

MAPS FOR DIFFERENT FORMS OF ORIENTEERING

László Zentai

Eötvös Loránd University, Pázmány Péter sétány 1/A

H-1117 Budapest, Hungary

laszlo.zentai@elte.hu

Abstract:

Orienteering became a worldwide sport in the last 25-30 years. Orienteering maps are one of the very few types of maps that have the same specifications all over the world. Orienteering maps are special, because to make them suitable for orienteering the map makers have to be familiar not only with the map specifications, but also with the rules and traditions of the sport.

The early period of orienteering maps was the age of homemade maps. Maps were made by orienteers using available tourist or topographic maps and only after the availability of cheaper reproduction techniques started the process of special field-working.

The International Orienteering Federation (IOF) was formed in 1961. The Map Commission (MC) of the IOF has introduced different specifications for the official disciplines (before 2000 the ski-orienteering and foot-orienteering were the only official disciplines). The last version of the specification, the International Standard for Orienteering Maps (ISOM) was published in 2000 and included specifications for foot-orienteering, ski-orienteering, mountain-bike orienteering. A new format, the sprint competition, required new map specifications (ISSOM) which were finalized and published in 2007.

The aim of orienteering map specifications is to provide rules that can accommodate many different types of terrain around the world and various forms of orienteering. We can use the experience of the official disciplines for developing new specifications: the official disciplines and formats were developed in the past 30 years (most of them are even newer). A discipline has to be practiced in different countries to utilize the experience of the countries so that the best traditions can be included and integrated. This is not a fast process and cartographers regularly involved only in the last part of the process when the aims of the disciplines and the basics of the competition rules are clearly defined and agreed internationally. Cartographers can translate these outcomes into graphic language to create optimized map specification, but best results can be achieved only when cartographers are familiar with the discipline itself.

Since orienteering maps are practically topographic maps and the development of the most traditional form of orienteering (foot orienteering) maps were based on national topographic maps in most countries, so the study of the topographic maps and the traditional orienteering maps may enhance the result: the new specification.

Beyond the officially existing disciplines other kinds of orienteering events are practiced. Some of them are practiced in several countries; some of them are relatively rare and mostly practiced only for fun; some of them are so rare that we can treat them as extreme sport. We try to list and investigate all known forms of orienteering events

where the maps are a key element of the sport. From cartographic point of view it is very instructive to list these different forms, to investigate the maps developed for them in different countries and to describe and follow the process of standardization. The conclusions of this research can be useful for developing forms of special maps, especially for orienteering maps, but it is clear that maps of the most traditional discipline of orienteering influence the development of maps of new forms.

Introduction

Orienteering became a worldwide sport in the last 25-30 years. The International Orienteering Federation (IOF) was founded in 1961 by the following countries: Bulgaria, Czechoslovakia, Denmark, Finland, Germany (East and West), Hungary, Norway, Sweden, and Switzerland. IOF currently has 70 member countries. Orienteering maps are one of the very few types of maps that have the same specifications all over the world. Orienteering maps are special, because to make them suitable for orienteering map makers have to be familiar not only with the specifications for maps, but also with the rules and traditions of the sport.

The short overview of the history of orienteering maps

The sport started as a military orientation training task in the second half of the 19th century. The first civil (non military) event was organised at the end of the 19th century (Norway: 31st October 1897, Sweden: 1900, Denmark: 1906).

Scandinavia is still the most developed region of orienteering. The main reason is probably the very complicated glacial terrain compared to Continental or Mediterranean areas, but the long term tradition of using topographic maps also played a role, just like the high level of cartographic knowledge in population as a result of large less populated areas, where the residents have to orient themselves. In every country where orienteering was practiced before the foundation of the IOF, local topographic maps were used for the events and training.

