Orest Kotylo

Mapping for WOC 2007. «Ukrainian» mapping style

Main mapping conception of WOC 2007

- The most interesting areas for each competition day
- Good arena
- ***Whenever possible new map***
- Shortest distance from event center

It was not simple task as in vicinities of Kiev rather simple forestland prevailed

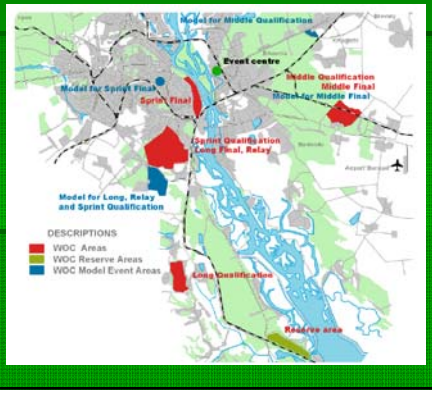
Areas for WOC

- Long final was fixed – Golosivo forest in the middle of Kyiv.
- Areas for sprint, middle and relay h***ave been changed later during next visits SEA Oivind Holt***

Examles of old WOC areas:

- Area L-Q ***has been planned originally for relay. But we had some problems with arena***
- ***Old S-F area had steep slopes***
- ***Long time we searched ideal area for middle final. Initial areas have appeared simple for M-F (good visibility in the forest)***

Final areas of WOC 2007



Final areas of WOC 2007

- L-F and relay u***se 18 square kilometers of a wood with the same arena. S-Q use nord part of a wood (existed old map)***
- ***M-F and M-Q are placed close through the railway (new maps)***
- ***S-F -- (new map)***
- ***L-Q not typical for Kyiv area (new map)***
- ***Maps for model evetns.***

WOC mapping: commom position

- ***The-coordinator of works was Victor Kirianov, which has agreed to perform all cartographical works (survey, drawing, checking, course setting during WOC) at the price 100 dollars per 1 sq.km***
- ***Any ukrainian mapper with an operational experience abroad had an opportunity to take part in surveying the maps***
- ***The preference was given working group with experience of teamwork***

WOC mapping: common position

- each map is drawn by a minimum quantity mappers (2 mappers on a map). The L-F area" was drawn by all group.
- Before survey viewing area for definition of the common surveing principles was carried out. Wishes of controllers were considered.
- Base maps: areal photos, military maps 1:25000, satelite photos (google earth)

WOC mappers:

- Viktor Kirianov - chief
- Oleksandr Gavryliuk
- Oleksandr Kapralov
- Oleksandr Mykhailov
- Vadym Prokopchuk
- Roman Slobodianiuk

- ***This working group has big experience of teamwork in Ukraine and abroad***

WOC controllers

- Senior event advisor Oivind Holt (NOR)
- Assistant SEA: Havard Tveite (NOR)
- National controller: Orest Kotylo (UKR)

Survey and checking maps

- Survey of maps is an extensive theme which can be presented by the separate report
- ***As an example " the ukrainian mapping style " you can use my theses (in German) of mapping seminars which are placed on http://o-maps.com***
- ***Check maps***

Check a maps after survey

- NC, SEA: the fragmentary control of maps
- Repeated updating on all area one mapper
- NC, SEA, assistant SEA: the Control of maps and prospective control points
- Repeated entering of corrections
- Planning of distances, marks control points in area. Entering corrections.
- NC, SEA, assistant SEA: the control of maps along running courses and in control point
- NC: the control of maps over areas CP and along prospective variants of ways of competitors
- The control before printing the maps

WOC mapping statistics

I am still waiting for this information from Victor Kirianov.....

The Ukrainian mapping style (UMS):

introduction

- ***Work of mappers in USSR time had the certain difficulties. All base maps and areal photos were a top secret, were meaningly deformed also then it was practically impossible to receive officialy. Therefore mappers these times did not use them at all and drew from " a white sheet ".***

UMS: introductions

Thus it was necessary to make many horizontal and vertical measurements. It was clear, that the more measurements will make the map more precisely. Simple tools for measurement of lengths (a measured tape) and a level (closed transparent pipe filled by color spirit) were used.

