



**Orienteering**  
**Austria**

# **Race & Course Quality Aspects**

---

Radek Novotný  
January 30, 2025

# Intro

---

- based on personal experience from course-setting at WOC, WC, JWOC, Czech national races and thousands of training courses for national teams and kids (as well as map drawing for these races)
- rather general focus this time -the specifics of disciplines and HLEs left for other occasions

# Cat & Mouse Game

---

- course-setter provides tasty food full of traps
- = > course-setter should know how do the athletes THINK, how do they FEEL and how do they NAVIGATE



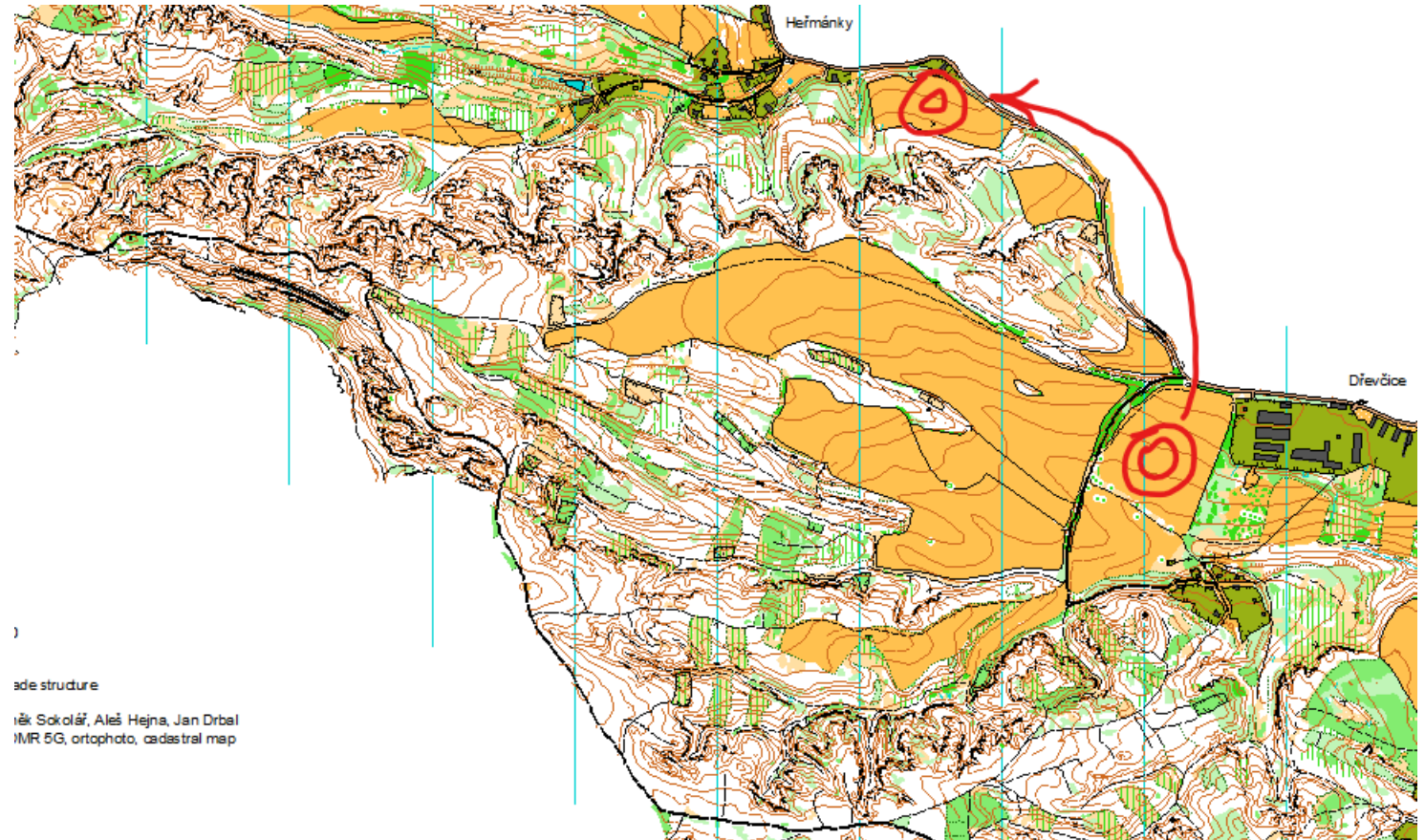
# Fairness

---

- orienteering is an outdoor sport, conditions are not sterile - that belongs to its nature, just to accept that
- however, the aim should always be to make it as even and fair as possible for all athletes at the start
- CS issues:
  - course leaking into public (system of pre-race data handling)
  - trampling the grass, nettles, bracken, blackberries...
  - control visible only when someone punches
  - huge temperature differences
  - long loops - hills at the end
  - too much help of athletes from other classes
  - visible run-out from the navigation start
- ÖFOL fair play codex: [FairplayCodex2024.pdf](#) (focusing rather on athletes behaviour than CS issues)

# Race Organisation Influences Course Q

- course-setter should not be disconnected from overall race organisation, many overlaps with impact on course Q
- ex.: WOC 2021 Long/Relay arena



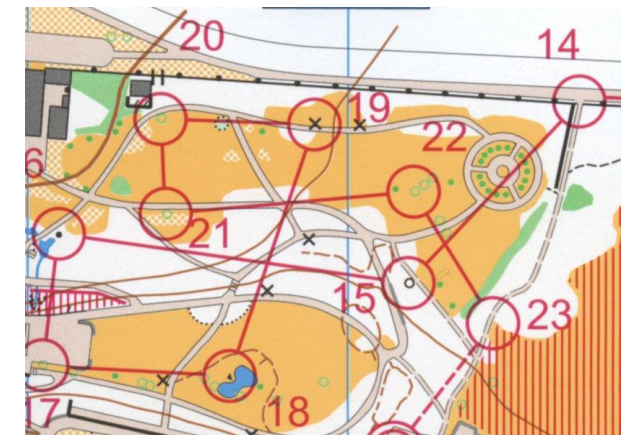
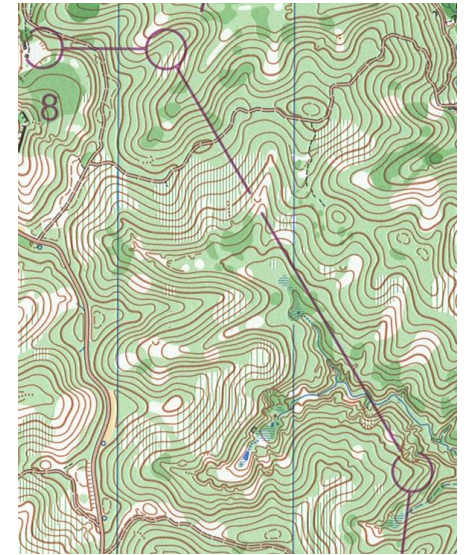
