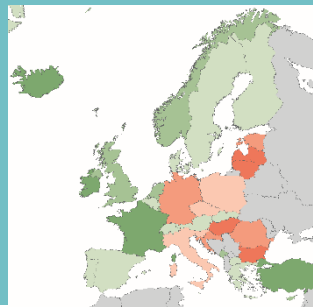
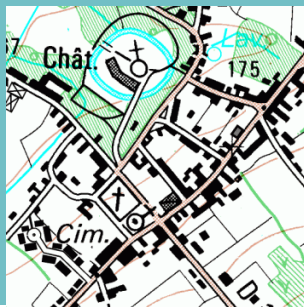


# The Latest Mapping Developments and Technologies

Gian-Reto Schaad, OCAD AG  
Big 5 O Week 2015/2016, Kaapsehoop, South Africa



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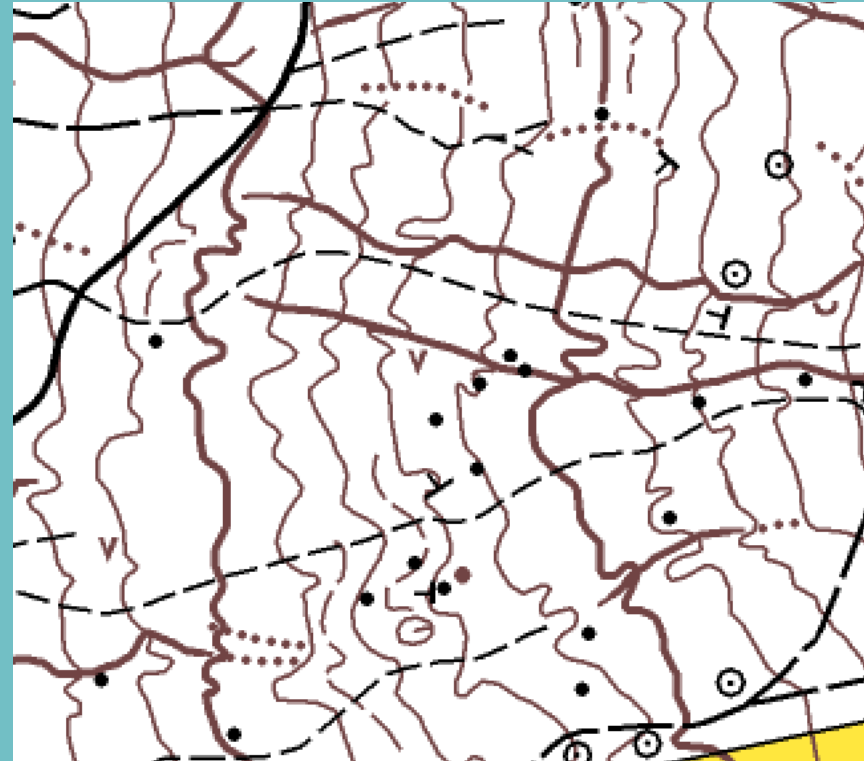
**OCAD**<sup>+</sup>  
the smart software  
for cartography

# Contents

- About Me
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- Mapping Technologies
- Special Maps, JWOC Project
- Future

# About Me

- Grown up in an Orienteering family
- Starting mapping with 17 drawn with OCAD
- Survey Engineer and IT
- 2003 Software Engineer at company OCAD AG



# About Me

- Member of Mapping Commission Swiss Orienteering
- Mapping smaller projects as spare-time job
- In charge of maps for
  - Swiss O Week 2011, Flims/Laax
  - Ski O European Champs Lenzerheide, January 2015
  - World Cup Final Arosa, Oktober 2015
  - JWOC Scuol, July 2016

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# Company OCAD AG, OCAD Software

- **Hans Steinegger** (OLV Zug) started to develop OCAD in 1988 in his spare time
- First **OCAD drawn orienteering map** «Schneitwald» used in Spring **1989** for a national event of OLV Zug
- Big success of OCAD started in the 90s
- **OCAD leading** orienteering mapping and course planning software
- 6 employees, based in Baar, **Switzerland**

