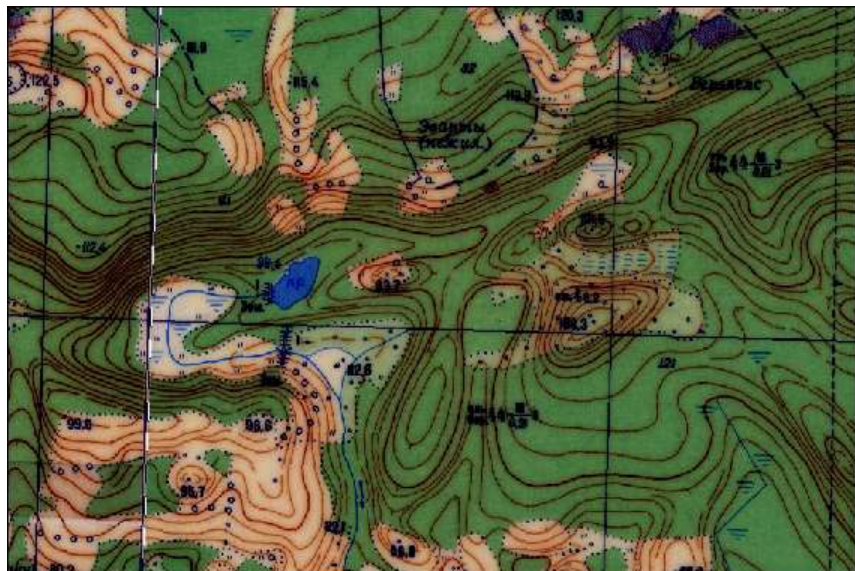


# **Laserscanning in Latvia**

ICOM 14, WOC Trondheim, August 11, 2010



Janeta Turka



Mērogs 1:10 000



Mērogs 1:10 000



Mērogs 1:10 000



Mērogs 1:10 000



- Since 2007
- EOC 2008
- Latvijas kauss
- Three-day orienteering event “Kāpa”
- Weekly competitions- Magnēts
- ...





magnēts  
ATBALSTA



VINCENTS  
grupa



LIELUPE  
Mēģ. Jūrmala, Lielupe



Nem un  
šķiro!

Mērogs 1:10 000  
Augstārtiņnesis ir pēc 2,5 m



ATBALSTA



The first map made on base of Laser scanning in Latvia. Mapmaker – Leonids Malankovs – said afterwards: “This is a revolution in orienteering map making.”

Statistics for recent years of orienteering maps made in Latvia  
Last 3 years with the effort of laser scanning materials

- 2006 – 0/53
- 2007 – 1/42
- 2008 – 25/50
- 2009 – 27/47
- 2010 –
- Together around 100

KOF 896 2008. Ventspils rajons,  
Arncas pagasts  
Irbene

Scale 1:15 000 / Contour 2,5 m



# EUROPEAN ORIENTEERING CHAMPIONSHIPS

Ventspils, Latvia. 25 May - 2 June 2008



General sponsors:



LATVIJAS KUĢNIECĪBA



Printed on G-Print 115 g/m²

R R R

One of the most difficult and the best map in Latvia (scanning was done in summer of 2007)

**SIA Metrum** (surveying company, provider of data)

- Leica Airborn Laser Scanner ALS50 Phase II (known as LiDAR)
- Costs – depends on territory and technical parameters of scanning - point density, accuracy

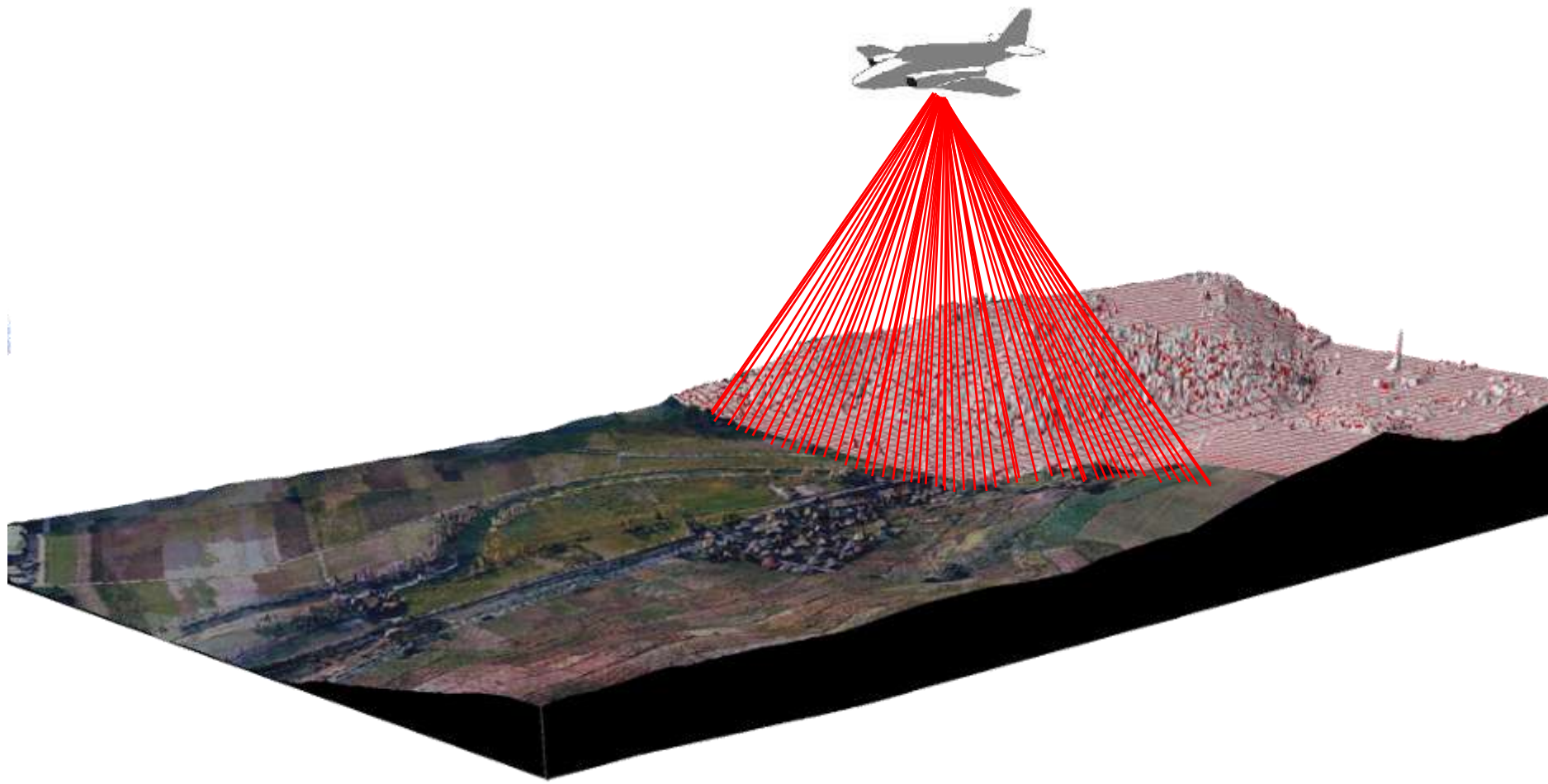
Costs – up to 30-50 LVL km<sup>2</sup> (existing data)