# To Do Before a Race

---

1. Area
2. Map
3. Course Lengths
4. Course Flow & Start Location
5. Courses & Classes & Start Table
6. Course System
7. Courses
8. Control Places & Control Descriptions

# Area | Terrain

- suitable for the particular race type?
  - also great to have an initial visit years before during the same season to see the runnability (and as a course-setter also get an inspiration of what could make the navigation difficult)
- available? some obstacles? contract?
- logistics? accessible?
- any place for arena? parking? toilets?
- wet options?
- (TV: accessible for heavy trucks?)



# Map

---

- delivered good time before the race
  - courses need to mature up
- according to IOF mapping standards
  - better chance that the map is readable
  - fair play (standard approach, not local specific)
  - easier to maintain the file (updates)
- print limitations early projected into course-setting (A4 etc.)
- approach control and adaptations (root stocks, significant trees, single tracks, bracken...)
- best possible print quality crucial - a front „product“ for our customers and embodied result of course-setters work



# Course Lengths

---

- calibration using estimated average kilometer time of Herren Elite winner
- estimation
  - a) data from previous races in the same terrain (taken in account possible differences - race type, season...)
  - b) pre-running
    - a) not easy to get valid results (motivation/effort, level of pre-runner, method...)
    - b) (!) allways whole course
  - c) analogy - using data from races in similar terrains
- in doubts? shorter is better than longer

