Lidar mapping for orienteering :

an event advisor perpective.

Lessons learned at the Longchamois national French and Swiss event on June 1, 2014

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Agenda

- Preliminary comments
- Context
- What is important for an event advisor (according to IOF)
- Remarks made after visiting the terrain
- Mapper's comments
- Elite runners comments
- Conclusion

Preliminary comments:

What follows is only my personal opinion

I am neither a mapper nor a lidar specialist

I am only an event advisor involved in roughly 1 national event /year and 2 to 3 regional events/year

Context

- Mappers : Ivo Haban, Ludek Kritcka, Zdeneck Lenhart, Petr Marecek, Radim Ondracek, Robert Micek all experienced mapmakers,
- Lidar data by www.helimap.ch 8 dots/m2
- Base data
  - For elevation 1 m contours and shaded relief.
  - For vegetation boundaries we used orthophoto
- Map « approved » by the Swiss advisors team

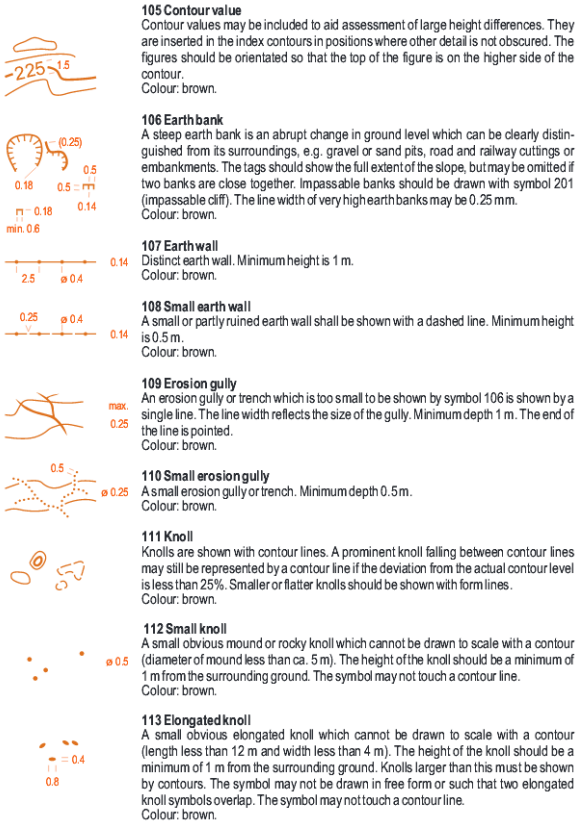
What matters for an event advisor 1/2

The map must give a complete, accurate and detailed picture of the terrain... The need for legibility is above other requirements: content, the need for accuracy, the level of detail. The chapter 2.4 Generalization and legibility in ISOM 2000 is very important to follow.

Source : CHECK LIST FOR CONTROLLING THE MAP MAKING OF MAJOR IOF EVENTS http://orienteering.org/wp-content/uploads/2010/12/Event-Adviser-check-list-for-map-making.pdf

ISOM 2000 Chapter 2.4: Good orienteering terrain contains a large number and a great variety of features. Those which are most essential for the runner in competition must be selected and presented on the orienteering map. To achieve this, in such a way that the map is legible and easy to interpret, cartographic generalization must be employed.

What matters for an event advisor 2/2



105 Contour value
Contour values may be included to aid assessment of large height differences. They are inserted in the index contours in positions where other detail is not obscured. The figures should be orientated so that the top of the figure is on the higher side of the contour.
Colour: brown.

106 Earth bank
A steep earth bank is an abrupt change in ground level which can be clearly distinguished from its surroundings, e.g. gravel or sand pits, road and railway cuttings or embankments. The tags should show the full extent of the slope, but may be omitted if two banks are close together. Impassable banks should be drawn with symbol 201 (impassable cliff). The line width of very high earth banks may be 0.25 mm.
Colour: brown.