One of main principles of the Ukrainian

mapping school:

- - To pass and measure all area of a map
- - The extra detailed elaboration of maps (a relief, vegetation)

Base maps in Ukraine

- In Ukraine following bases maps are used:

- Aerial photographs.It is printed on photographic paper.
- Military maps 1:25000. maps 1:10000, 1:5000. Quality of these maps very bad.
- Orthophoto and photogrammetry it is not used, as it is expensive also bad quality.

Example from Poland (1991)

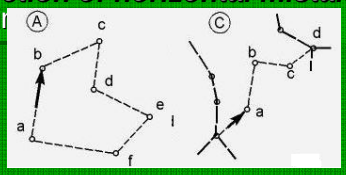
- ***I have got a basis 1:10000 on which on 70 % all objects was on a place!! It was necessary:***
  - ***only to run from a point to a point***
  - ***to measure a little bit distances***
  - ***to put roads and vegetations.***
- ***It was necessary:***
  - ***By good basic map 3-4 days per 1 sq.km on the average in interesting areas.***
  - ***By ukrainian basic map on the same areas 7-9 days per 1 sq.km.***

Creation base map for o-mapping

- In details all mapping process is described in the handbook Ukrainian mappers V. Alioshin " The Map for orienteering" ,1983.

Stages of the creation a base map:

- ***Realization of horizontal measurements (closed). I must be made so many measurements as possible.***
- ***Creation of high-altitude base (a level, clinometer, alimeter)***
- ***Correction of horizontal mistakes***
- survei



Tools for measurements

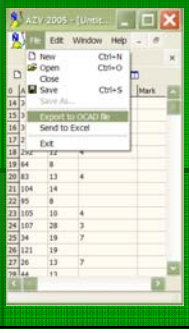
- ***Compas Silva 4/54 combi***
- ***Pocket PC for data recording***
- ***GPS (recording of tracks every 5 meters. Accuracy GPS up to 10 m on ridges at the forest, on the open area - 3-5 m)***
- ***barometric altimeter for fixing hights. I close during short time courses. Start and finish in the same point. Accuracy + - 2 meters for each point***

Measurement in process

Measurement in process

- Distances I measure by steps. On 1 km of a course about 10-20 m, (0,2 %) are mistakes
- Speed of measurements: 12-15 minutes per 1 km of road
- Time for each point is about 5-10 seconds.

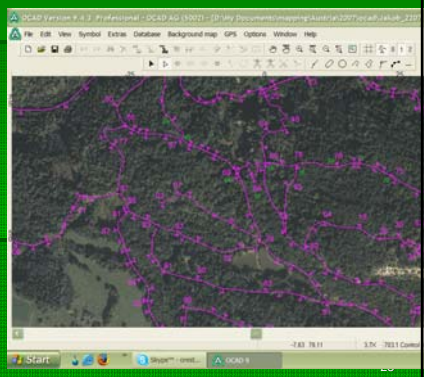
Import of data and correction of measurements in OCAD



- I use program AZV since 1998.It is my idea. last realization on Delphi. A demo version you can find on on my web site.
- Open data from Pocket Exel
- By copy-paste I copy data
- Azimuth, distance in pairs steps, features of objects
- Export in OCAD.