# Lenhart table

- ancient, but still valid...

| Level<br>Terrain (HE winner min/km) → |          |           | I<br>5 6 7 9 |      |      |      | II<br>5 6 7 9 |      |      |     | III<br>5 6 7 9 |      |     |      |
|---------------------------------------|----------|-----------|--------------|------|------|------|---------------|------|------|-----|----------------|------|-----|------|
| Cat.                                  | win time | range     |              |      |      |      |               |      |      |     |                |      |     |      |
| H-10                                  | 20       | 16-26     | 2,9          | 2,5  | 2,5  | 2,5  | 2,4           | 2,2  | 2,2  | 2,2 | 2,0            | 1,8  | 1,8 | 1,8  |
| H11-12                                | 25       | 20-32:30  | 4,4          | 3,5  | 2,8  | 2,8  | 3,6           | 2,9  | 2,8  | 3,1 | 3,2            | 2,8  | 2,4 | 2,5  |
| H13-14                                | 40       | 32-52     | 6,7          | 5,9  | 5,1  | 4,7  | 6,2           | 5,3  | 4,7  | 5,2 | 5,7            | 5,0  | 4,0 | 4,2  |
| H15-16                                | 50       | 40-65     | 8,8          | 7,7  | 6,7  | 5,9  | 7,9           | 7,1  | 5,9  | 6,7 | 7,4            | 6,3  | 5,6 | 5,6  |
| H17-18                                | 60       | 48-78     | 11,5         | 9,5  | 7,9  | 6,3  | 10,0          | 8,1  | 6,7  | 7,5 | 9,2            | 7,5  | 5,7 | 5,7  |
| H19-20                                | 70       | 56-91     | 14,3         | 10,7 | 8,9  | 7,4  | 11,7          | 9,5  | 7,8  | 7,8 | 10,8           | 7,8  | 7,0 | 7,8  |
| H21-                                  | 85       | 68-110:30 | 17,0         | 13,1 | 10,8 | 8,9  | 14,7          | 12,0 | 10,2 | 8,5 | 13,9           | 10,6 | 9,4 | 10,0 |
| H35-                                  | 70       | 56-91     | 12,3         | 10,2 | 8,3  | 7,0  | 11,1          | 9,3  | 7,5  | 7,4 | 10,0           | 8,2  | 7,1 | 7,4  |
| H40-                                  | 65       | 52-64:30  | 10,3         | 8,9  | 7,5  | 6,8  | 9,7           | 8,1  | 6,8  | 6,8 | 8,7            | 7,2  | 6,2 | 6,5  |
| H45-                                  | 60       | 48-78     | 8,8          | 7,3  | 6,5  | 6,3  | 8,0           | 6,7  | 5,5  | 5,5 | 7,2            | 6,0  | 4,8 | 5,0  |
| H50-                                  | 55       | 44-71:30  | 7,3          | 6,0  | 5,5  | 5,5  | 6,5           | 5,5  | 4,6  | 4,6 | 5,9            | 5,0  | 3,9 | 3,9  |
| H55-                                  | 50       | 40-65     | 6,3          | 5,5  | 4,8  | 4,8  | 5,6           | 4,8  | 4,0  | 4,0 | 5,0            | 4,0  | 3,3 | 3,3  |
| H60-                                  | 45       | 36-58:30  | 4,7          | 4,1  | 3,9  | 3,9  | 4,3           | 3,6  | 3,2  | 3,2 | 3,8            | 3,2  | 2,8 | 2,8  |
| H65-                                  | 45       | 36-58:30  | 4,3          | 3,5  | 3,0  | 3,0  | 3,8           | 3,0  | 2,6  | 2,8 | 3,2            | 2,8  | 2,5 | 2,5  |
| H70-                                  | 50       | 40-65     | 4,2          | 2,9  | 2,9  | 2,9  | 3,6           | 2,8  | 2,5  | 2,5 | 3,1            | 2,6  | 2,3 | 2,3  |
| HE                                    | 90       | 81-108    | 18,0         | 15,0 | 12,9 | 10,0 |               |      |      |     |                |      |     |      |