The early period of orienteering maps was the age of homemade maps. In most countries (excluding Scandinavia), there were no suitable maps available for public use. According to the running speed and the course distance the required scale of maps was 1: 20,000-1: 40,000 (1: 50,000- 1: 100,000 in the early years). In some countries, the topographic maps were classified and therefore unavailable for civil use (Eastern Europe), in other areas the largest available scale of topographic maps was only 1:50 000 (Germany, Spain). Using tourist maps was a logical alternative, but in Eastern Europe the accuracy of publicly available tourist maps was not suitable for these events. Therefore, these countries even tried to find more accurate tourist maps that were published before the communist era.

There was also a problem of copying. The only simple method of making some dozens of maps (this was the average number of participants at most events in the early days) was black and white photography. Offset printing (especially colour) was too expensive

and technically very difficult for even keen organisers. To move one step further, the sport had to reach a higher level: increase the number of participants in events, create international relations, form regional and continental organisations.

The first colour orienteering map specifically ground surveyed (field worked) for this sport was published in Norway in 1950.

In 1965, the Map Committee of the IOF was formed (the first meeting was held in 1967, Zürich). All five members were cartographers and orienteers (*Jan Martin Larsen – Norway, Osmo Niemelä – Finland, Christer Palm – Sweden, Torkil Laursen – Denmark, Ernst Spiess – Switzerland*).

The most important and urgent work of the committee was to establish the specifications for World Championship maps that could also become future map specifications:

- The maps had to be newly surveyed.
- The map had to show every detail of the terrain that could affect the route choice of the competitor.
- Most important was the accuracy and legibility: small and unimportant details had to be omitted.
- The maps of international events had to use the same specifications.

Suggested scale was 1:25 000 or 1:20 000, the contour interval (equidistance) was 5 m (10 m or 2.5 m were also allowed depending on the terrain).

Orienteering discipline	The time of first World Championship	Limitation on the map or event	New symbols, changes relative to foot o maps
Foot Orienteering	1966	There is a tendency to standardise not only the maps, but the terrain too (not to use extreme terrains on international events).	
Sprint Orienteering (part of foot-o)	2001	New venues: city, park. Due to the very large speed of the runners, the legibility of maps is critical.	Different map standards: larger scale, more details. Some new symbols, especially special urban and park features.
Ski Orienteering	1975	Reduced content: runability is omitted. Skiers mainly use tracks.	Classified track symbols.
Mountain bike Orienteering	2002	Reduced content: runability is omitted. Competitors in general are allowed only to use marked tracks, paths and roads.	Classified track and path symbols (based on the rideability).
Trail	1999	Necessary to take into	Sprint maps are suitable in

Orienteering (also for wheelchair)		account that the map has to look correct from sitting position.	practice.
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Table 1. Overview of the maps of the official disciplines of orienteering

Development of the maps for official orienteering disciplines

Ski-orienteering maps

The second official discipline of orienteering was ski orienteering that was regularly practiced in Scandinavian countries (for example the first orienteering event organized in Finland was a ski orienteering event, in 1904).

It was clear that the faster speed of the competitor and the less visible details on the terrain during the race required a transformed map.