(minimum cost 100 LVL for a map)

100 km<sup>2</sup> (compact) – 4000 LVL

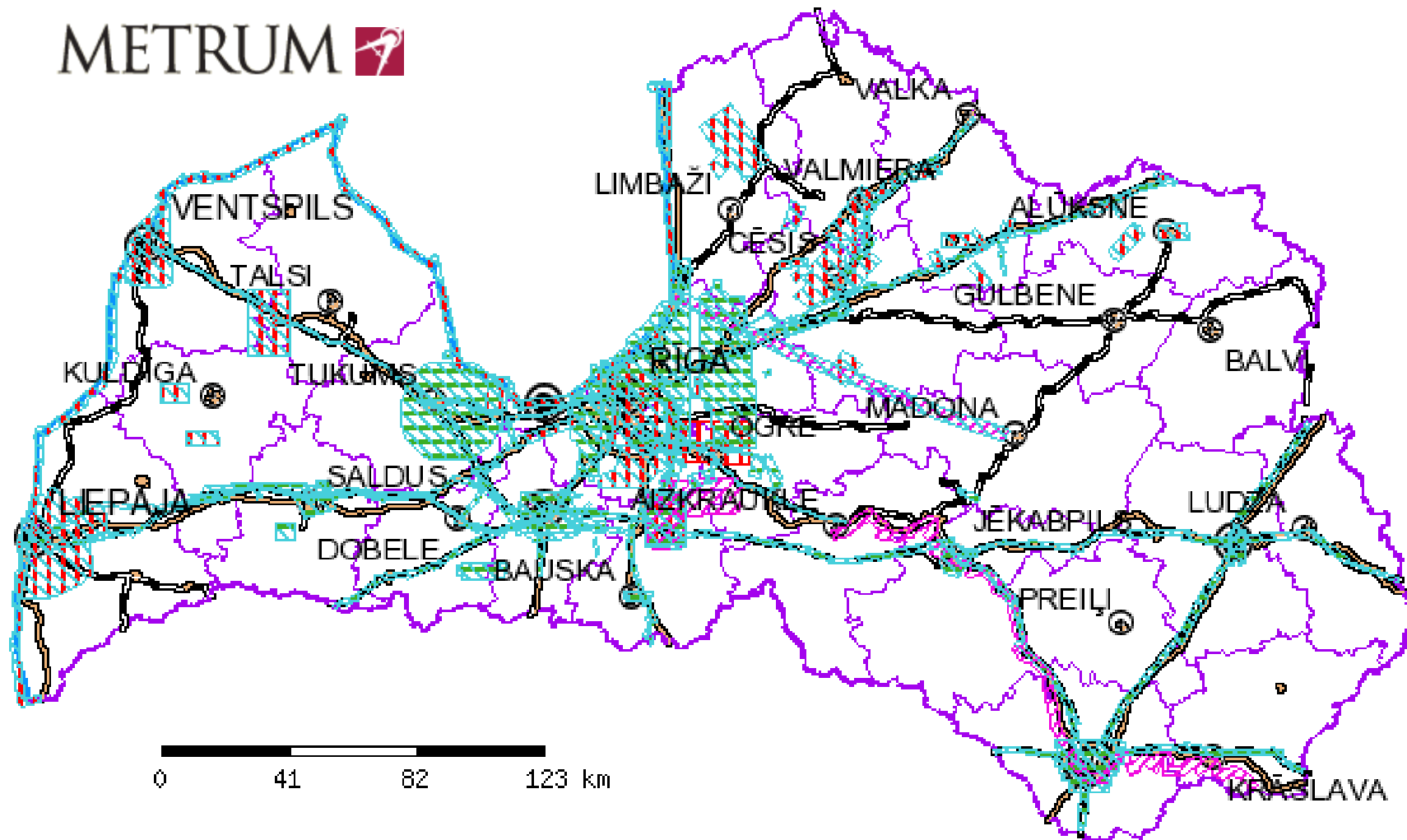
(minimal cost for flight – 2000 LVL)