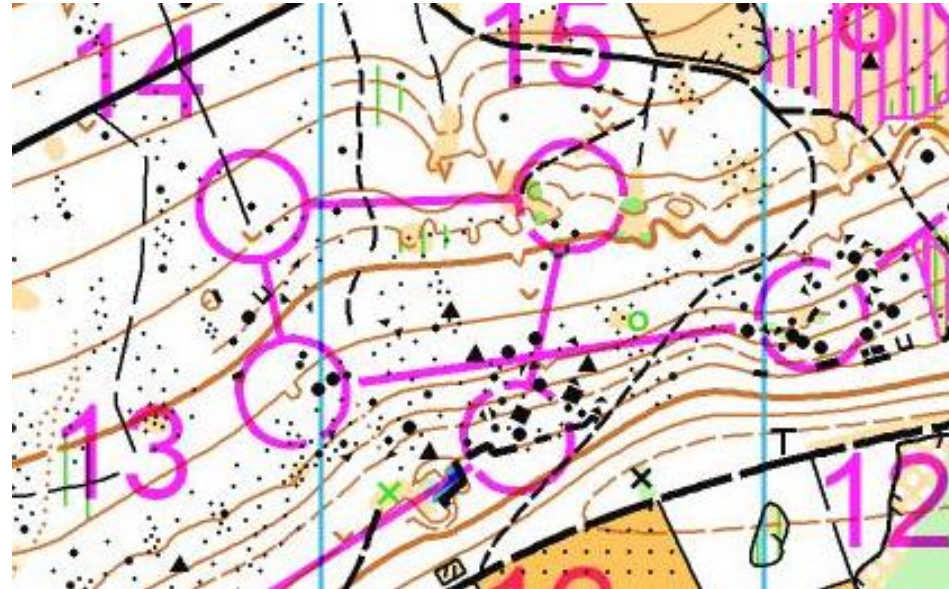
# Course Flow & Start Location

---

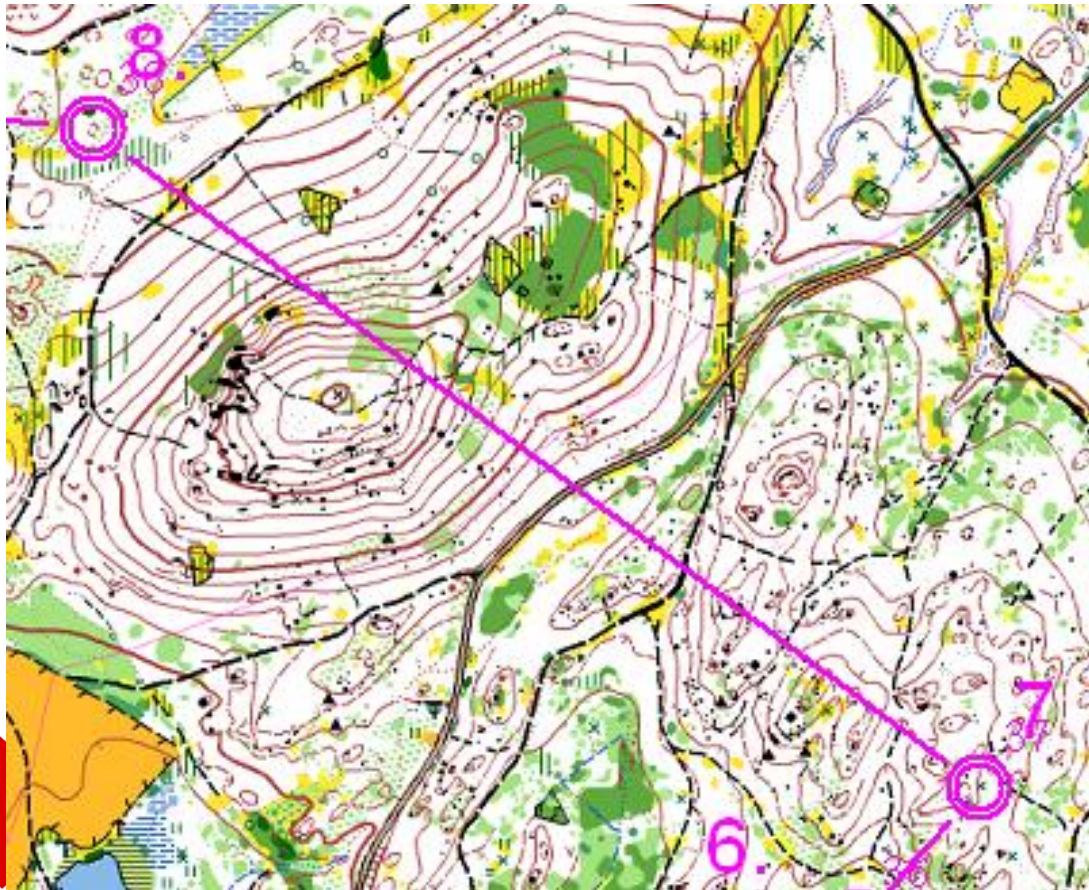
- to place start - definitely not the first action of CS proces! ;)
- how to handle the terrain? how to get the best out of it? how to satisfy all stakeholders? (elite, kids...)
  - long - finding good longer legs providing some route options
  - middle - how to approach the most interesting parts of terrain, how to reach the highest possible technical challenge?
- => pilot courses of different lengths and character (incl. kids)  
=> optimisation of start place location (also w.regards to logistics, but course quality first)
- start place layout (pre-start, time start, start of navigation...)

