

Determine the cadastral borders by natural shapes instead of border marks?

Why not?

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Structure

- Present situation in Finland
- Organic Cadastre
- How to do it?
- Testing
- Analyzes
- Conclusions



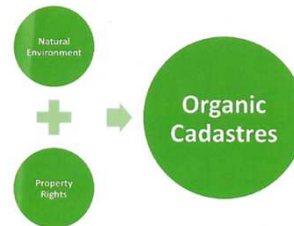
Present Situation

- In Finland the border marks placed to the field are more relevant than coordinates – although the borders are fixed
- Cadastral proceedings consists technical and judicial part
- Border mark accuracy requirements are 0.1m-0.5m
- Almost every parcel ought to be surveyed to achieve the required accuracy
 - Border marks has been placed to the field since 18th century
 - To survey all the inaccurate border marks in Oulu region would take 19.700 working days
- Sometimes surveying a parcel is more expensive than the total value of the very same parcel



Organic cadastre

- How about to quit field works on rural areas?
- Determining the borders to natural shapes instead of border marks
 - Borders would not be straight lines
 - Could cause more efficient land use
- Natural boundaries already exists in some cadastral systems, e.g. Finland and Australian states
- Does the border follow the changes of natural element?
 - Australia: YES
 - Finland: NO

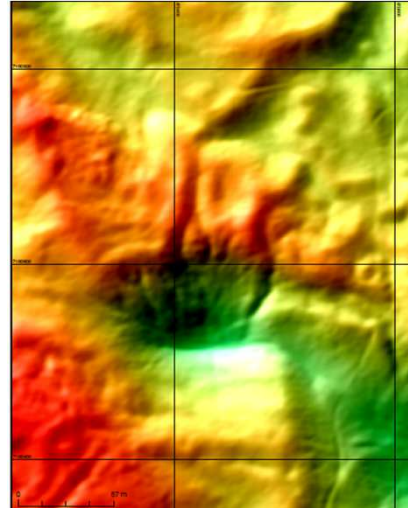


Upthrust in Hailuoto. The red border is determined in 1931 and land rises ca. 9 mm/year

How to do it?

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- Already existing technologies:
- Ortho photos
 - Aerial photo map
 - Frequency of flights is 3 to 10 years
- Lidar data
 - Remote sensing method
 - Produces point cloud from where is possible to determine the land surface without flora