100 LVL = 140 EUR



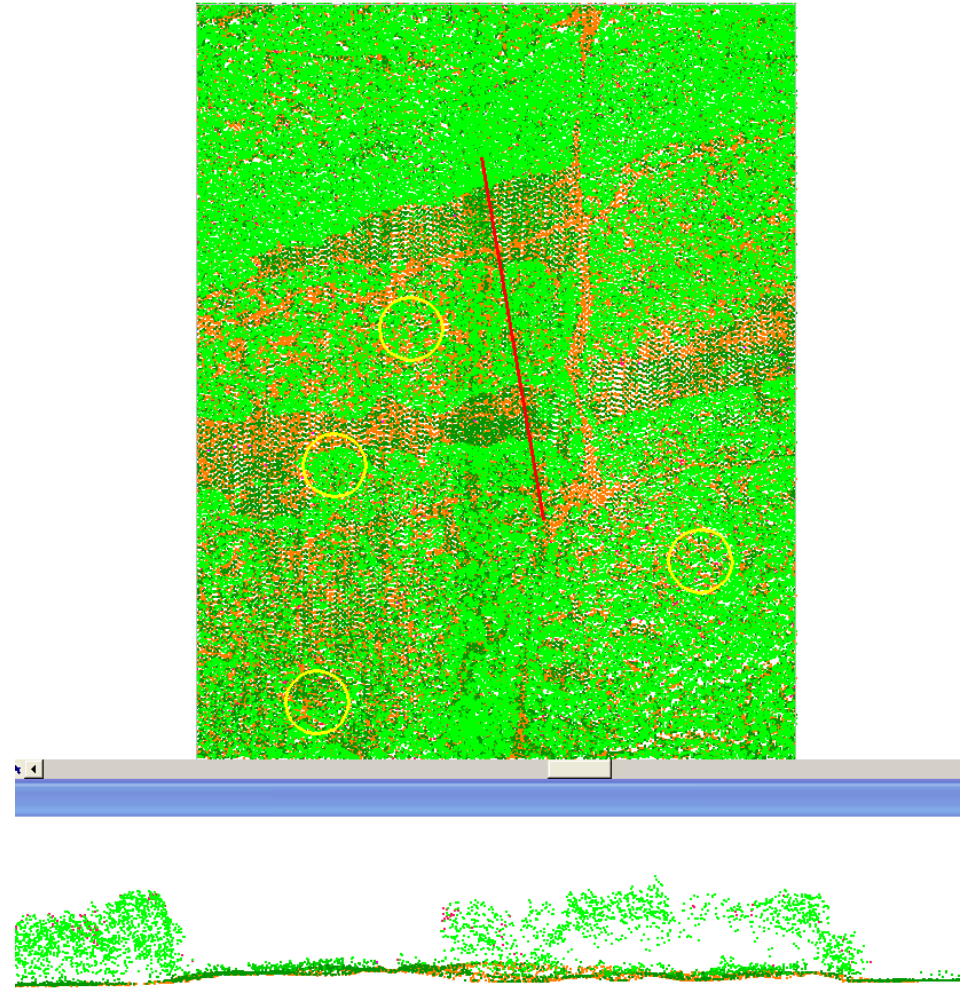
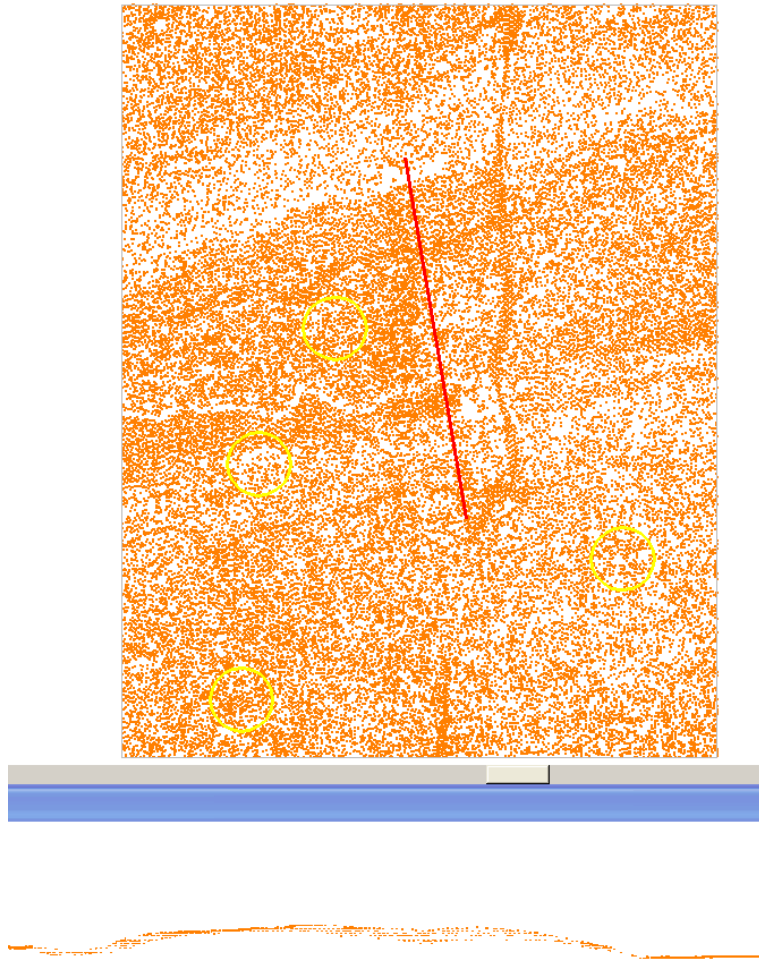
Technical view on laser scanning – multiple reflection from different objects on the ground, also ground itself which is point of our interest – surface of the earth – relief. Differences in the data processing.