# Loops help to exploit the terrain

---



# Longer legs across natural obstacles



# Courses & Classes & Start table

- how many athletes expected in each class?
- course lengths calculation => some courses of similar length and character => joined classes (less courses to set, higher quality)
- [start intervals \* largest classes] + other limitations (elite last etc.) => total start window => creating start table with first controls
- assessment of density, adaptation of start intervals where possible

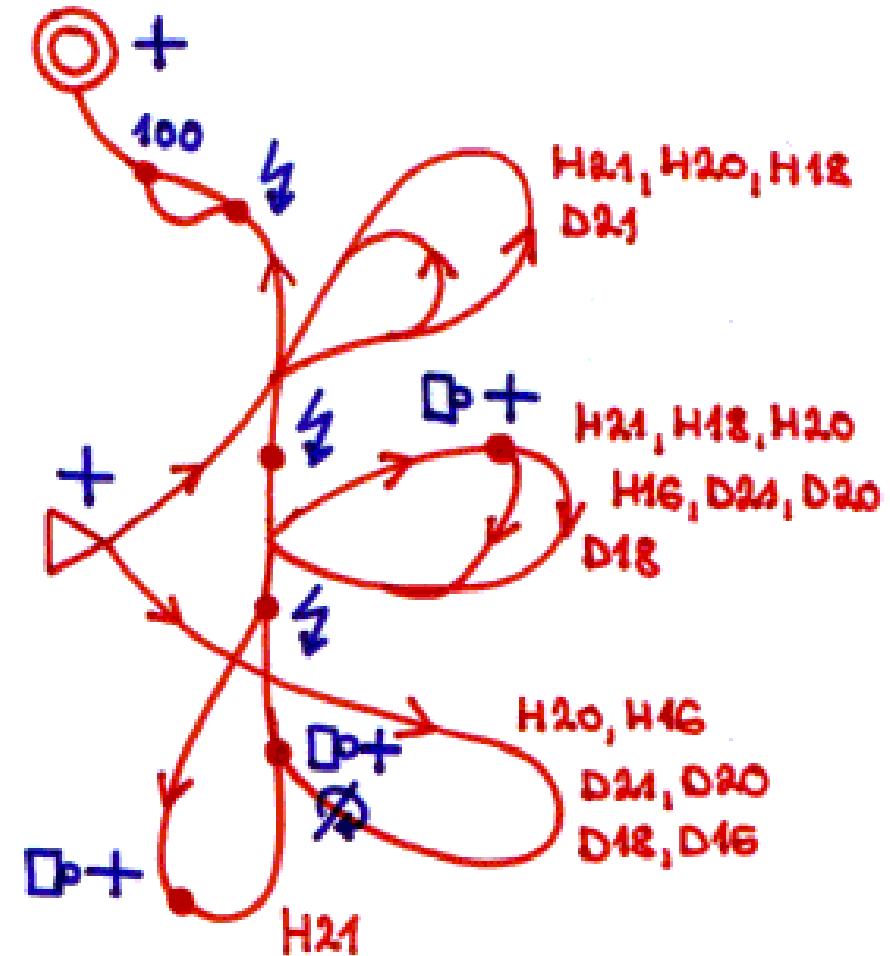
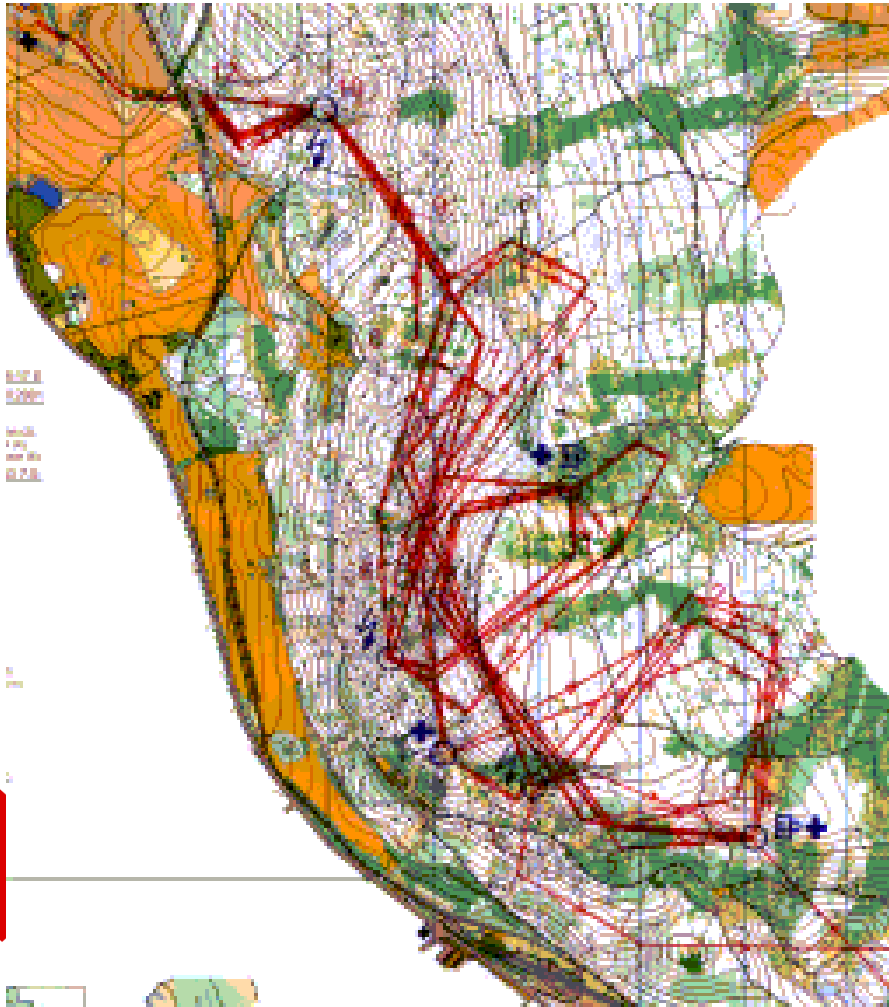
| ID   | class | course ID | length | interval | K1  | entered | start window (min) |
|------|-------|-----------|--------|----------|-----|---------|--------------------|
| aTV1 | H21   | m1        | 2,62   | 1        | 31  | 33      | 33                 |
| aTV2 | D21   | m2        | 2,08   | 1        | 31  | 30      | 30                 |
|      |       |           |        |          |     |         |                    |
| m    | H18   | m5        | 2,03   | 1        | 31  | 51      | 51                 |
| m    | H20   | m3        | 2,24   | 1        | 32  | 42      | 42                 |
| m    | D18   | m6        | 1,69   | 1        | 58  | 43      | 43                 |
| m    | H16   | m7        | 1,79   | 1        | 59  | 65      | 65                 |
| m    | D16   | m8        | 1,67   | 1        | 60  | 59      | 59                 |
| m    | D20   | m4        | 1,76   | 1        | 109 | 32      | 32                 |