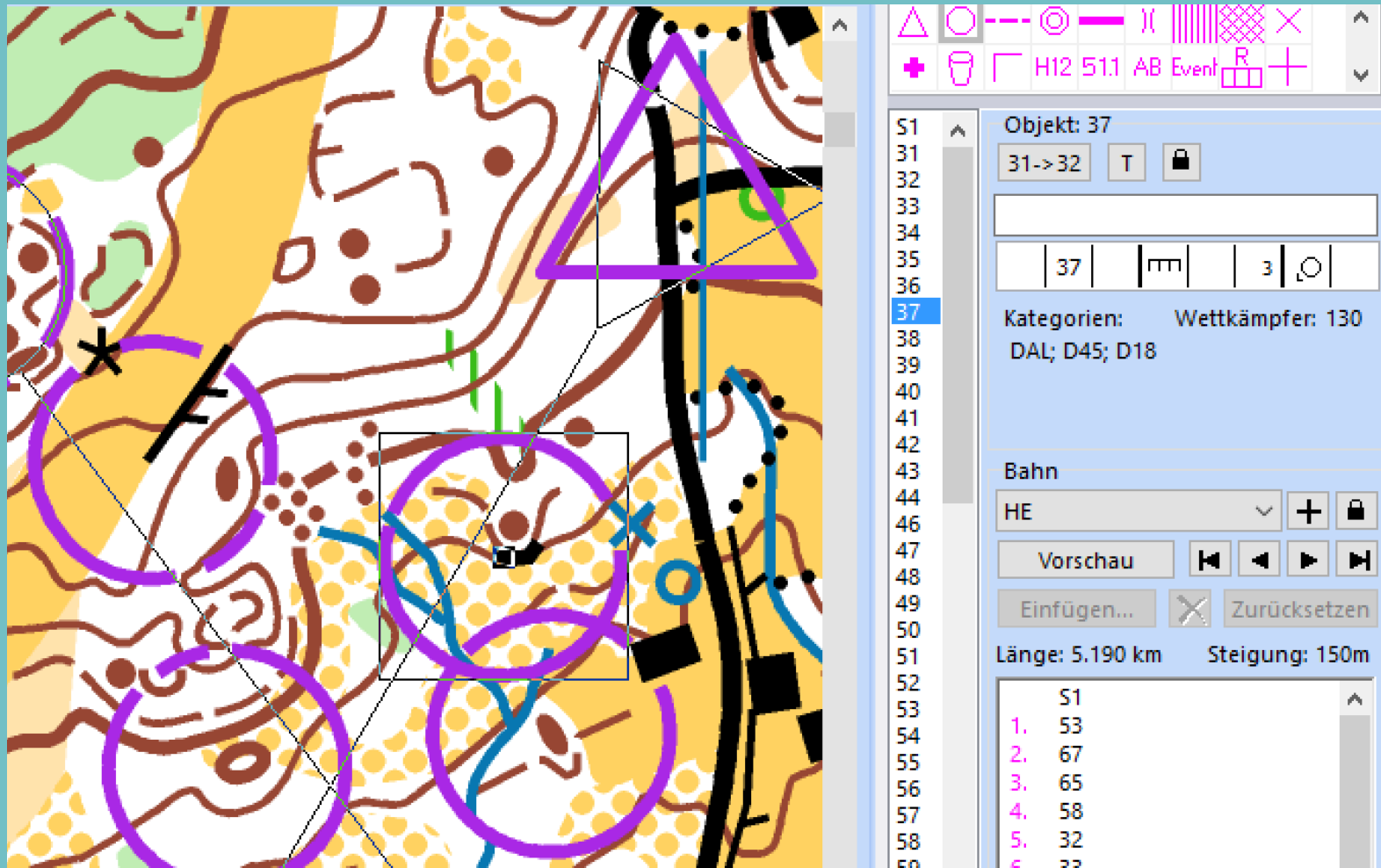
# OCAD Software

- **OCAD 12** released October 2015
- **7 different editions** for orienteering sport and publishing companies

**OCAD 12**  
Orienteering

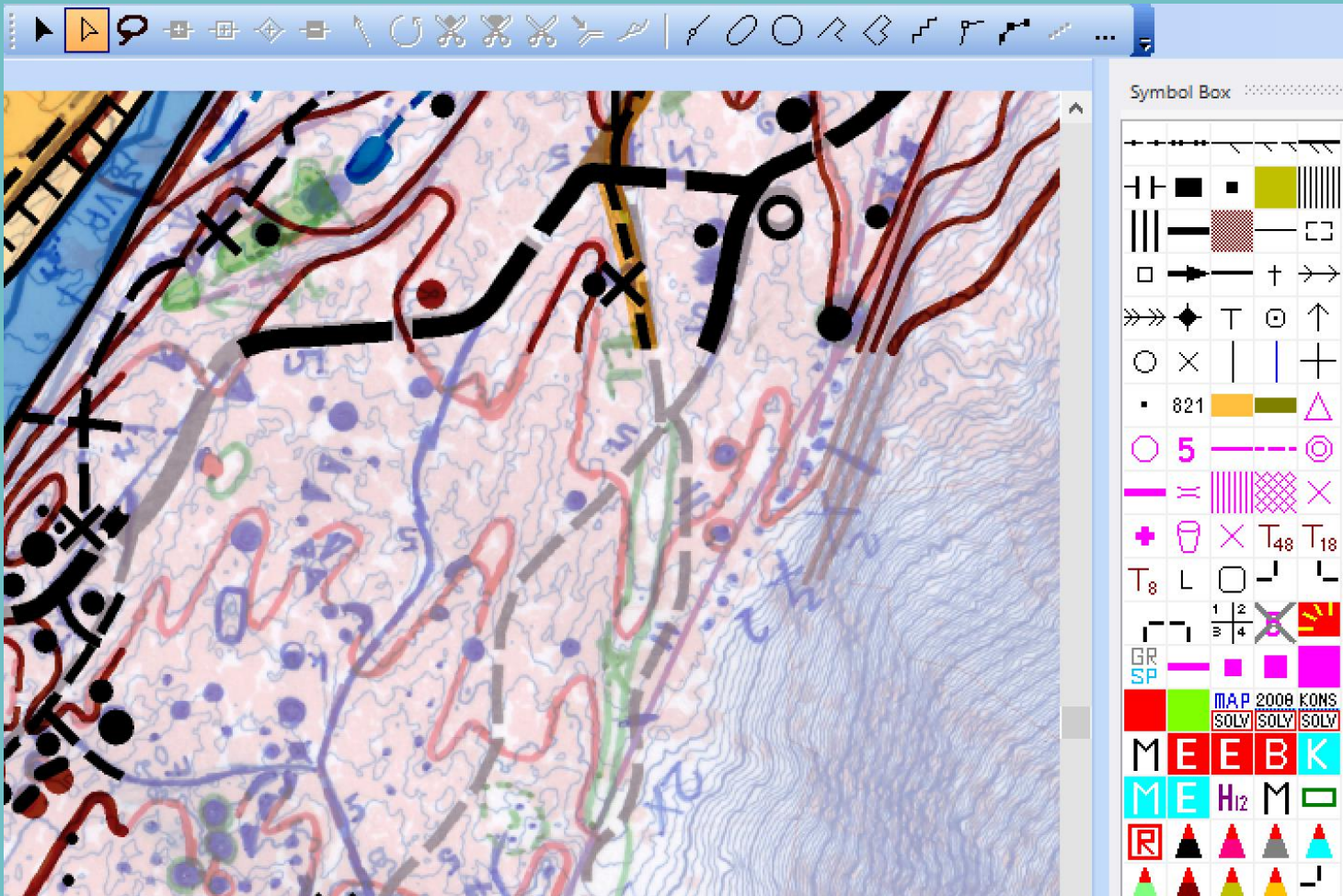
**OCAD 12**  
Course Setting  
for Orienteering Sports

