

MOUNTAIN TRACKS CAPTURING

Dusan Petrovic

University of Ljubljana,

Faculty of Civil and Geodetic Engineering,

Ljubljana, Slovenia,

dusan.petrovic@fgg.uni-lj.si

ABSTRACT

The paper discuss about the problem of mountain and other footpaths capturing. In the past, paths were mainly captured by terrain check, partly supported by aerial photogrametric survey. Today, when there are many new technologies for capturing spatial data, footpaths become the least reliable topographic content on maps or in topographic databases. On the other side users, using modern technology on the terrain, search for more and more accurate spatial data, that are mostly not at the same accuracy level and therefore not fits their measurements.

Key words: mountain tracks, data capturing, GPS survey

INTRODUCTION

Marked mountain tracks are the very important part of infrastructure in hilly and mountain areas, and consequently one of the obligatory content of topographic and also tourist maps of such areas. Their presentations on the maps have been traditionally serving for a general orientation on the terrain and as a guide for route planning. The exact positional presentations on the maps have been a great problem but, since they are marked on the terrain, such displacements only in extreme and rare situation caused any remarkable problems. Nowadays, marked mountain tracks on the maps or as a content of vector digital topographical databases serve for many other purposes: direct track-following using GPS or other navigation device, exact locating in a case of accident, rescue and searching actions, registration of land own, and database for maintenance of tracks. These ways of usage would need more reliable and positional correct data. But on the other hand methods that can improve positional accuracy of mountain tracks are limited and more reliable ones

are very expensive. Remote sensing interpretation is limited in forest areas, where tracks are often not visible. Terrain measurements are time-consuming and consequently expensive, but still depended of the conditions. Finally, people that continuously maintain the tracks, so called “track-markers” are often adult ones and with limited computer knowledge. Their description of tracks is usually available only in scratches or in written form.

To overcome this problem we checked possible sources to capture the best possible marked mountain tracks data for territory of Slovenia. The part of the project overlapped with a project of Mountain Association of Slovenia that would lead to establishment of marked mountain tracks database for entire Slovenia.

SAMLE TRACK CAPTURING

As the test path we decided for the mountain track from Stahovica to Velika planina in Kamniško-Savinske Alps, in northern part of Slovenia. The path goes from 400 to 1600 m a.s.l. At the lower part it follow vehicle tracks, middle part goes through forest area while the last part of the mountain track is on the open area, where it can be seen also from aerial photography.

Figures 1 and 2 show the difference between path position, marked on the previous topographic map, track, captured with two different GPS receivers and visibility of the track on the orthophoto. At the figures orange line shows the track, captured with Garmin GPSmap 60CS (model 2005), while violet line in track from Yakumo deltaX 5 BT Pocket PC with GPS SiRF Star III single chip integrated.

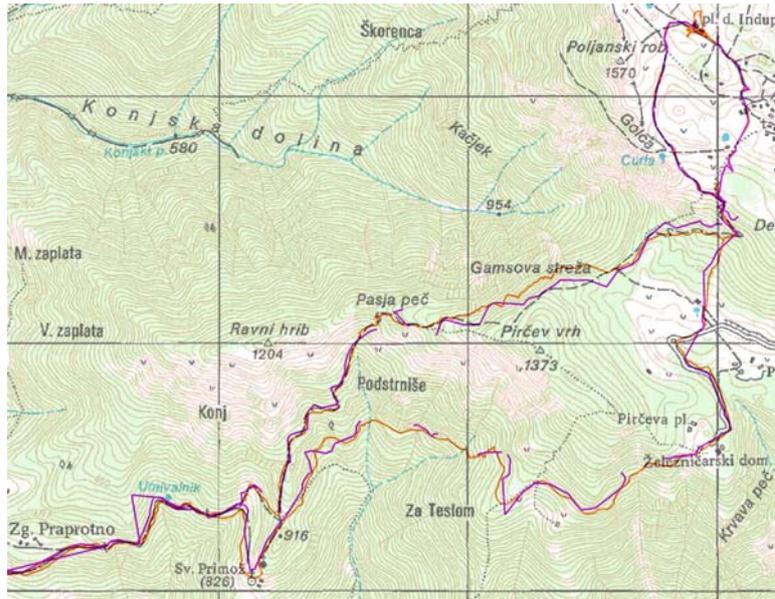


Figure 1: two GPS receivers' survey vs. official topographic map



Figure 2: two GPS receivers' survey vs. orthophoto

It's obvious that different sources give four different track positions. It happened also in the past, but this was not a huge problem for users. In the times, when users used only compass and sometimes altitude meter as aids in terrain orientation the positional accuracy didn't play very important role. It was much more important that other quality parameters, such as completeness and especially logical consistence between mountain tracks and other relevant objects were reached. Today, using GPS receivers users realize, that the track position is displaced according to the real situation on the terrain, so the tracks should be

captured more positional accurate. But, sometimes displacement is the result also of positional displacement of user's GPS measurement and often this is not understandable by users. They also don't understand that the track inaccuracy on the maps is very often result of cartographic generalization according to map scale.

CONCLUSION

As often in the period of big technology changes, the change in minds have to be made at both sides, at data providers and data users. Cartographers have to realise that the positional displacement as a result of cartographic generalisation couldn't be acceptable and theoretically correct as it was through the decades of development in cartography. Of course that means a lot of recapture of already captured content that is very time consuming and expensive, spatially for mountain tracks, where terrain measurement is in majority case the only enough reliable method. And the other hand also users should be informed and educated, that the map or topographic database content have limited positional accuracy, and also that their measurements are not free of errors and consequently displacements between both positions are the fact that have to be accepted and understood.