious accident. Foundation work went right through a metro tunnel and a train carrying 700 passengers hit the foundation pillars.

FIG - 06.05.2009 Eilat

10



## 3D CADASTRES IN GREECE



**A typical example of a settlement's vertical development is Santorini island in Greece**

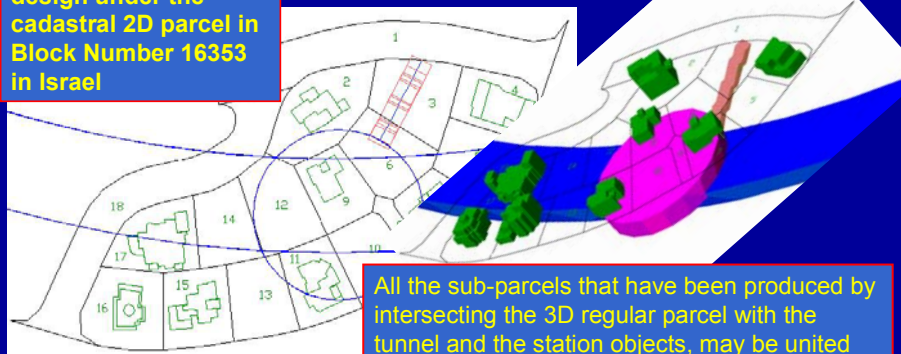
Here a property's yard can at the same time be the roof of a neighbouring one, providing two registered rights and consequently two different cadastral id numbers. In this case the only way to clarify the status of the ownerships and to visualize the position of the properties, is 3D registration and representation.

FIG - 06.05.2009 Eilat

11

## 3D CADASTRES IN ISRAEL

**A cadastral map that illustrates the tunnel design under the cadastral 2D parcel in Block Number 16353 in Israel**

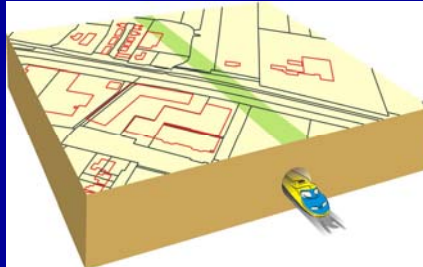


All the sub-parcels that have been produced by intersecting the 3D regular parcel with the tunnel and the station objects, may be united together in order to produce the main 3D parcel of the tunnel.

FIG - 06.05.2009 Eilat

12

## 3D CADASTRES IN THE NETHERLANDS



In the full 3D cadastre it will be possible to entitle a person or a company, to a volume parcel that is no longer related to the surface parcel  
(Jantien Stoter)

Current cadastral registration of 3D situations can be accomplished by a notification in the cadastral registration specified with an 'OB' code (underground construction). Such a notification is registered on the surface parcel.

FIG - 06.05.2009 Eilat

13

## 3D CADASTRE IN NORWAY

### New Law on Cadastre

- A new law to replace The Subdivision Act has been in the making since 1998. It was approved by the Parliament in 2007, but the law will not be enacted before January 2010.
- This law does not make any property three-dimensional, but it opens up for the creation of special "construction parcels". These are three-dimensional and can be both below or above the surface parcel.