# OCAD – Course Planning





# OCAD – Map Drawing



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# Orienteering Map History

- International Orienteering Map Specifications **ISOM** since 1969
- Slightly changed, current edition **ISOM 2000**

# Milestones

- Base map: special **photogrammetric base maps** from arial images in 70s
- Map Drawing: first **computer drawn maps** in 1988
- Field work: laser distance meter in 90s
- Field work: mapping with **tablet computer and GPS** around 2000
- Base Map: **Airborne Laserscanning (ALS)** Data in 2005

# General about Mapping

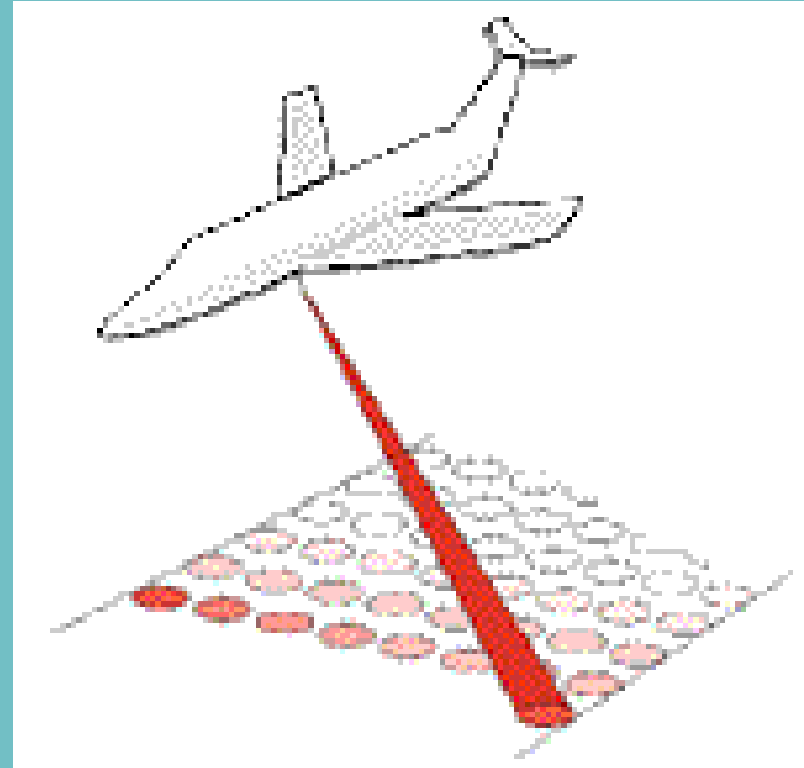
- We do not go in the terrain with white sheet
- The better your base map is the faster your field work
- It is important you always know your current position on the base map when doing field works
- It is worth to spend some time and money in a good base map

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# Airborne Laserscanning

- Laserscanner mounted on air plan or helicopter, scans the terrain
- Capturing 3d data of large areas in short time
- Result: Point cloud with information about terrain and vegetation



# Airborne Laserscanning Data

- Forest: Canopy, ground and intermediate points
- Point: Coordinate, elevation, return type and signal intensity
- Determinate classification (ground, vegetation, water, building, ...)