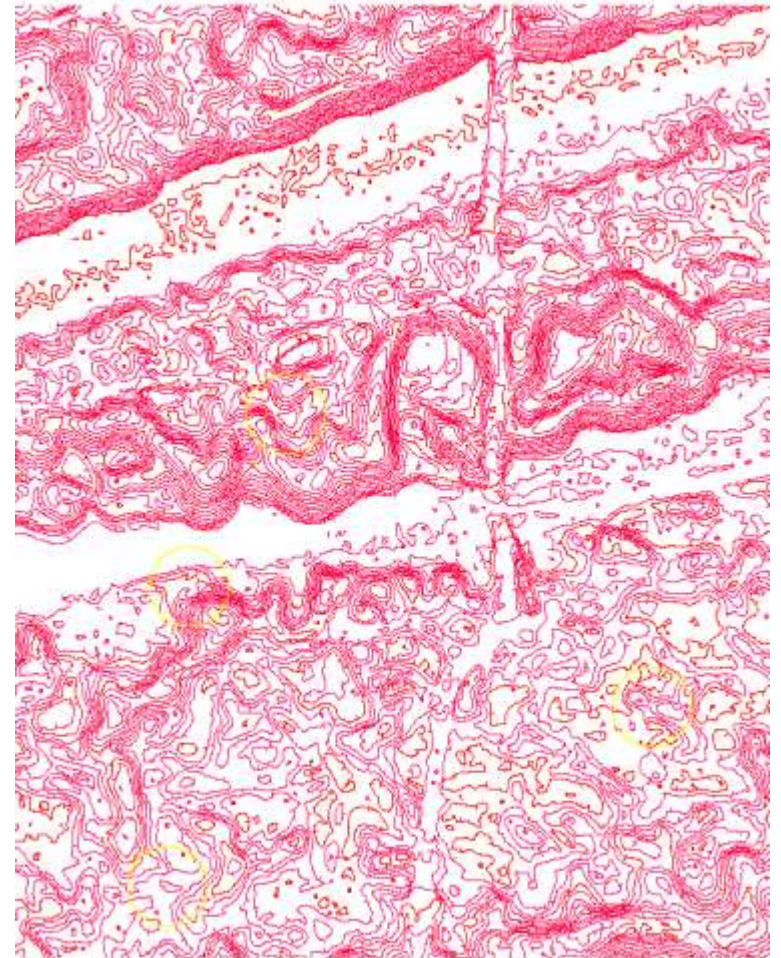
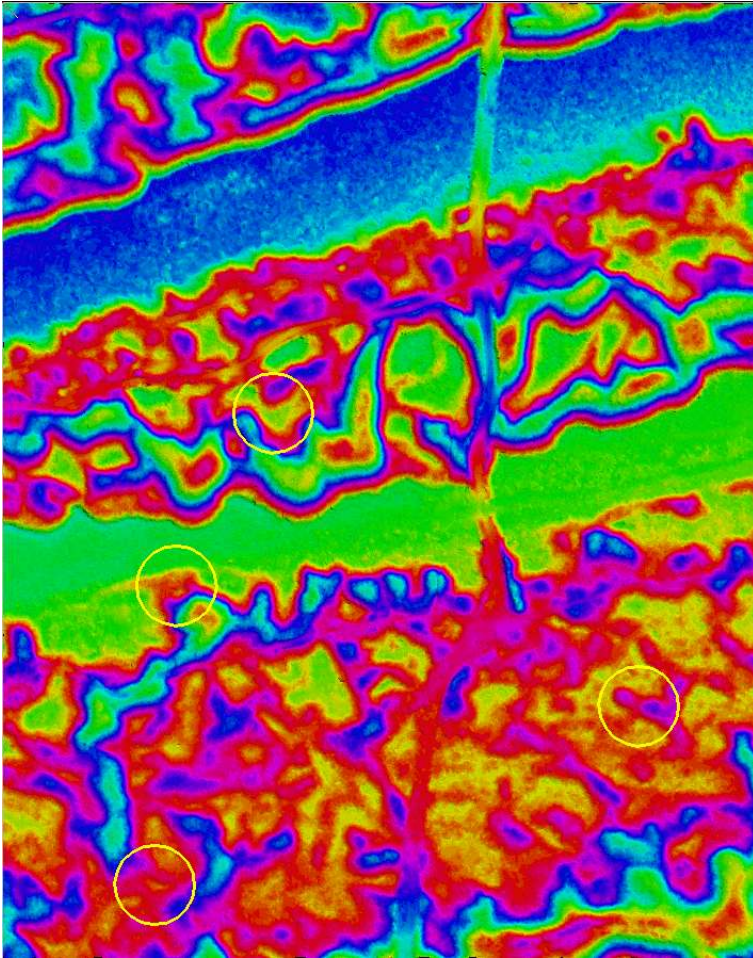
The existing scanned areas in Latvia. Some of them were scanned especially for Orienteering maps – Ventspils, Tērvete, Snēpele, Īvande – connected to other projects. Lately orienteering map makers don't order scanning of new territories but tend to make maps in territories where there already have been scanned, like area around Riga. Lot of old maps has been redrawn by using laser scanning data.