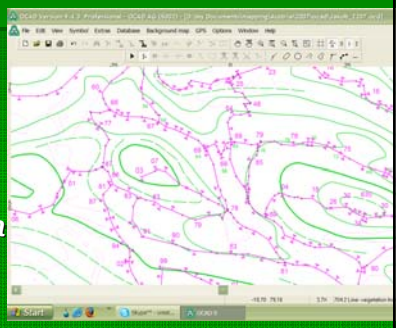
Export in OCAD

- placing the measured lines on orthophoto
- stretching, rotating if necessary
- ***if the orthophoto is absent I use tracks GPS and put measured lines on these tracks.***

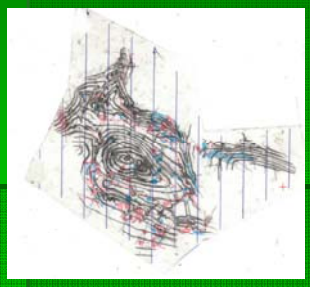


Completion of the base map

- ***placing hights measurement according to barometric altimeter***
- ***copying from orthophoto borders, roads (precisely visible lines)***
- ***importing contours from a base map (through 5-20 meters)***
- ***The basis map is ready.***

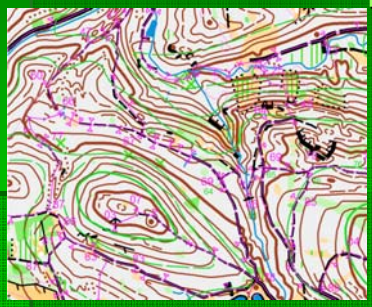


Survey...



- For fieldwork I Use compass
- Silva 4/54 or Recta DO 595 Global system
- Clinometer SUUNTO PM - 5/360 PC

Map after drawing



- For this area is necessary about 60 hours per 1 sq.km

Updating of existing maps

The old map should be those, that all high-altitude and horizontal objects should be measured. Then updating is not difficult.

I define quality of old maps as bases very simply: I make some measurements for horizontal objects and high points. If the objects were measured inexact, I recommend the customer to draw a new map. In my experience 95 % of cases is a new surveing

Base maps: opinion

- Orthophoto (min 0.5 m/pixel) together with a map 1:10000 - good base for maps (cheaply)
- Photogrammetry- it is ideal to use only for the open area.
- Laser scanning: according to publications of testing in Switzerland I have some doubts of using LS in the closed forest about the relation of:
  - the price and quality
- I plan to test laser scanning in 2008 in Switzerland.

An operational experience with other devices

According to my information Ukrainian mappers not so intensively use technical equipment for surveing.

It not always justifies herself.

Basically it is inexpensive devices which it was mentioned aboven.

Differential GPS. According to an operational experience WOC 2005 mappers and Hungarian mappers accuracy in 1 meter will be ideal base. Thus the support personnel can make base points. But the device is very expensive.

Range-finders

- ***Range finders: can be used as auxiliary tool.***
- ***In June 2007 in Austria I tested laser range finder-goniometer Leica Disto A8 (thanks Eugen Kainrath, HSV Pinkafeld).***
- ***It is a laser range finder with the level sensor. The device works up to 100м without a reflector***

Testing Leica Disto A8: advantages

- Instant and exact measurement of the distances reflected from trees, rocks, stubs and knolls.
- The level sensor works irrespective of a range finder and constantly shows a corner of an inclination (accuracy of 0.15 degrees - quite sufficient).
- Excellent visibility of a laser beam in the dark wood

Testing Leica Disto A8: disadvantages

- Complexity of prompting on object at distances is more then 20 m. The Digital display is not precise enough and slows down an aiming and reception of result. It is sometimes difficult to see a point of a beam on object.
- Bad reflection of a signal from the rocks covered by a moss.
- Bad reflection from trees at distances is more then 30 m
- Vibration of the device in hands complicates measurement on greater distances.
- Full invisibility of a beam on the open area.

Leica Disto A8: disadvantages

- Inconvenience of vising at definition of a corner of an inclination.
- There is no direct calculation of hight on a corner and distance (it is necessary to make two measurements).
- Small memory of the device also is absent Bluetooth for communication with Pocket PC.
- The high price of the device - 900 euros
- Conclusion:
- For creation maps for orienteering the device has not justified. It slows down work very much and there is not always an opportunity of measurement up to the necessary point.

The Conclusion

For orienteering maps the prevailing factor is the operational experience of mapper. Any hardware can't replace it. They only allow to accelerate process of creation of maps, to increase their accuracy.