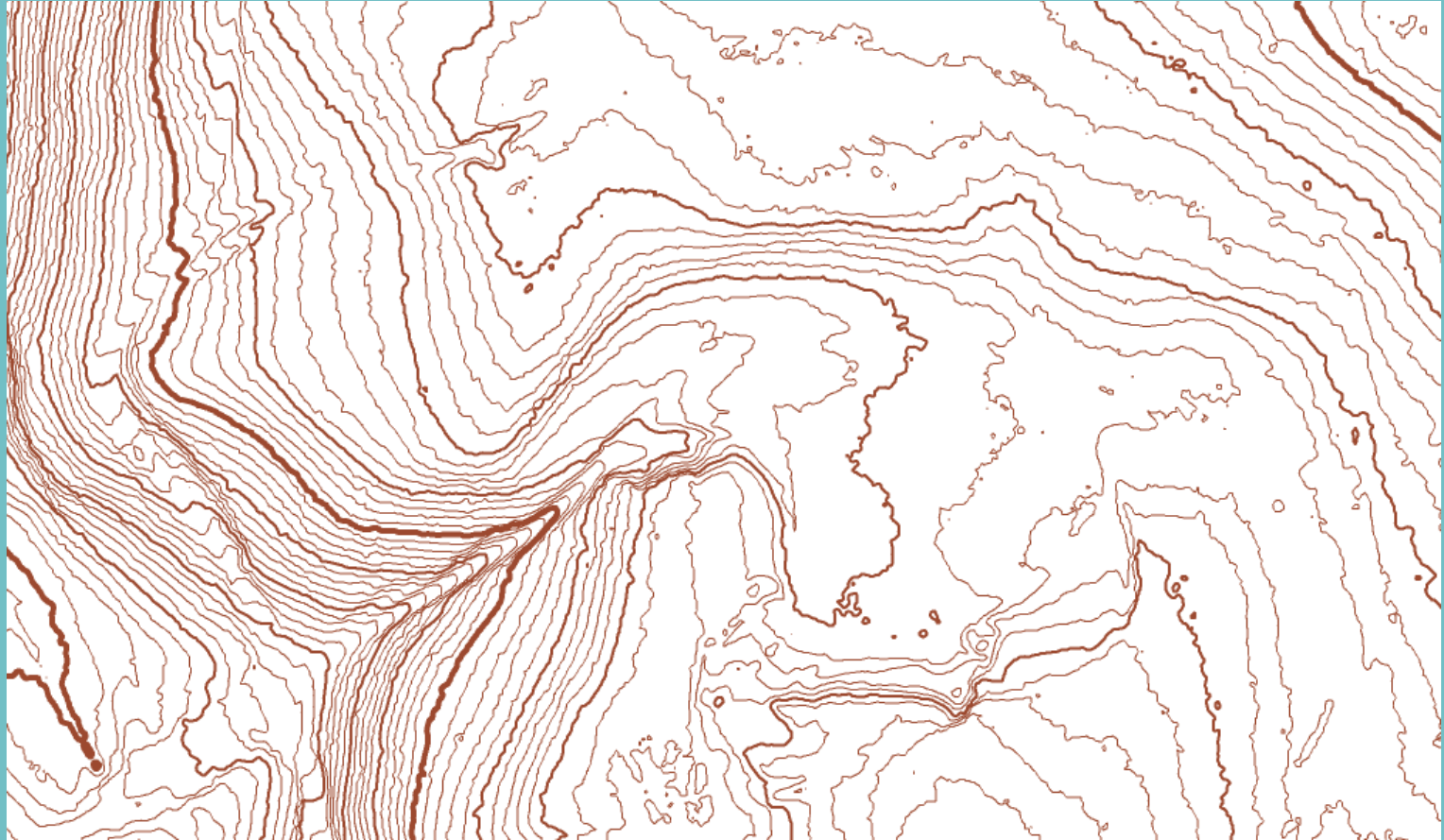




# ALS Data in Switzerland

- Completely covered since 2004 up to 2000 m asl (purpose: agriculture and forestry), **1 point per 1 m<sup>2</sup>**, data is available
- ALS is new technology -> development is very fast
- Newest data from 2014 from Canton of Zurich (flood protection)  
**50 points per 1 m<sup>2</sup>** in the forest (15 points on ground, 35 vegetation points)  
5 km<sup>2</sup> forest: 250 M points, 8 GB data size
- Very high resolution