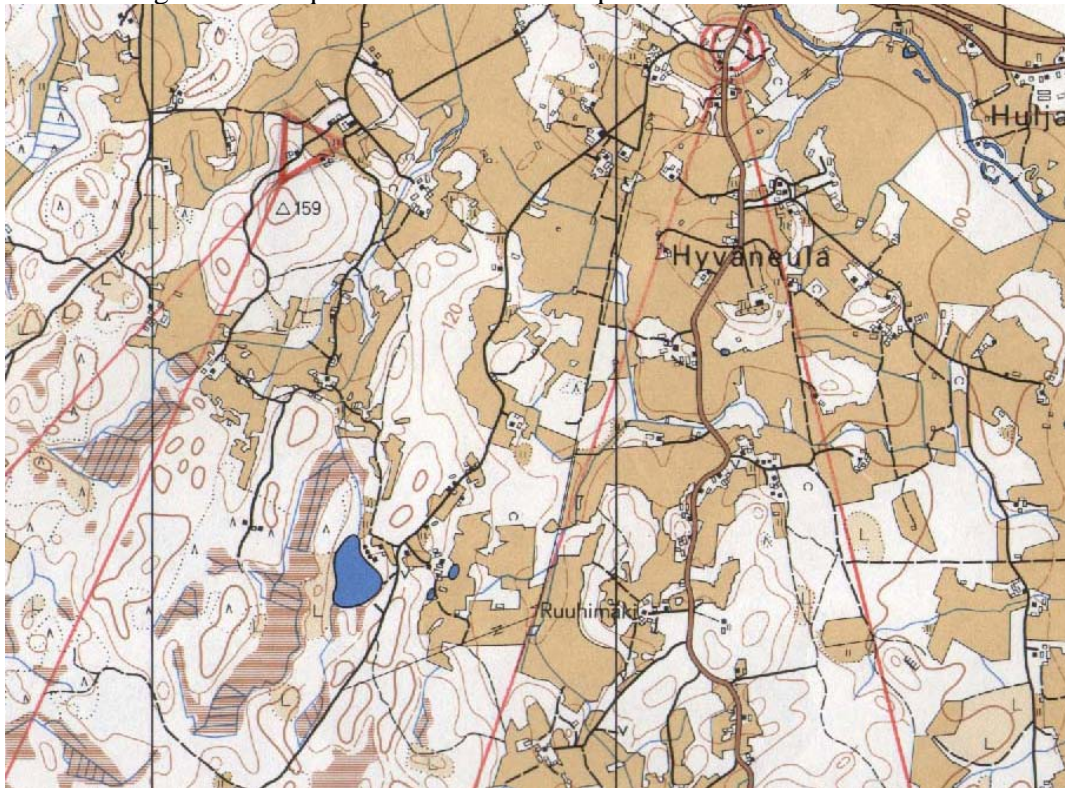


Figure 1. The map of the first Ski-orienteering World Championships, Finland, 1975

In 1984, shortly after the first Ski-orienteering World Championships the IOF released the map specification for ski-orienteering where the map scale and contour interval was standardized and most importantly track and path symbols were re-classified according to width and possible speed (green line symbols).

The crucial problem of this discipline in non Scandinavian countries is unpredictability of snow coverage on suitable terrains for ski-orienteing and therefore a lot of announced events have to be cancelled.

Mountain-bike orienteing maps

Mountain-bike orienteing events were organized first in the 1970's when this type of bikes became popular. In some countries where foot-orienteing has already been practised the sport was invented separately mostly for fun or as an opportunity to attract new competitors. It was evident that foot-o maps were used for these events, but the experience of the first events was that due to the larger speed of the competitors a smaller scale and more generalization was necessary.

After organizing the first international events the IOF has formed a special commission for the discipline to develop competition rules. The commission was working together with the IOF Map Commission to create map standards which were published as part of the ISOM 2000. The first World Championships of this discipline were organized in France (2002) with a large number of participating countries. Due to the fast development of the discipline the standard can be changed soon based on the experience of several recent international events. The theory of the representation is similar to ski-orienteing maps (re-classification of the road and path network), but the conditions are a little bit different which require different map standards. Traditions of foot-o maps may interfere with new ideas for representation on mountain bike orienteing maps, but due to the development of printing technologies (colour laser printers can reach the quality of offset printing and the price is continuously decreasing) may change the aversion to using new, non-traditional colours (like purple).

Trail-orienteing maps

Trail orienteing is an orienteing discipline focused on precise map reading in natural terrain (in several countries it is called precision orienteing). The discipline has been developed to offer everyone, including people with limited mobility, a chance to participate in a meaningful orienteing competition.

The first events were organized in the 1990's when the IOF formed the discipline commission and the first World Championships was organized in 2004. Due to the limited number of participants the discipline simply used park orienteing maps. Park orienteing became popular in the second half of the 1990s years, but due to the different types of terrains (urban, park, forest) where such events were organized the maps were not standardized. Due to the popularity of these events and their potential to attract media, the IOF established a new form, the Sprint. This form became a part of the official World Championships programme in 2001, but the first IOF sprint map standard (ISSOM) was created in 2003 (revised in 2007). This specification has also been taking into account the requirements of trail-o. But we have to understand and accept that the trail-o map is an oblique view presented in plan form, it needs to appear correct from a very limited number of oblique viewing points (that needs special survey,

though no different specifications). Competitors are not permitted to leave the trails and enter the terrain and this also has a number of consequences for trail-orienteeing mapping, but the ISSOM as a maps specification is adequate.