|      |       |           |        |          |     |         |                    |
| v    | H21A  | v2        | 2,28   | 1        | 39  | 70      | 70                 |
| v    | H40   | v3        | 2,22   | 1        | 40  | 32      | 80                 |
| v    | H45   | v3        | 2,22   | 1        |     | 48      |                    |
| v    | H14C  | v13       | 1,91   | 2        | 42  | 21      | 42                 |
| v    | D16C  | v8        | 1,75   | 1        | 48  | 12      | 80                 |
| v    | D18C  | v8        | 1,75   | 1        |     | 8       |                    |
| v    | D21B  | v8        | 1,75   | 1        |     | 17      |                    |
| v    | D21C  | v8        | 1,75   | 1        |     | 8       |                    |
| v    | H70   | v8        | 1,75   | 1        |     | 12      |                    |
| v    | D60   | v8        | 1,75   | 1        |     | 23      |                    |
| v    | H16C  | v16       | 1,81   | 1        | 58  | 16      | 79                 |
| v    | H21C  | v16       | 1,81   | 1        |     | 14      |                    |
| v    | D45   | v16       | 1,81   | 1        |     | 49      |                    |
| v    | D21A  | v5        | 1,98   | 1        | 51  | 60      | 61                 |
| v    | H20C  | v5        | 1,98   | 1        |     | 1       |                    |
| v    | H35   | v1        | 2,37   | 1        | 57  | 29      | 72                 |
| v    | H21B  | v15       | 2,19   | 1        |     | 43      |                    |