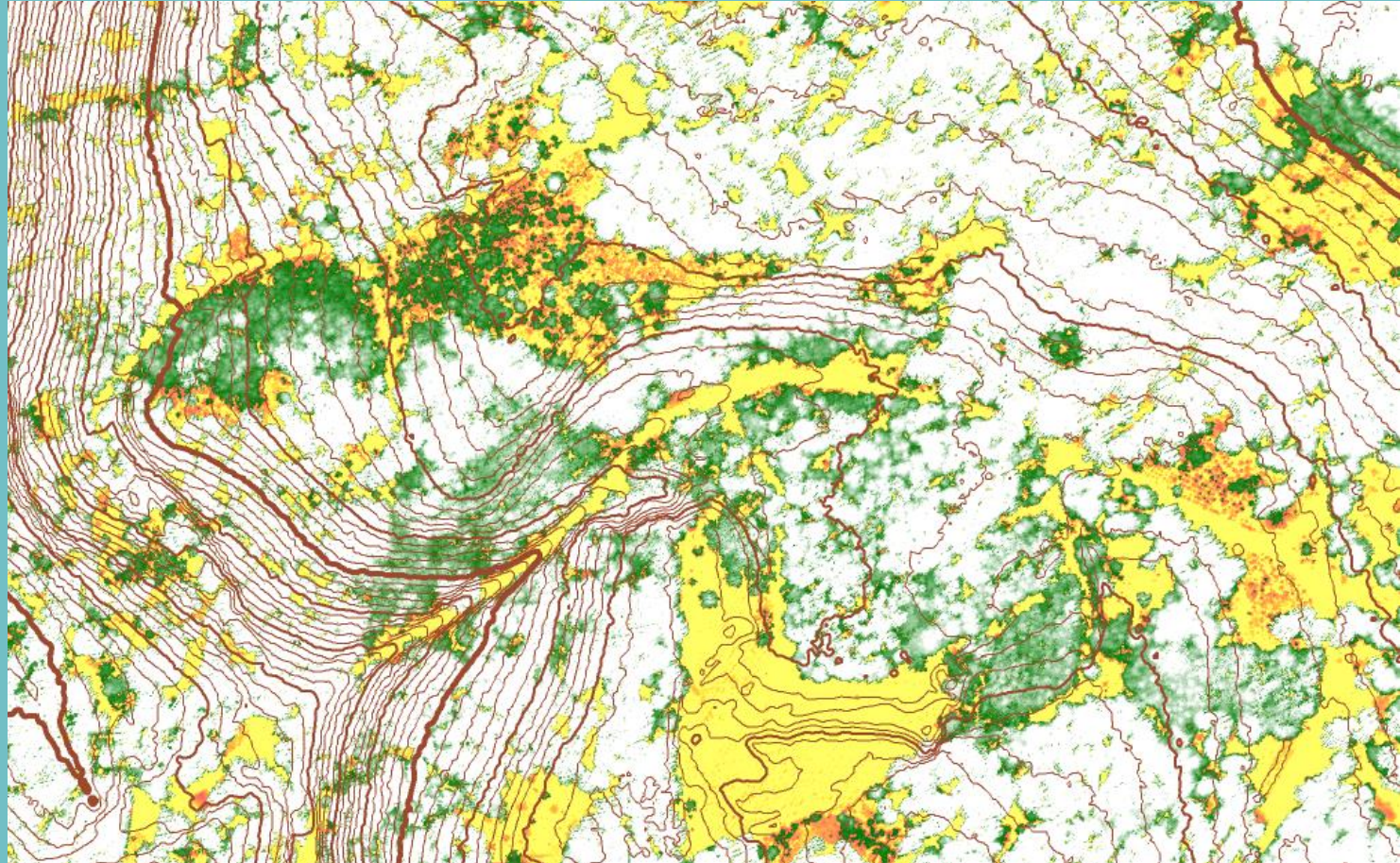
# Contour Lines



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# Vegetation Height Map

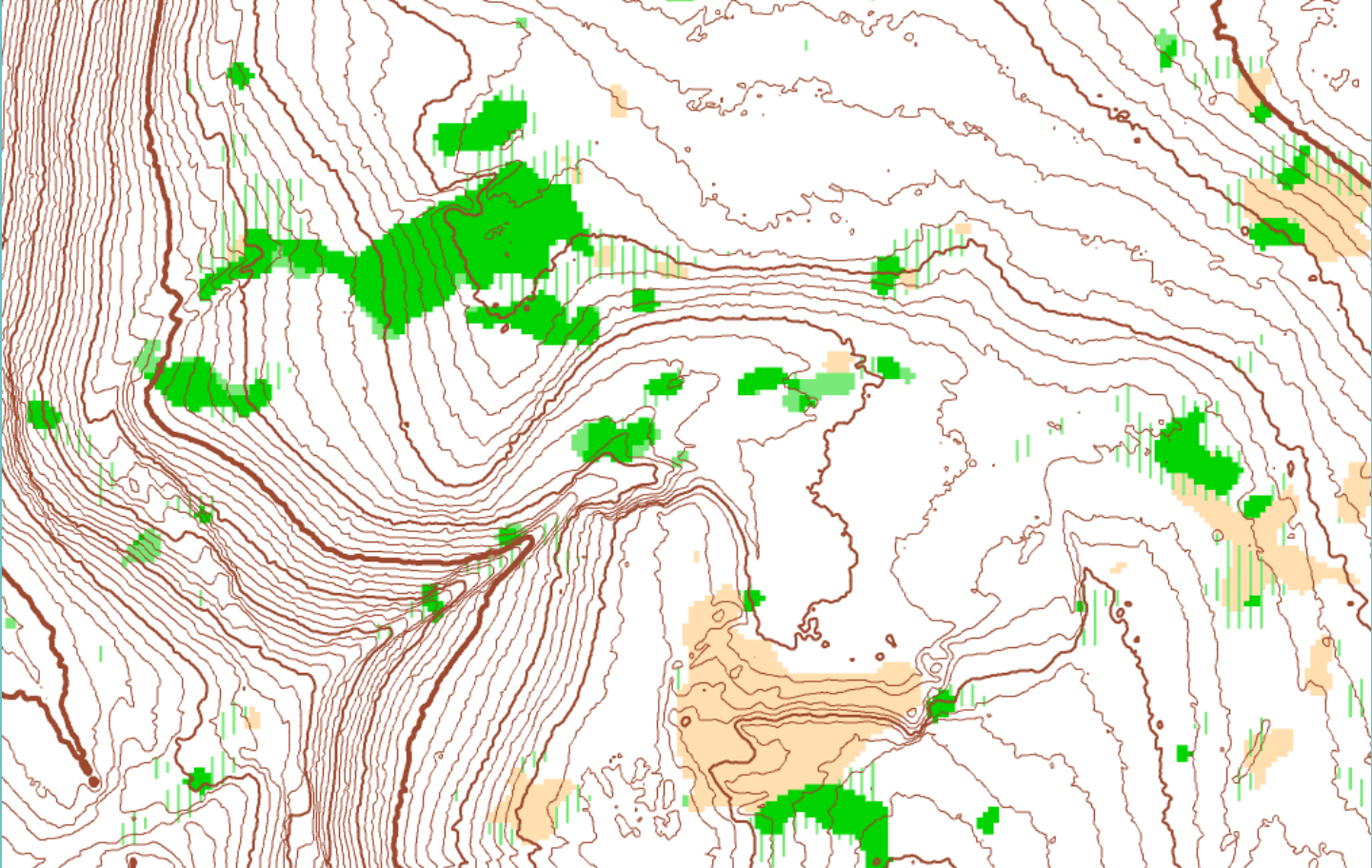


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# Vegetation Map



# Intensity Map

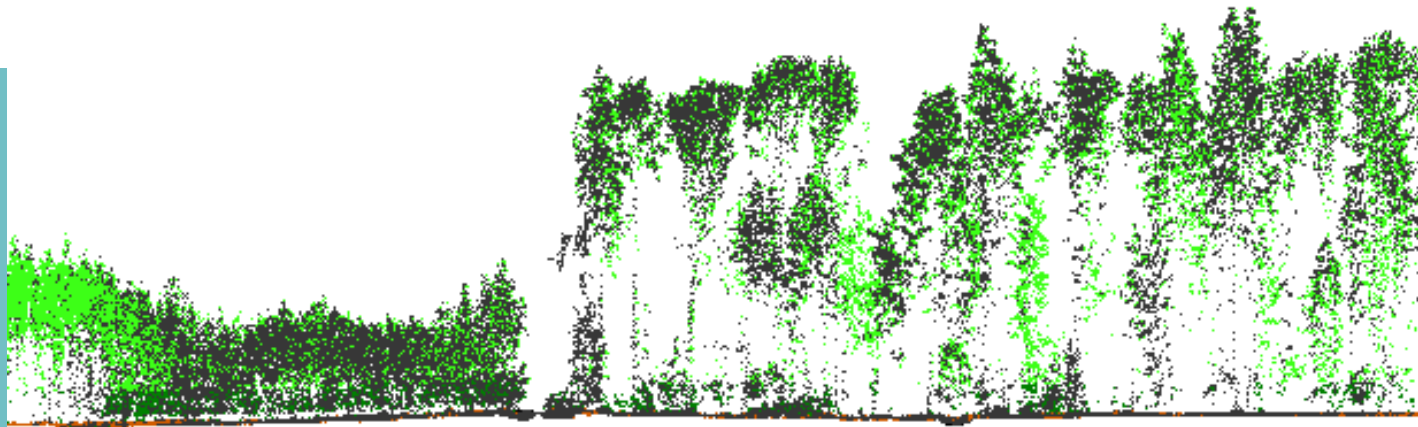
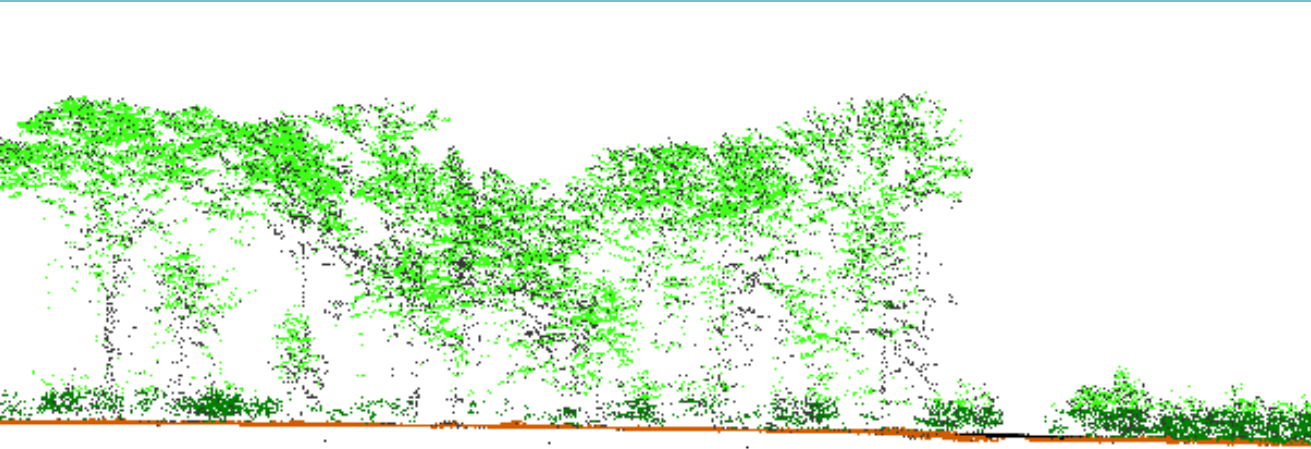




# Hill Shading



# Cross Profile



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# Base Map Examples

- Urban sprint map «Ardez» using data from catastre data
- Forest map «Isenberg» based on ALS data



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# Swiss O Week 2011 Flims-Laax

- 6 Days event with 4000 orienteers
- Terrain between 1000m and 2700m asl

# Stage «Vorab», Start on 2600m



# Snow Fields

- Stage «Vorab»: Snow fields mapped with light blue color  
*How big are the snow fields at the competition day? Snow melts...*
- Finally, we mapped one year before the event. Result was quite good.