New challenges for the official disciplines

Every sport which is widely practised in many countries wants to be media friendly. Extreme sports became more popular in the last 10-20 years and to attract new participants the sport itself should make changes that include:

- o traditional disciplines, extreme variations
- o new „disciplines”, the original idea
- o new venues, the original idea
- o new ideas

Orienteers are very innovative to develop new variations, but these are used mostly for fun events or trainings (marathon orienteeing, adventure races, rogaining , micro orienteeing) and doesn't require special orienteeing maps or simply use topographic maps. It is more common to organize events in unusual areas (old town, shopping centre, zoo etc.), but the ISSOM can help the mapping process.

The only exception is the micro orienteeing where the event is very short (about 2-3 minutes), but very fast and the scale is very large (larger than 1:1000). In such scale the features can be mapped mostly in plan shape so very few symbols are used. Such scale is also used for indoor events.

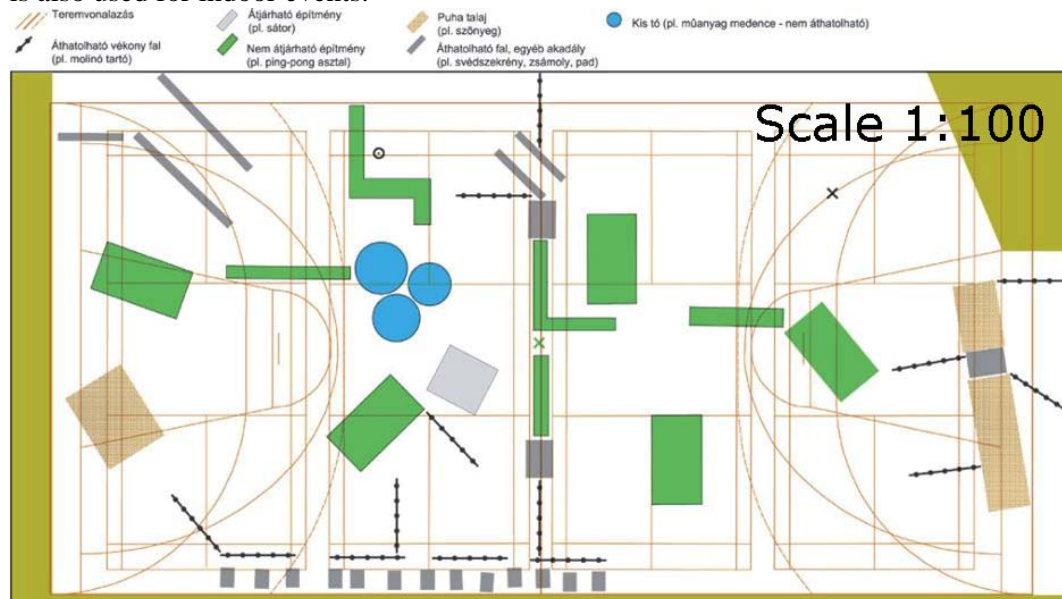


Figure 2. Map of indoor orienteeing event (sports hall, Hungary)

New disciplines

Keeping the original idea, but changing the traditional forms of movement, orienteers were also very keen inventing new disciplines:

- *Horse-riding orienteering:*
Normal orienteering maps can be used, but the selected areas have to fit to the relatively special needs (avoid dense vegetation, very steep areas, cliffs). This idea cannot be as popular as traditional disciplines, but from the cartographic point of view, changes are not necessary.
- *Triathlon orienteering:*
Although it is difficult to find a suitable area for this complex form of event, but the popularity of the normal triathlon can be a big advantage to recruit participants. From the mapping point of view swim-orienteering is the only special, new discipline, but this form can't require so challenging navigation as the traditional disciplines.

