

From Control Points to VRS - The Development of Using GPS in National Land Survey of Finland

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NATIONAL LAND SURVEY OF FINLAND – DOWN TO EARTH



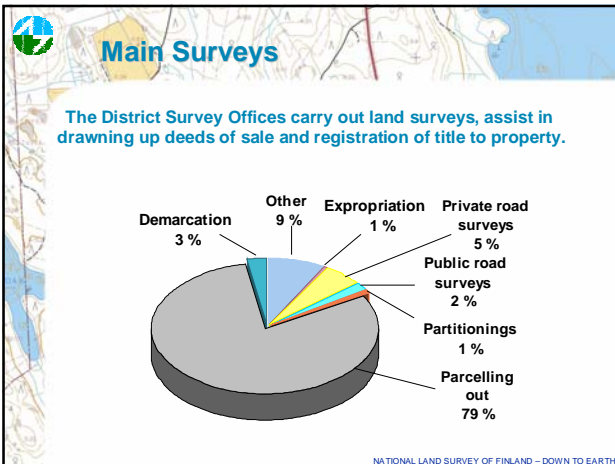
Duties of National Land Survey

In Finland, cadastral survey and mapping tasks are handled by the government, municipalities and private consultants

National Land Survey

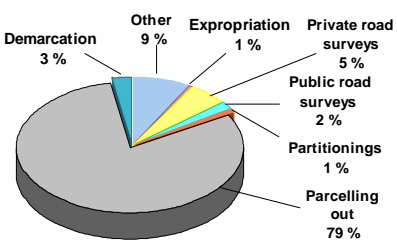
- ◆ carries out land surveys outside city plan areas
- ◆ carries out national mapping assignments
- ◆ maintains the national cadastral system
- ◆ promotes the shared use of geographical information

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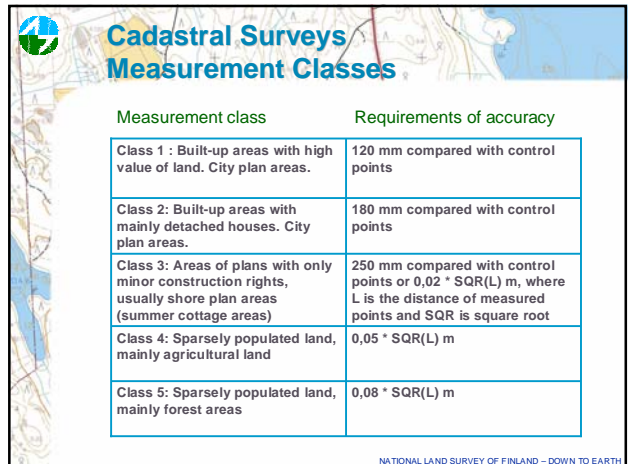
Main Surveys

The District Survey Offices carry out land surveys, assist in drawing up deeds of sale and registration of title to property.



Survey Type	Percentage
Parcelling out	79%
Other	9%
Demarcation	3%
Private road surveys	5%
Public road surveys	2%
Partitionings	1%
Expropriation	1%

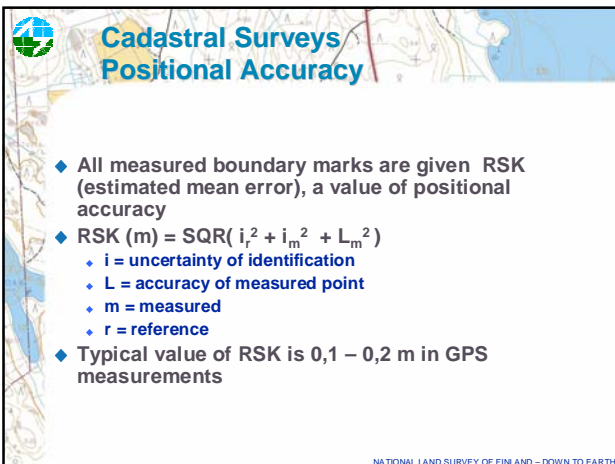
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Cadastral Surveys Measurement Classes

Measurement class	Requirements of accuracy
Class 1 : Built-up areas with high value of land. City plan areas.	120 mm compared with control points
Class 2: Built-up areas with mainly detached houses. City plan areas.	180 mm compared with control points
Class 3: Areas of plans with only minor construction rights, usually shore plan areas (summer cottage areas)	250 mm compared with control points or $0,02 * \text{SQR}(L)$ m, where L is the distance of measured points and SQR is square root
Class 4: Sparsely populated land, mainly agricultural land	$0,05 * \text{SQR}(L)$ m
Class 5: Sparsely populated land, mainly forest areas	$0,08 * \text{SQR}(L)$ m