# Ski O European Champs

- Ski tracks mapped with GPS



# Ski O European Champs



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# Ski O European Champs

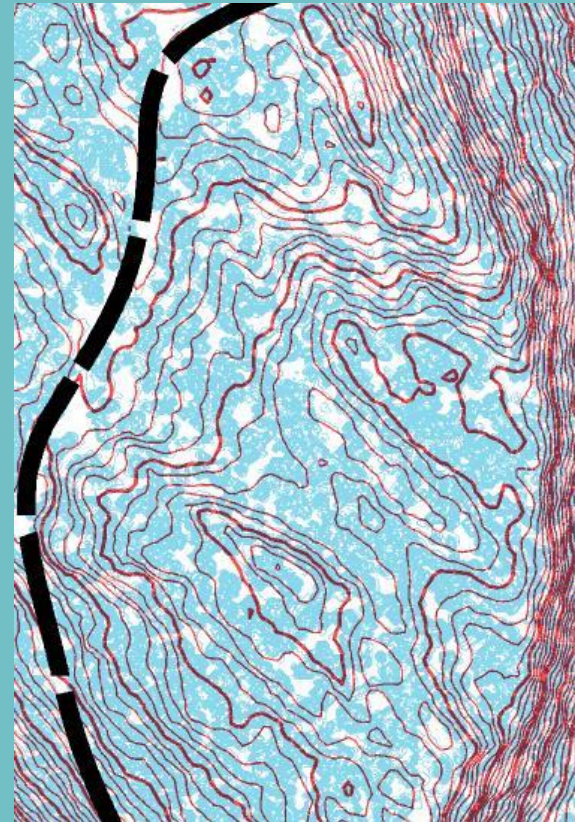
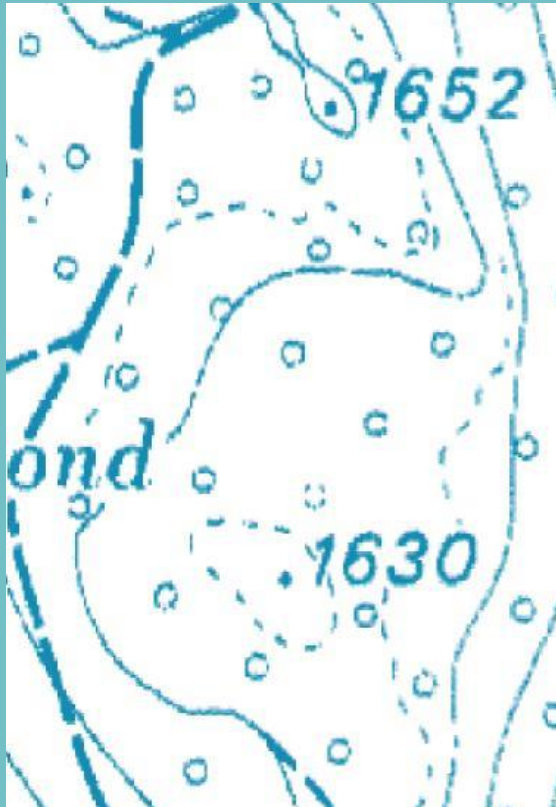


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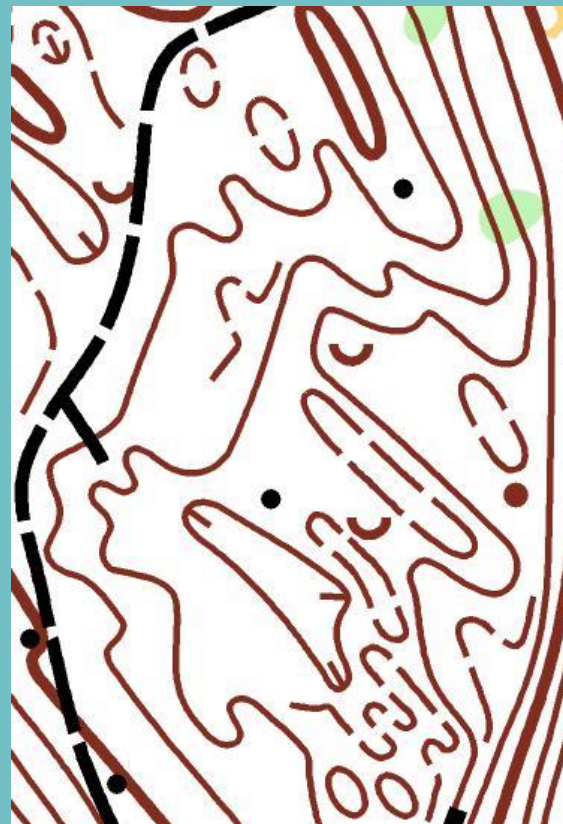