# Course System (individual race)

---

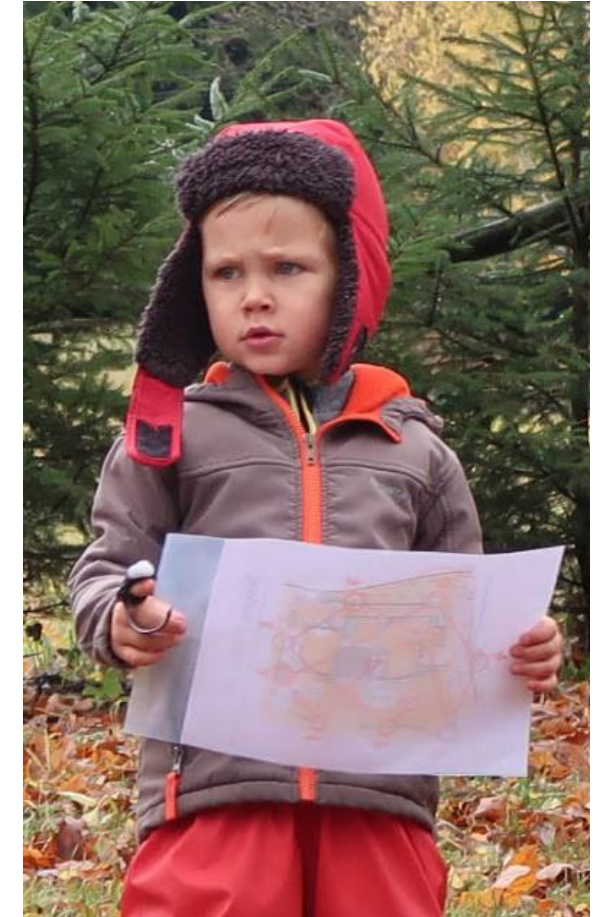
- challenge:
  - impossible to make 30-60 great but much different courses
  - at the same time we need to spread the crowd
  - and deliver best available challenge and enjoyment to everyone
- solution? => a suitable **common model of course-leading through the area and its FORKING into particular courses**
- the better this model (concept) is, the easier derivation of any other courses needed, without compromising the quality
- enables also easier planning of refreshments, radios, TV, photo ctrls, preserved zones...
- secures one-way approaching of controls (no contra running)
- as a side effect brings a relay-style disturbance and makes hanging more risky