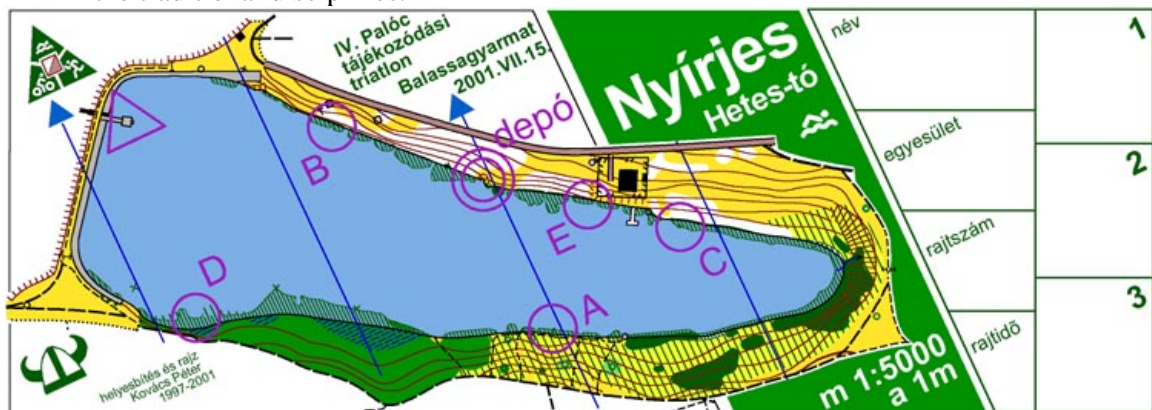


Figure 3. Swimming part of the triathlon orienteering event (Hungary)

The following factors have to be taken into account when we create a map for this from: the map scale is adjusted to the suitable size of the map (the map is attached around the wrist), the visibility from the water level is limited, we have to make difference between the different types of shores.

- *Orienteering in a cave*
Caving as a sport or speleology as a research discipline can produce cave maps. Mapping a cave is a more complex issue than any other mapping mentioned in this list. Cave mappers cannot omit the third dimension, but sometimes it is really difficult to represent these unusual features on a paper map. All the important and large caves have already been mapped and the cavers sometimes organize navigational events in caves where it is possible and allowed. Because these events are organized for cavers, these maps are based on their traditions and there is no similarity between cave maps and any type of orienteering maps. Cave mapping is using virtually the same technique worldwide and cavers use practically the same symbols to mark cave features (practically there are no symbols on these types of maps).
- *Kayak-canoe orienteering:*

This form may require really new type of navigational skills if special areas chosen. If we want to increase the importance of navigational skills we have to choose areas where kayak-canoeing doesn't require very special training or venue (like slalom). The most interesting area can be a sea side, where the ebb and flow (low and high tide) should be taken into account during the event. The map symbols used on this kind of maps are influenced by large scale navigational charts because orienteering maps evidently have no symbols for water features. These maps can be so unusual for the participants that a legend must be shown on the map (which is not common on the maps for traditional disciplines of orienteering) or it must be available for study in advance. Also some lakes with a lot of vegetation, intermittent lakes, rivers with a lot of branches, backwaters can be very interesting for these kinds of events.