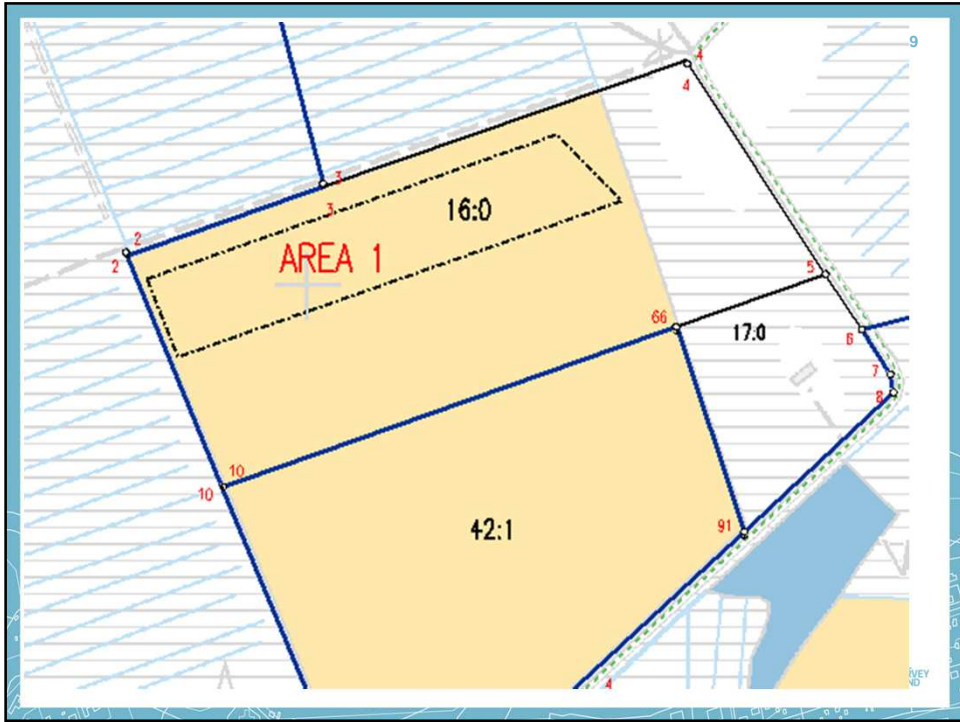


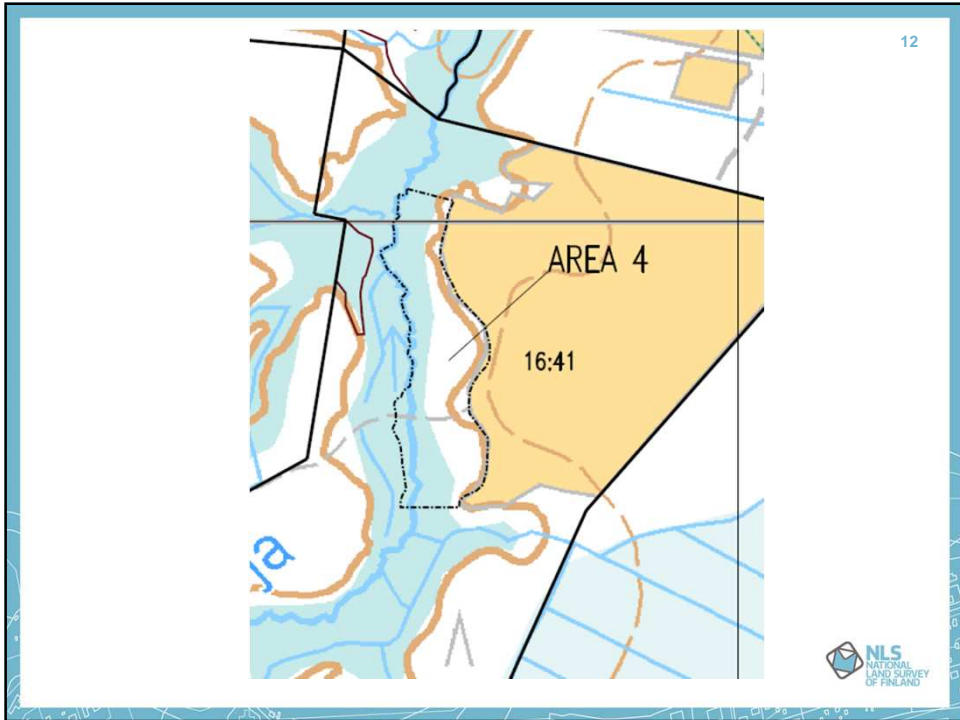
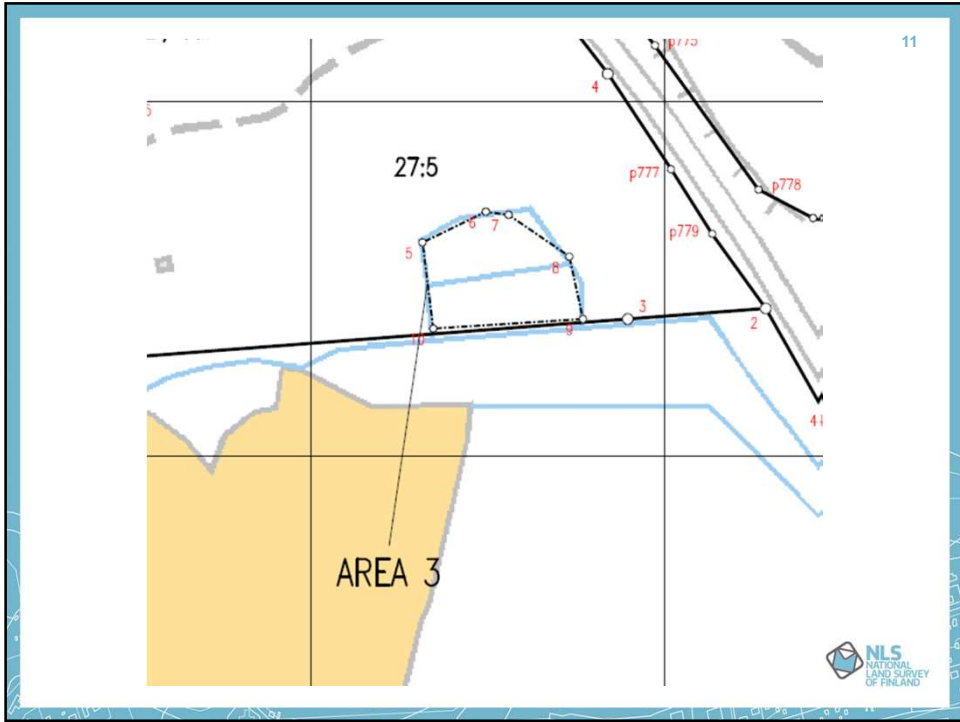
Testing