107 Earth wall
Distinct earth wall. Minimum height is 1 m.
Colour: brown.

108 Small earth wall
A small or partly ruined earth wall shall be shown with a dashed line. Minimum height is 0.5 m.
Colour: brown.

109 Erosion gully
An erosion gully or trench which is too small to be shown by symbol 106 is shown by a single line. The line width reflects the size of the gully. Minimum depth 1 m. The end of the line is pointed.
Colour: brown.

110 Small erosion gully
A small erosion gully or trench. Minimum depth 0.5 m.
Colour: brown.

111 Knoll
Knolls are shown with contour lines. A prominent knoll falling between contour lines may still be represented by a contour line if the deviation from the actual contour level is less than 25%. Smaller or flatter knolls should be shown with form lines.
Colour: brown.

112 Small knoll
A small obvious mound or rocky knoll which cannot be drawn to scale with a contour (diameter of mound less than ca. 5 m). The height of the knoll should be a minimum of 1 m from the surrounding ground. The symbol may not touch a contour line.
Colour: brown.

113 Elongated knoll
A small obvious elongated knoll which cannot be drawn to scale with a contour (length less than 12 m and width less than 4 m). The height of the knoll should be a minimum of 1 m from the surrounding ground. Knolls larger than this must be shown by contours. The symbol may not be drawn in free form or such that two elongated knoll symbols overlap. The symbol may not touch a contour line.
Colour: brown.

Minimum size defined in ISOM 2000 (1m or 0,5 m)

After visiting the terrain

Visiting the terrain
First a quite long walk through the terrain with map printouts (competition scale or strict enlargement)

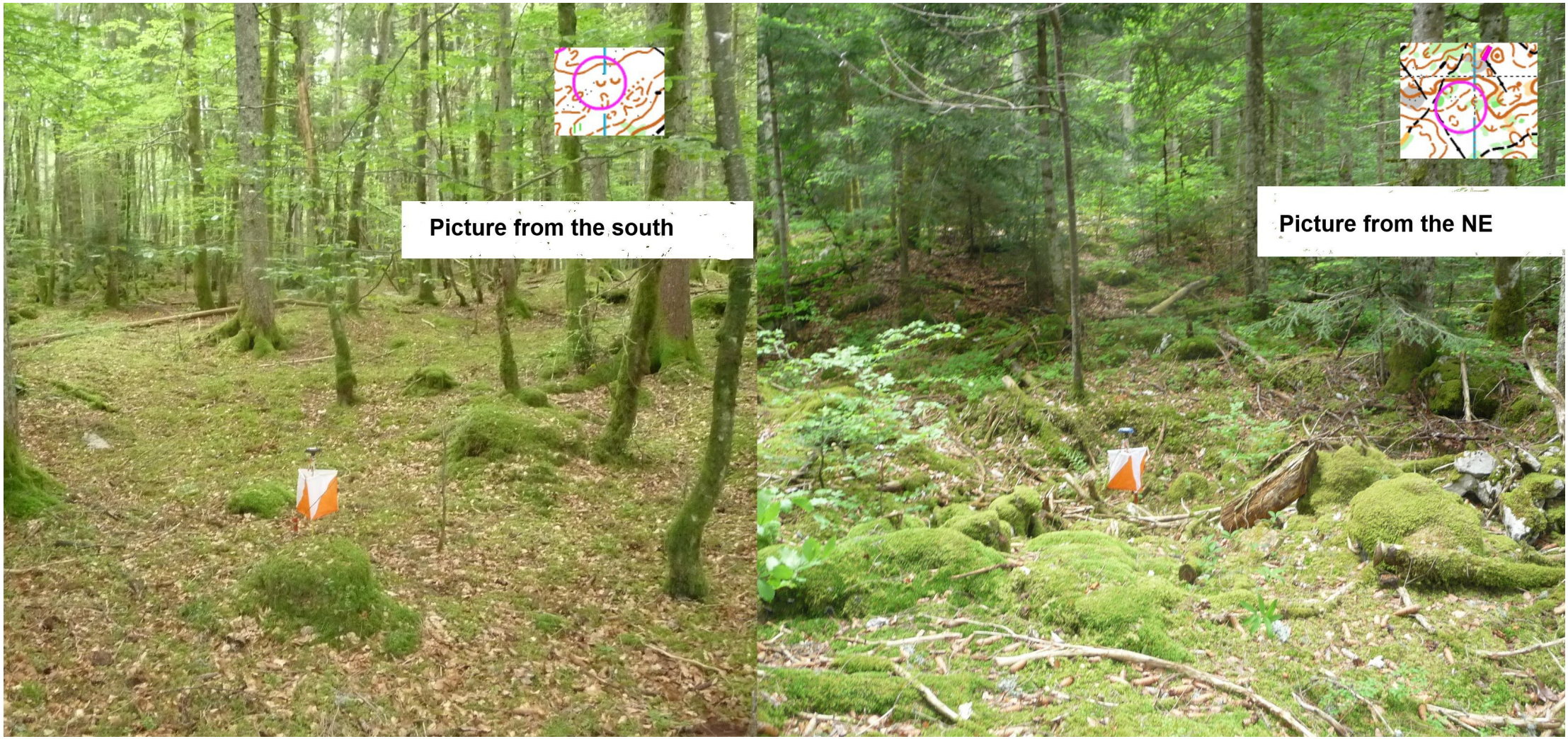
Controlling especially the following matters:

- The level of generalization
- The readability of the map
- How has the shape of the terrain been drawn?
- How have form lines been used?
- For flat terrain: the optimal level of the index contours
- How is the runnability shown?
- How are the open and semi-open areas shown?
- How has the classification of tracks and paths been done?

Poor readability due to lack of generalization and abuse of form lines

Overrepresentation of small size elements invisible at running speed

- small depression -115- Small shallow natural depressions and hollows (minimum diameter 2 m) which cannot be shown to scale by contours are represented by a semicircle. Minimum depth from the surrounding ground should be 1 m.
- Knoll -111- Knolls are shown with contour lines. A prominent knoll falling between contour lines may still be represented by a contour line if the deviation from the actual contour level is less than 25%. Smaller or flatter knolls should be shown with form lines.
- A small knoll -112- A small obvious mound or rocky knoll which cannot be drawn to scale with a contour. The height of the knoll should be a minimum of 1 m from the surrounding ground



Small depressions (under 1 m in depth)

Picture from the SSW

From the NE

The same from the SE

Knolls (below 1m in height)

Underrepresentation of other elements like vegetation or rocks

Mapper's comments (Ludek Kritcka)

- Deleting of content for more readable 1:15000 would lead in non-consistent map with information holes. Adherence of IOF on 1:15000 scale for classic distance in such specific terrains is non sense.
- Concerning vegetation details: We decided not to put stumps into the final map as such terrain is wealthy with other details. Moreover this objects are subjects of rapid change during the time, you have plenty of new stumps each year.

http://www.entes.cz/zaves/ Map |77| Bois de la Chaites 1:10000, Jura, France, 2011

http://www.holidaymappers.eu/en/?page=longchaumois

French Elite runners comments

Philippe ADAMSKY

- Running speed is always dependant on the reading. Having a 1/10000 map in Longchaumois1/15000 helped a lot in the reading process.
- Vegetation representation was enough as the relief information is the priority and bring the most valuable data for orienteering.

Lucas BASSET

- No problem in reading
- 1/15000 mapping was possible

Conclusion

- Lidar is a must have technology but orienteering mapping requires field checking and generalization
- Event advisors will have to face strong requests from mappers and event organizers to accept deviations from the present rules (1:15000 scale) and specifications (ISOM). On a long term these requests may lead to changing the spirit of the long distance races
- How the IOF mapping commission may help the organizers and the event advisors in specifying their mapping process using LIDAR as a basemap?