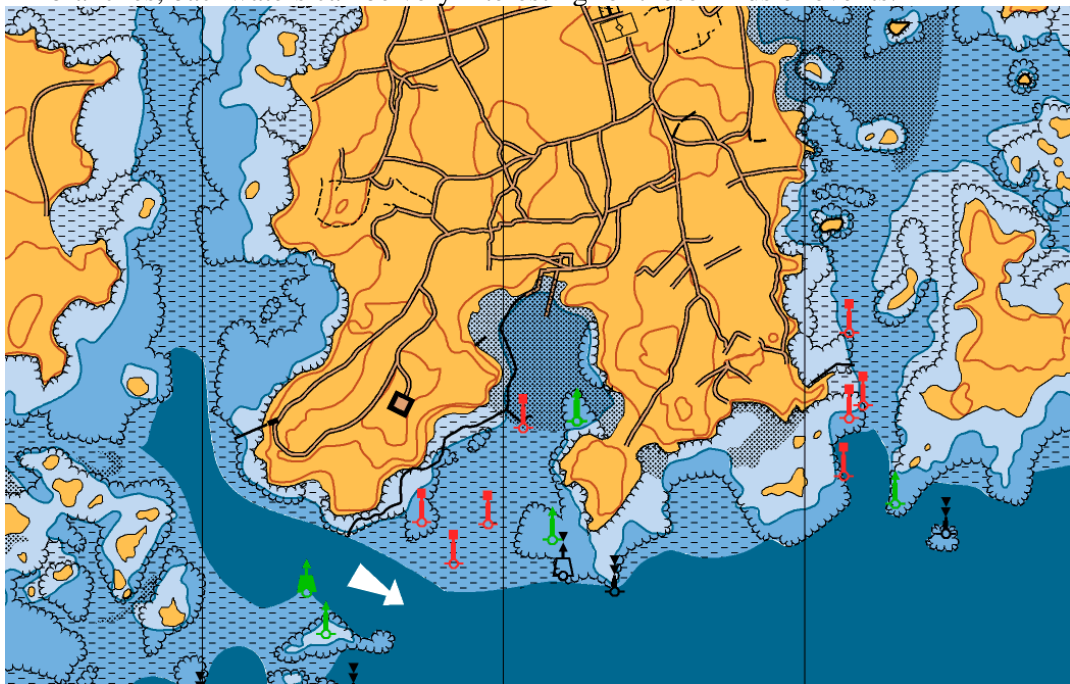


Figure 4. Map of a Kayak-canoe orienteering event (France)

○ *Mobile orienteering:*

The rules for this type of competition are simple and can be varied in many ways. The race consists of two-person teams, each with a navigator and a runner. The start and the finish are at the same location. The map with the course to complete remains with the navigator who directs the runner on the track exclusively via mobile phone. The only additional support for the runner who is without a map is a compass. After completing the track, the runner changes roles with the navigator, then directs him or her along another route. In all other aspects, the competition follows the rules of orienteering. From a mapping point

- of view there is no special requirement for mobile orienteering map, this special event form can be organized in every discipline of orienteering.
- Other extreme orienteering events have already been organized for fun or to soften the monotony of trainings, but from a cartographic point of view they are not relevant because special maps were not invented for these events (e.g. sledge orienteering, orienteering event on the ice of a frozen lake, orienteering event on the decks of a cruise, orienteering event organized in a flat or only in a room). The map symbols for these types of events mostly depend on the scale: in a large or very large scale the plan shape representation is dominant, in smaller scales the specification is much closer the traditional orienteering maps or topographic maps.

Conclusions

Navigation tasks, the essence of orienteering sport, can be presented in different forms for different kind of events. Orienteering maps must serve as an optimized navigational tool. When the map specifications were created for these different disciplines and forms the following factors were taken into account:

1. Legibility is the most important issue: the selection of the proper scale, the composition of map symbols are all subject to optimized navigation. Competitors should be able to follow their position continuously, hence the scale of the map must fit speed of the competitors: if the speed is high (like in ski- or in mountain- bike-orienteering), the map scale is smaller (1:20000); if the speed is low or the competition area is very small, the scale is larger (from as large as 1:100 to 1:5000).
2. One of the most important tools of the legibility is generalization. Modern mapping techniques can precisely represent all types of terrains. What is really difficult for mapmakers is to define which features are necessary to map and which ones can be omitted.
3. The number of different symbols is limited on all types of orienteering maps: there is no need for too many symbols; the competitors are concentrating only on the shape and size of the features and not on their function. Symbols are graphically very simple and their size is optimized: they can not be very small because it may make the legibility worse and they can not be very large, because they may cover much larger area on a map than their real size.
4. Cartographers may not be able to create good map specifications based only on their cartographic knowledge. Cartographic tools are important, but the understanding of the essence of orienteering disciplines is the best tool to improve map specifications.

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