# Swiss O Long Champs «Got Grond»





# Swiss O Long Champs «Got Grond»



# JWOC / SOW 2016

- 2 weeks in July 2016

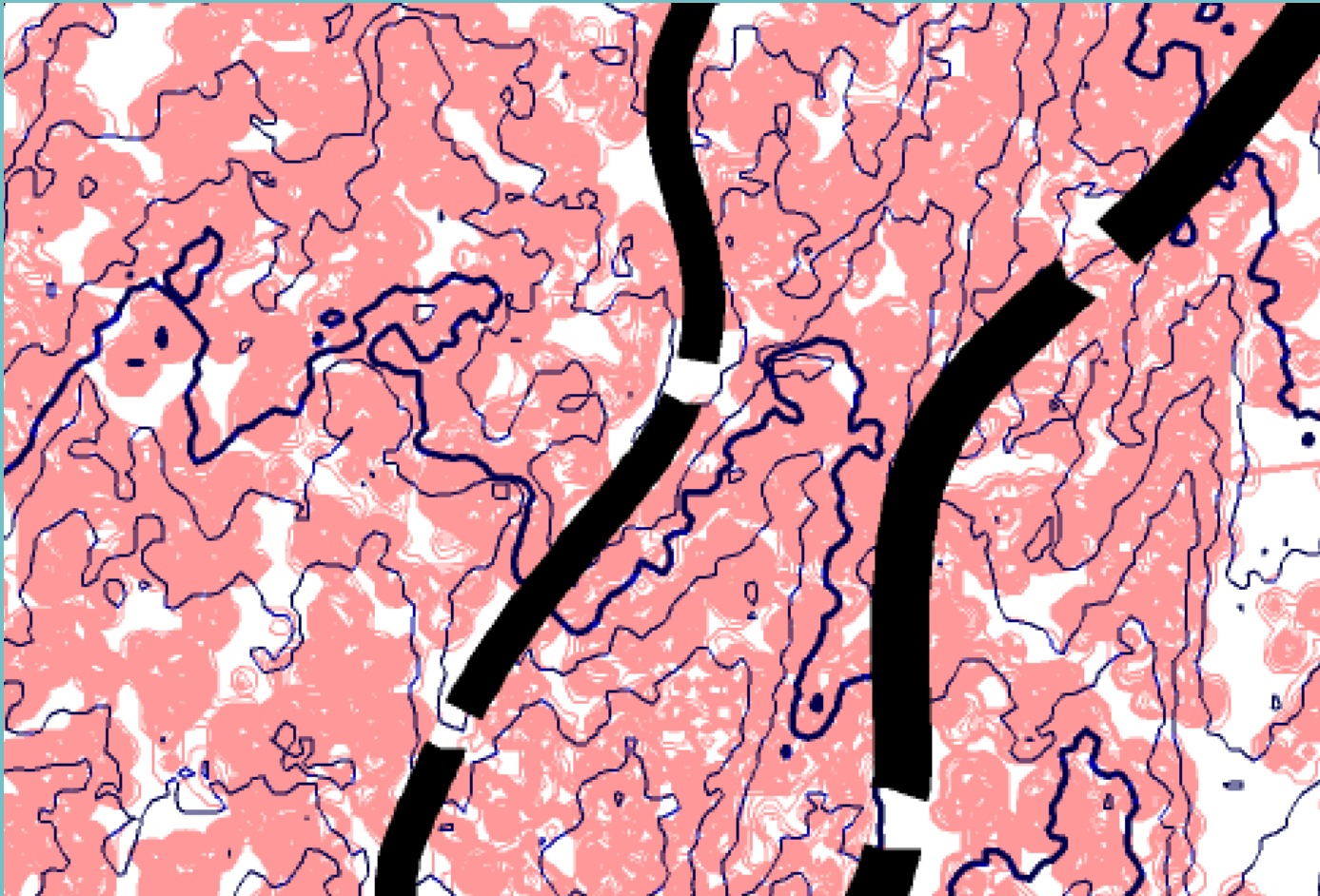


# JWOC / SOW 2016

- Totally 32 maps (training and competition maps)
- 5 different mappers (2 full time mappers)
- Costs: 200'000 \$
- Nearly all maps are ready
- JWOC trainings started in summer 2015



# SOW Training Map «Tais»



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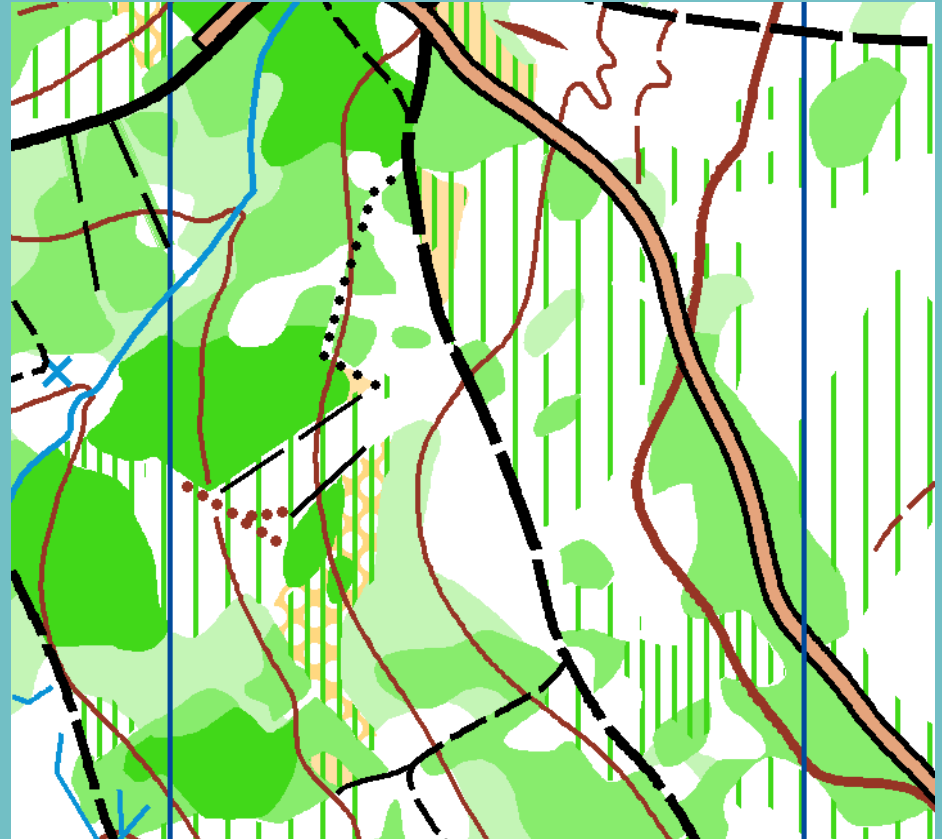
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# Conclusion

- ALS data really improve the quality of the contour lines
- The mappers are faster with the field work, need less time
- Only up to date data helps for the time consuming vegetation mapping (at least in Switzerland)

# WOC 2012 Switzerland

- Swiss Plateau
- Vegetation changes fast, small different green areas
- Solution?





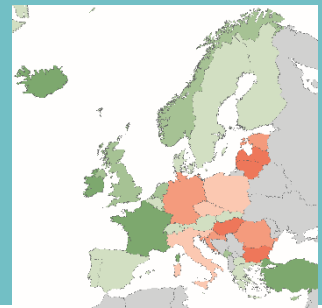
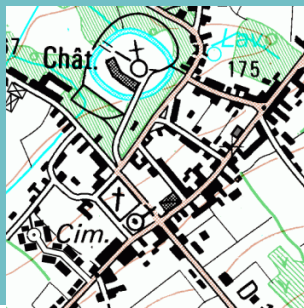
# Future

- Intergeo 2015:  
Leica Pegasus  
Backpack:  
Mapping with  
terrestrial  
Laserscanner, GPS  
and video  
camera in the  
terrain





# Thanks for your attention!



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