# Technical data on Irbene map making



Based on multiple refraction the point density varies due to terrain – 4-15 point/km<sup>2</sup> in Forest areas and 2-4 point/km<sup>2</sup> open areas. Afterwards the data are being classified based on the height in several groups -ground control points in brown colour, separately low and high vegetation in green colour, other objects like buildings etc. You can also see the data crosssections – relief or vegetation, etc.

# Technical data on Irbene map making



From the classified ground points the ground surface has been created, which can be represented by the contours with high detail. Contour intervals 0,5 meters (though usually in field work use only 2,5 or even 5 m contour interval and then put the necessary ones).

# Technical data on Irbene map making



There are also a scanned data file which consists of reflected signal strength out of which the intensity view has been made. And also joined with contours. (It is also possible to combine them in different ways.

All these materials are available for our mapmakers for all the territories which have been scanned.



Fragment of the final orienteering map Irbene for the same area as previous samples. Comparing all the materials and the final map, can be seen what could be used to make this map.

- Laser scanning improve the quality of orienteering maps and make the mapmaking process faster and more efficient
- The generalisation of orienteering maps is extremely important so as to make competition maps as legible as possible at running speed
- New technologies encourage more and more detail to be inserted on the map and clutter the base maps. It may encourage the mapmakers to transfer these new features from the base map onto the final orienteering map

# Accessibility of laser scanning in Latvia has led to:

- **increase of orienteering maps made per year**  
(can be considered both – good and bad. Good – more new maps, bad – the quality of maps because the time spent on field work decreases and therefore the quality also decreases)
- **increase of number of orienteering map makers without corresponding knowledge**  
(orienteering maps usually are made by non-professional mapmakers, even though there are some principles of traditional cartography, which should be known and taken into consideration) also in Latvia our best mapmakers say that now with accessibility of laser scanning data almost everyone can draw an orienteering map (because the most difficult part has been drawn before – contours)

# Accessibility of laser scanning in Latvia has led to:

- **decrease of use of other base materials or technologies used before** (GPS, orthophoto, topographic maps, photogrammetric or surveying technologies, remote sensing, etc)
- **decrease of sense of generalisation instead of increasing** (as we know - The generalisation of orienteering maps is extremely important so as to make competition maps as legible as possible at running speed – and therefore in Latvian orienteering maps the amount of contours, especially semicontours (which for EOC2008 maps were criticized) increase)



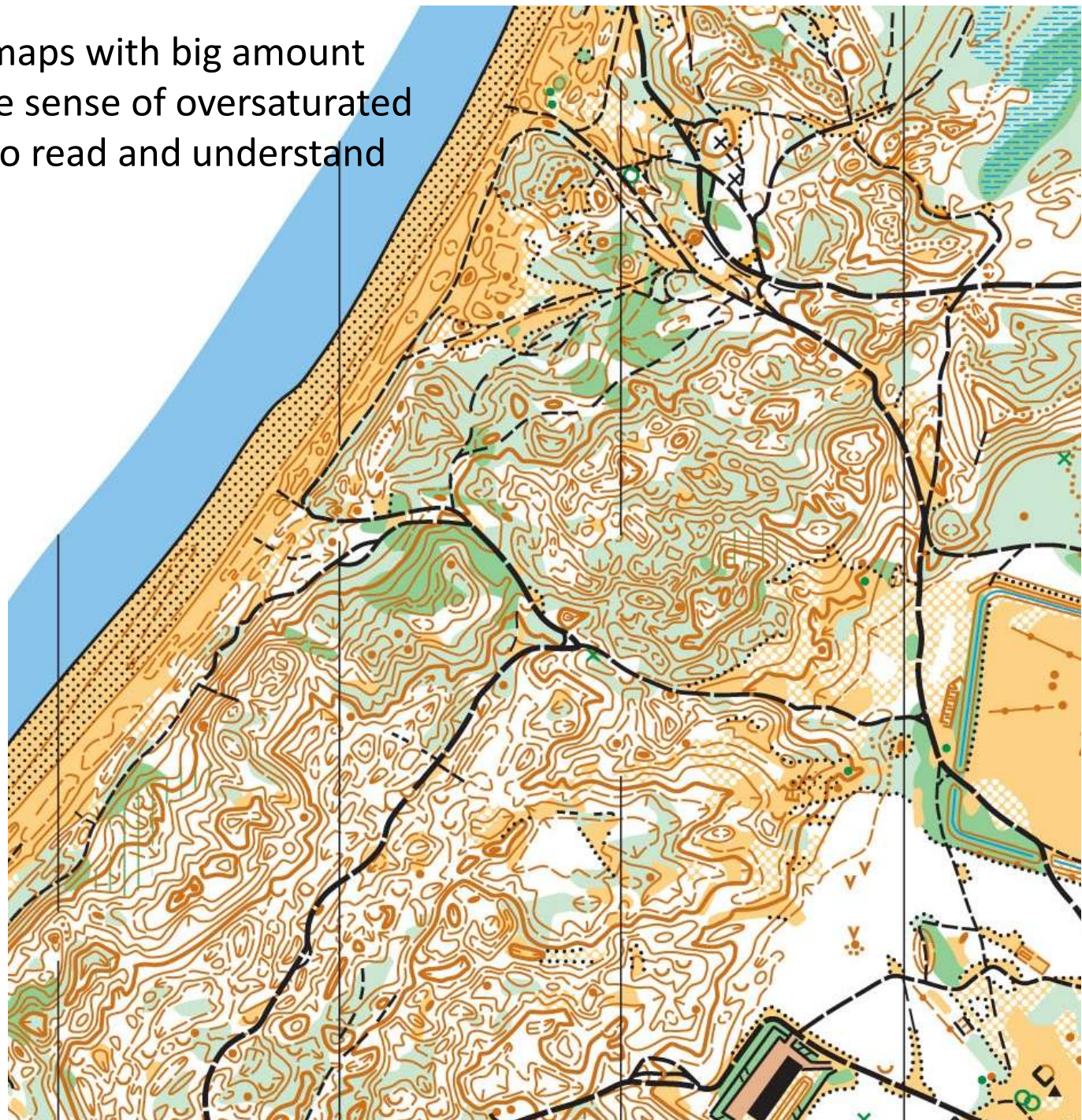
# Accessibility of laser scanning in Latvia has led to:

- increase of amount of small details in **orienteering maps** (as we know New technologies encourage more and more detail to be inserted on the map and clutter the base maps and teoretically we know that this may lead to transfer these details to final map as well. Maps became harder to read, they are oversaturated with objects and also orienteering becomes not so easy. Finally this has led to changes of the scale – more maps are made in scale 1:7 500. That also changes the idea of orienteering (or at least part I understand) – navigation through terrain and finding controls not trying to not getting lost in all those simbols and objects in map. From side of course setters (map orderers) this is more interesting to set the course and makes the map legible for using many times . From other side – runner – it becomes harder to understand where you are because the system (scanner) has the sensivity to detect small changes in altitute, those people can not detect and it may happen often that there are such contour or even semi contour details human can't detect.)

# Problems

- Too much details
- Form lines
- Reduce of scale (1:7 500)
- Changes orienteering itself

Sample of one of the maps with big amount of small details and the sense of oversaturated details, which is hard to read and understand in running speed.

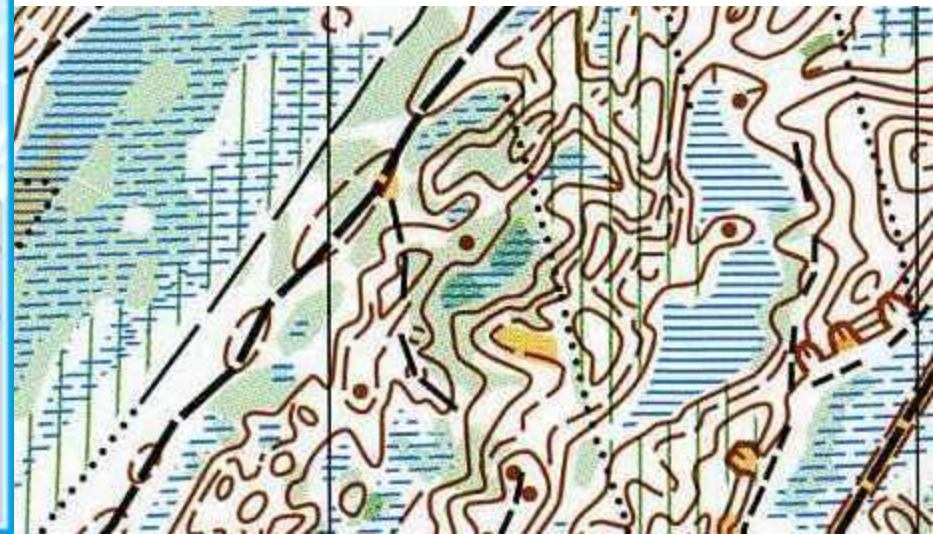


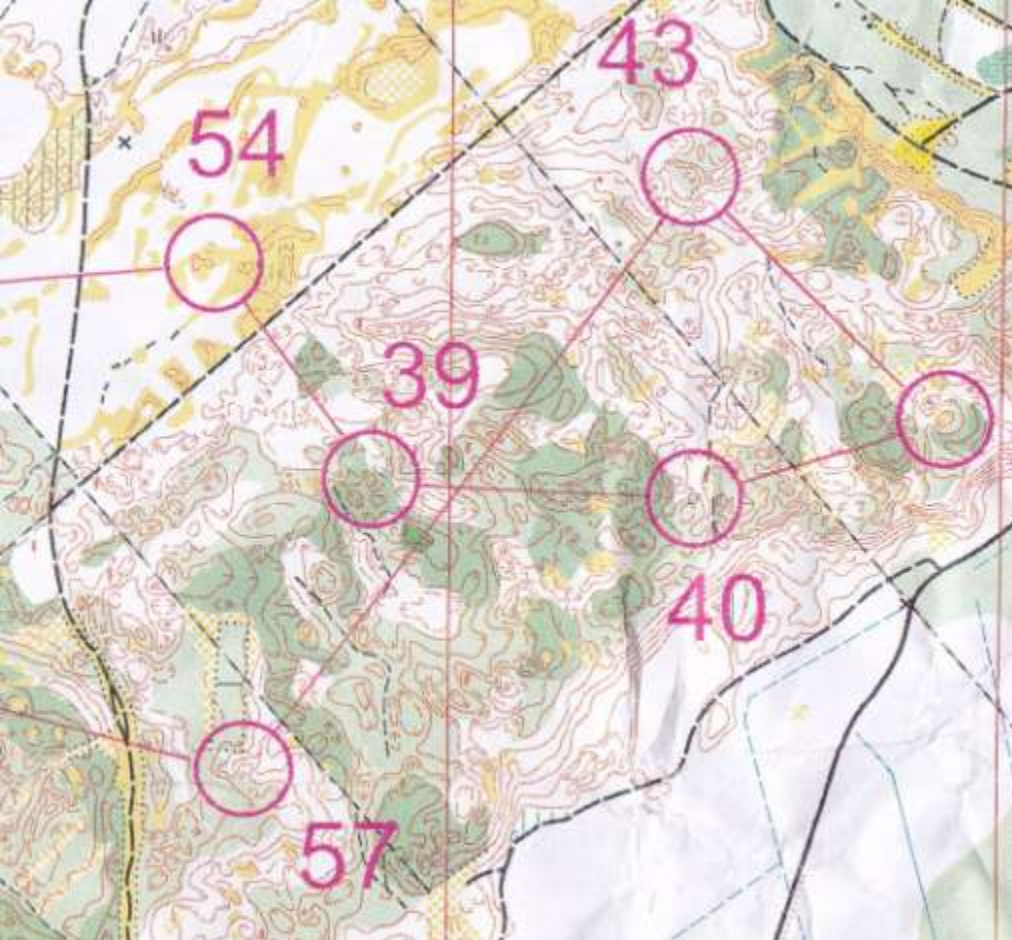
Scale 1:10 000  
Contour 2,5 m

899  
2008 Vertikāli rādīt  
Izstrādājis  
Jansons 2  