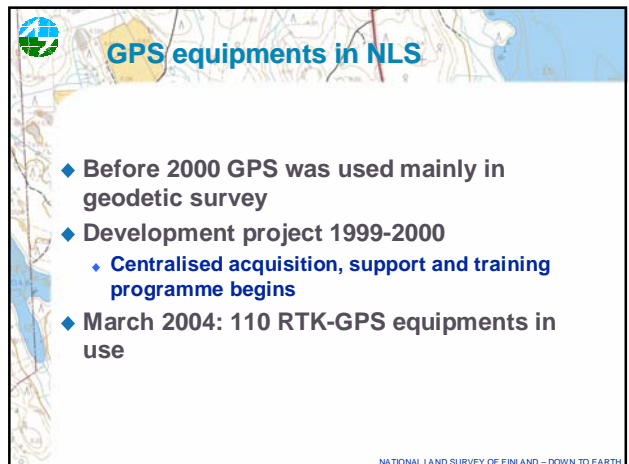
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Cadastral Surveys Positional Accuracy

- ◆ All measured boundary marks are given RSK (estimated mean error), a value of positional accuracy
- ◆ $\text{RSK (m)} = \text{SQR}(i_r^2 + i_m^2 + L_m^2)$
 - ◆ i = uncertainty of identification
 - ◆ L = accuracy of measured point
 - ◆ m = measured
 - ◆ r = reference
- ◆ Typical value of RSK is 0,1 – 0,2 m in GPS measurements

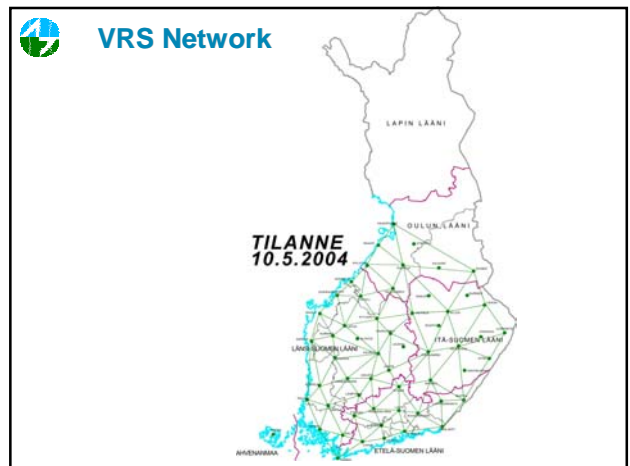
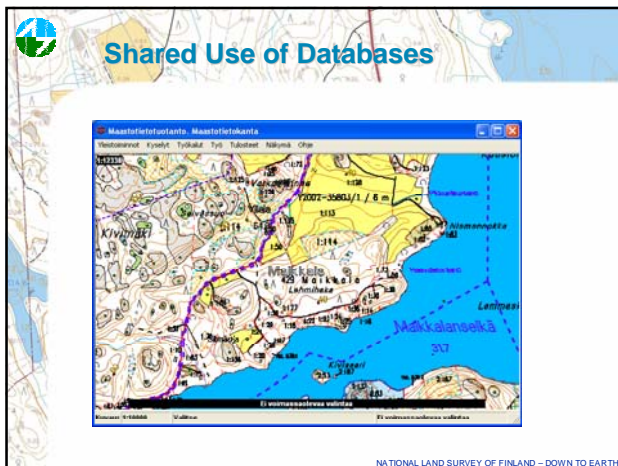
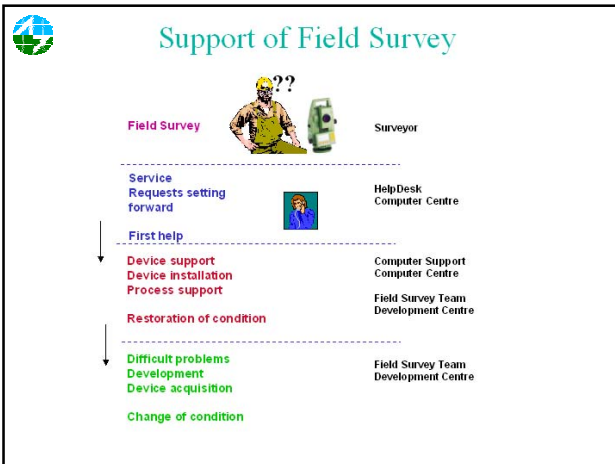
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GPS equipments in NLS

- ◆ Before 2000 GPS was used mainly in geodetic survey
- ◆ Development project 1999-2000
 - ◆ Centralised acquisition, support and training programme begins
- ◆ March 2004: 110 RTK-GPS equipments in use

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- ## Future Development
- ◆ VRS network covering whole country 2005
 - ◆ DGPS measurements
 - ◆ Better accuracy using VRS ?
 - ◆ Road Database updating cycle gets shorter
 - ◆ Updating Topographic Database, more objects (buildings, etc.)
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