Does pace counting and compass work belong to the definite past?

For a long time, good pace counting and exact compass bearings belonged to the most important surveying methods for generating orienteering maps. More and more they are losing importance, because of detailed evaluation possibilities from airborne laser data, GPS measuring tools, and newly also from laser distance measuring tools.

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The most common foundation for creating orienteering maps used to be the base-map in a scale of 1:10'000. However, many details such as paths, thickets or depressions that are important for orienteering were missing. It was and still is the main task of map makers to measure and draw such objects. However, they cannot do this using common measuring tools such as Theodolites with the optical distance measuring tool. For one, these tools are very expensive and on the other hand, it is very costly to operate them, as at each object needed to be mapped, an assistant has to stand with a reflector.

Pace counting and compass bearings are therefore still one of the most commonly used mapping methods; they are simple yet often still adequate enough for the accuracy requirements of orienteering maps. However, what is a simple mapping task in flat areas turns out to be a masterwork in steep slopes. Here, not the sloping distance is needed, but the horizontal distance. It is therefore compulsory to calibrate the individual pace counting in each training and continuing education class for orienteering map makers.
In the same context, it is not always easy to aim correctly at mapping objects with the compass. Thick vegetation can cause poor visibility. Additionally, the compass needle pointing to the magnetic north makes it further difficult as the survey map must be aligned to the geographic North Pole. Therefore, the declination from the magnetic to the geographical North Pole always has to be considered.

New Laser Distance Measuring Tool

In the beginning of the nineties, the Leica concern launched handy binoculars with integrated laser technology. With this tool, it was possible for the first time to measure distances up to 1000 meters without a reflector and within a 2 meters accurate precision. However, this tool turned out not to be a break-through innovation. It was very expensive and heavy. Additionally, the handling was cumbersome in the measured azimuth (angle) and the distance had to be transferred by hand onto the field notes.

Fig. 1: Laser distance measuring tool TruPuls 360.

Around the turn of the millennium the first handy GPS-tools appeared on the market with which one could measure the mapping objects in the terrain. With it, the transfer by hand was at least eliminated. Whichever may be, the GPS-tools do not release the mapper from needing to visit each mapping object to be measured, a very time-consuming process.

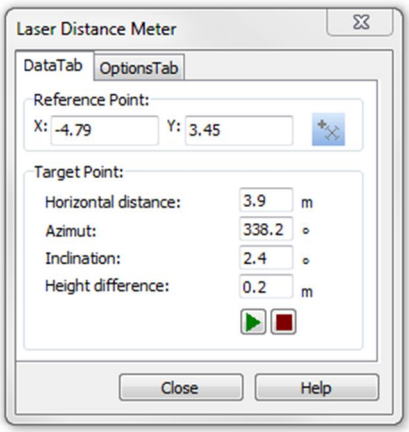

Fig. 2: Dialogue window for laser distance measuring tool.

Since almost two years, the company Laser Technology offers the TruPuls 360 Laser distance measuring tool with integrated compass and inclinometer, including a Bluetooth interface. With this tool, the measured azimuths and the automatically reduced length measurements from horizontal distances can be transferred directly onto a Tablet

PC. OCAD 11 Professional supports this tool with different recording functions. Two of them are the star-like measuring method and the stretch line. They allow measuring many different objects from the same location.
An orienteering mapper uses a location that she or he has determined precisely through either GPS measurement or through a survey map (i.e. laser airborne evaluation). The mapper chooses a point object such as a rock from the OCAD symbol list and through the laser distance tool the rock is aimed at. By pressing a button the data is transferred directly to OCAD and the rock is placed with the correct symbol and at the correct position onto the map.
If one chooses a line object instead of a point object, a stretch line is measured. This could be for instance a path or the edge of a clear cut. Thus the mapper saves him/herself the trip around the clear cut area.

Tested as part of a High School Thesis
Simon Guldimann from the OLG Basel club has extensively tested the laser distance measuring tool for his High School thesis „New methods and basics for orienteering maps“. He concludes that “the laser distance measuring tool is usable most often in open areas or in steep slopes. Here, the map objects do not need to be visited, but simply aimed at. He has never used pace counting and compass bearings as used to be common practice some time ago”. His complete thesis can be downloaded from the Swiss Orienteering website → “map committee” or from the OCAD AG website.

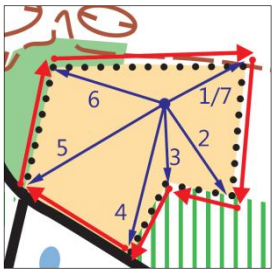

Fig. 3: Measuring of a clear cut from one location

Thanks to the very detailed evaluations from laser airborne data, GPS and laser distance measuring tools, the old-fashioned pace counting and compass bearing methods lose more and more importance in orienteering map making; something very few mappers will be sad about.

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Every two months he is presenting the most important new functions of the new version 11 of the cartography software.