LOF



Also semicontours is one of the problems  
Map from EOC2008, middle distance,  
criticized for excessive use of form lines.  
Sand dune relief is flat, so it is tended to  
use more form lines also in cartography.





The old map and the new map of the same area.  
New based on laser scanning – the amount of small details has increased noticeably.



Despite the problems, laser scanning data becomes more and more popular in orienteering map making in Latvia, especially in sand dune relief as it is one of most difficult and interesting.



Mērogs / Scale **1:10 000**  
Augstummēlīknes līk pēc / Contour **5 m**

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**VASARĀ**

PIEDZĪVOJUMU PARKS  
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GARĀKĀZE NOBRAUCIENI LATVIJĀ  
KRĒSLU PACĒLĀJIS  
KĀLNĀJ KĀMARIŅAS  
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SLĒPOŠANAS UN SNÖVBORDA INVENTĀRA NOMA  
PASĀKUMU ORGANIZĒŠANA

[www.ozolkaļns.lv](http://www.ozolkaļns.lv)

**Cēsu rudens - 2008**

20. septembris, Ozolkaļns  
un Cēsu rajona atkārtais čempionāts orientēšanās sportā



Šīs kartes autors:  
Leonīds Malenkovs 2008. g.  
Karte sagatavota SmartGIS



All the previous examples were from maps in sand dune relief. Also this map with bigger relief forms and more dense forest were made by using laser scanning data. Based on knowledge we got, laser scanning data are more suitable for very detailed relief, with small relief forms. There it suits better to the real situation.