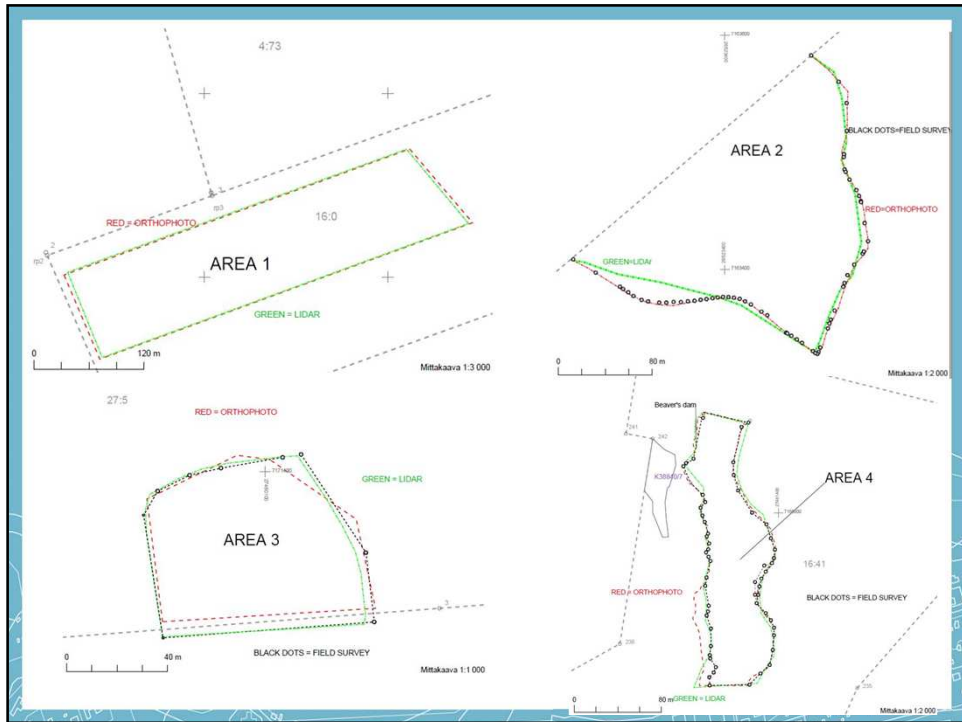
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- Four test ranges
- Determining the borders to natural shapes by ortho photos, Lidar data and field survey
- Comparison and analyzing the results of different methods
 - Point comparison on the field
 - Comparison of areas afterwards









Analyzes

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Test Area 1

	Aerial Ph	Lidar	Field survey	dAP-Lid[ha]	dAP-Lid[%]		dLid-FS[%]
Area [ha]	4,1408	4,0783	X	0,0625	1,51	X	X

Test Area 2

	Aerial Ph	Lidar	Field survey	dAP-FS[ha]	dLid-FS[ha]	dAP-FS[%]	dLid-FS[%]
Area [ha]	3,2771	3,1176	3,2760	-0,0011	0,1584	-0,03	4,84

Test Area 3

	Aerial Ph	Lidar	Field survey	dAP-FS[ha]	dLid-FS[ha]	dAP-FS[%]	dLid-FS[%]
Area [ha]	0,4486	0,498	0,5072	0,0586	0,0092	11,55	1,81

Test Area 4

	Aerial Ph	Lidar	Field survey	dAP-FS[ha]	dLid-FS[ha]	dAP-FS[%]	dLid-FS[%]
Area [ha]	1,3076	1,2725	1,1855	-0,1221	-0,0870	-10,30	-7,34

Comments

At field survey the Lohioja -brook was not able to survey completely. Approximately 40 meters was unable to be surveyed because of flooding caused by a beaver's dam.



Conclusions

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- It is possible to demarcate new border to natural shapes without field surveys with good accuracy
 - After determine the border has coordinates and it is visible on the ground
- Combination of ortho photo and lidar data will increase the accuracy
- This method reduces costs; there is no need to go to the field so often
- Suitable method to rural and low value areas
- Needs changes to legislation and surveyor's attitudes



Thank You!

Questions?