FIG - 06.05.2009 Eilat

14

# CONSTRUCTION PARCEL NORWAY

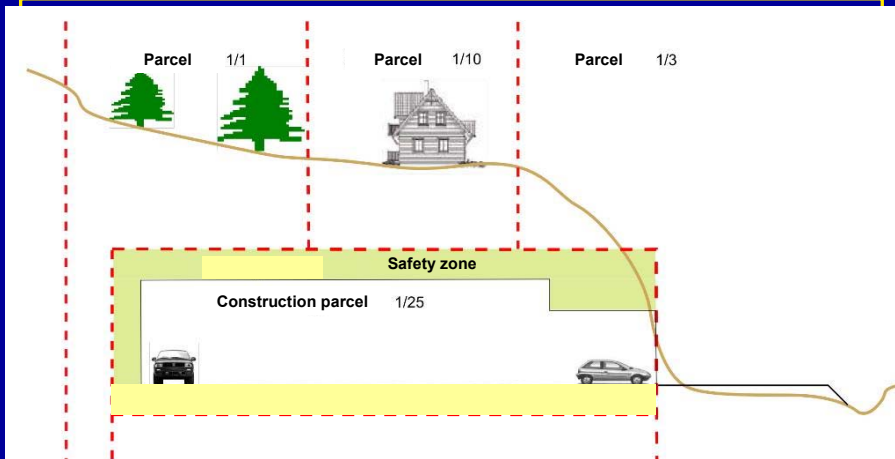


FIG - 06.05.2009 Eilat

15

# CONSTRUCTION PARCEL NORWAY

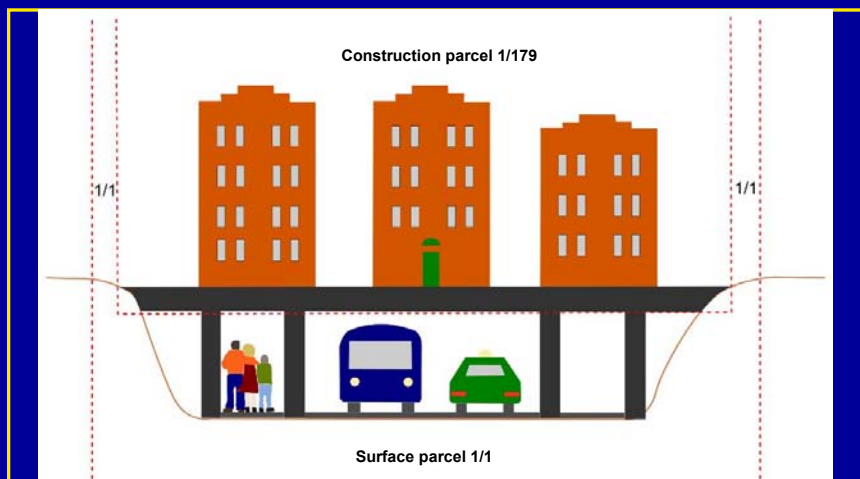
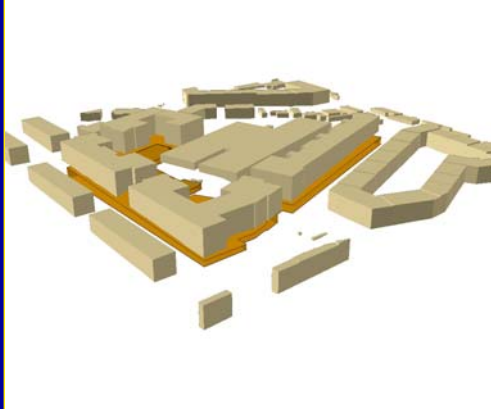


FIG - 06.05.2009 Eilat

16



## THE CADASTRAL SYSTEM OF NORWAY



### The 3D Cadastre

The present law on subdivision from 1978 had no provision for three- dimensional parcels, but some municipalities developed their own 3D system based on agreements locally

FIG - 06.05.2009 Eilat

17

## THE CADASTRAL SYSTEM OF OSLO

### The 3D Cadastral System of Oslo

- The present law on subdivision from 1978 had no provision for three- dimensional parcels so the City of Oslo established a system called the Oslo Method in 1987 based on an agreement between the City of Oslo and the local court
- About 100 3D parcels have been registered since
- An underground parcel is precisely defined in all three dimensions and ownership is limited to the constructed volume only
- Special register number, since 300 are added to the area number of the surface parcel
- Underground parcels may also be surveyed, but usually we accept the contractors drawings
- Survey certificates are always made and used to register the new parcels in the national property register

FIG - 06.05.2009 Eilat

18

# CADASTRAL SURVEYING IN OSLO

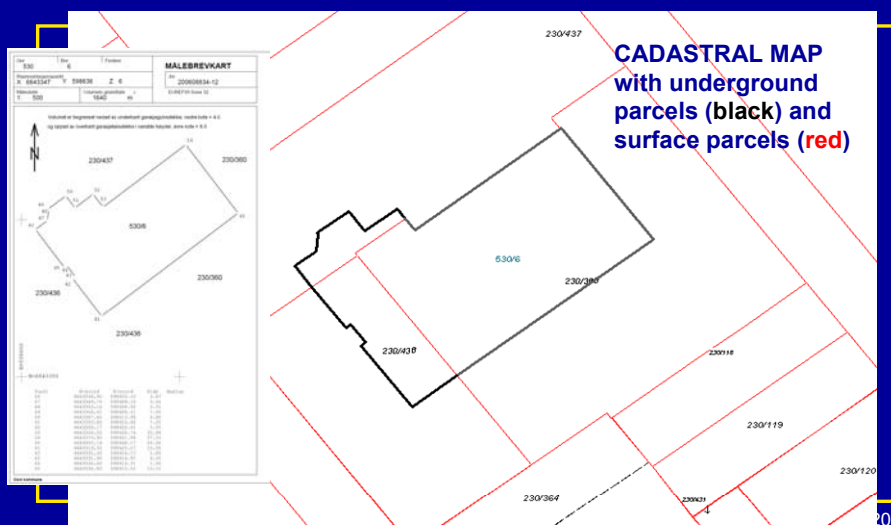
All cadastral surveying are carried out by municipal surveyors



FIG - 06.05.2009 Eilat

19

# 3D CADASTRE IN OSLO SURVEY CERTIFICATE AND CADASTRAL MAP



20

## 3D CADASTRE IN OSLO (ORTHOPHOTO)



FIG - 06.05.2009 Eilat

21

## 3D CADASTRE IN OSLO (OBLIQUE PHOTO)



FIG - 06.05.2009 Eilat

22

# 3D CADASTRE IN OSLO (OBLIQUE PHOTOS)



23

# 3D CADASTRE IN OSLO



FIG - 06.05.2009 Eilat

24



# 3D CADASTRE (Video)



FIG - 06.05.2009 Eilat

25



FIG - 06.05.2009 Eilat

26

## FUTURE OF A 3D CADASTRE



Some countries like Finland are now preparing for new legislation allowing 3D objects in their cadastre.

In the near future there will probably not be established any real three dimensional cadastre. But to develop national 2D cadastres to include 3D parcels will be more common.

It will also be necessary for the new legislation to differentiate between condominiums and 3D parcels.

## 3D CADASTRE

**Thank you for your attention**