# DIGITAL Area data



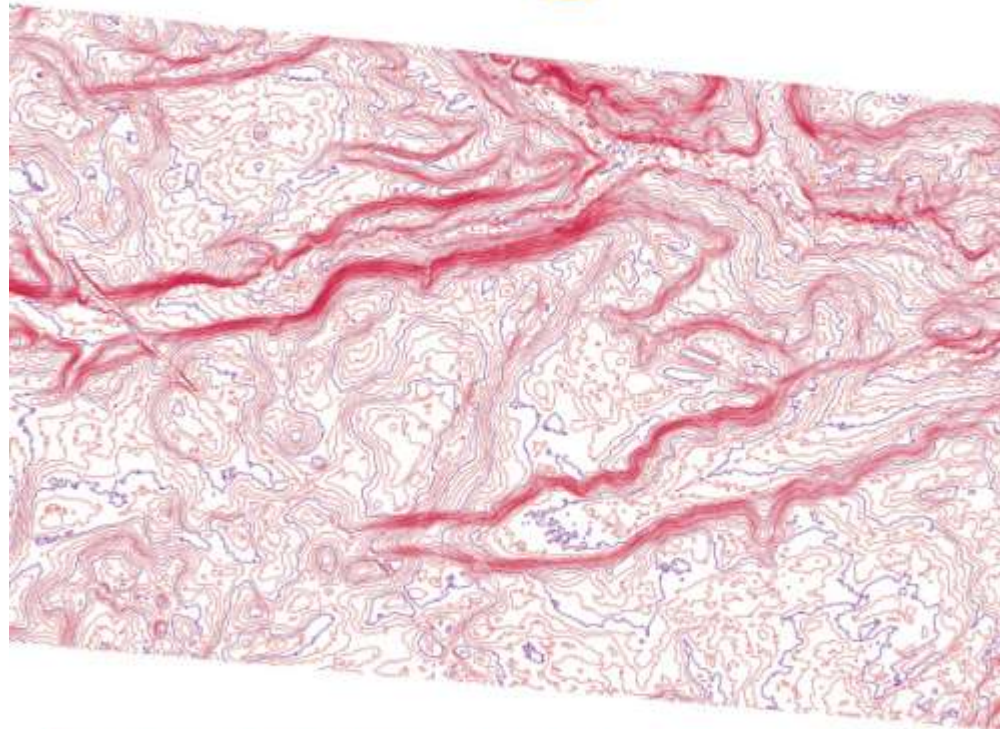
**METRUM** 

- Topogrāfija
- Robežu plāni
- Zemes ierīcības projekti
- Aerofotogrāfēšana

Bezmaksas info 8000 8100

From the scanned data you can get the intensity view.  
This is one of the material being produced from scanned data by our Surveying company.

# ORIENTIERING MAP With Digital Data



**METRUM** 

- Topogrāfija
- Robežu plāni
- Zemes ierīcības projekti
- Aerofotogrāfēšana

Bezmaksas info 8000 8100

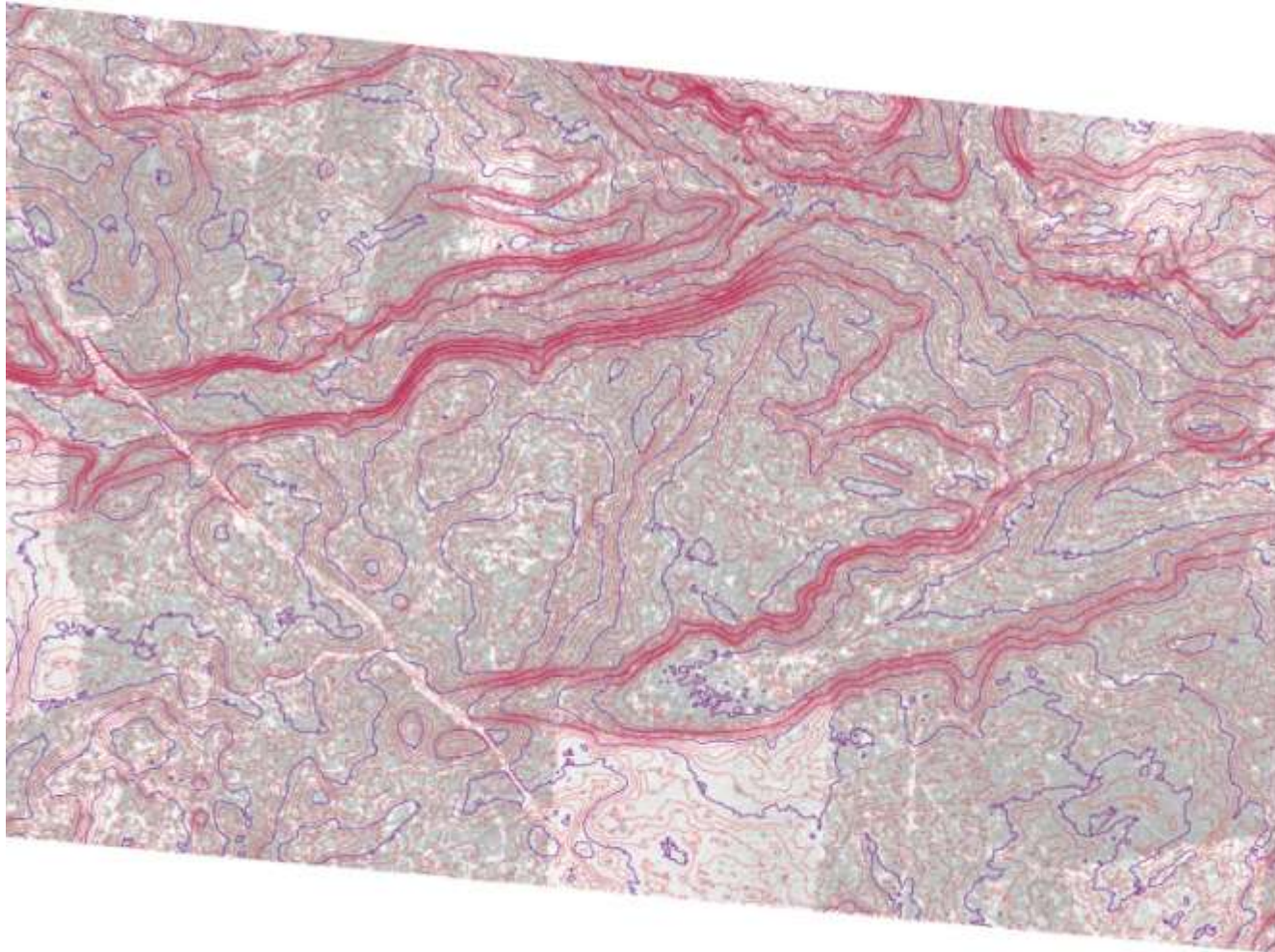
**Digital contour**

**Contour 50 cm**



# DIGITAL

## CONTOURS data + AREA data



# Orienteering Map!