# Course System

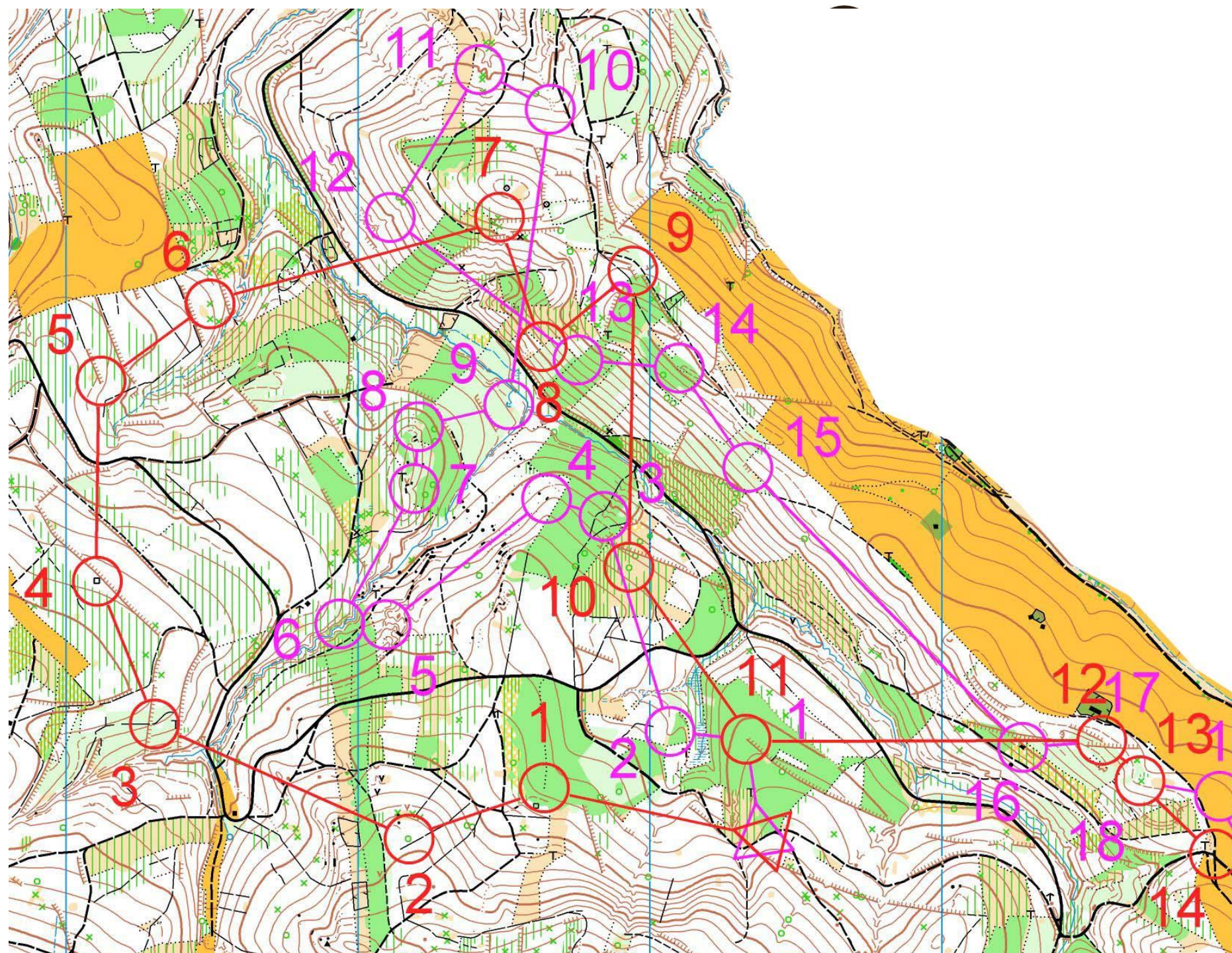


# And Eventually... Courses ;)

- A GOOD PERFORMANCE COURSE...
  - a) according to the **discipline definition**
  - b) **variable** (directions, leg lengths, morphology...)
  - c) **exploits the terrain** specifics
  - d) is **regardfull** (no redundant climbing, pure road running...)
  - e) is **fair**, eliminates luck influence
  - f) uses the **reduced visibility** where possible
  - g) is **inspirative** (as a course-setter I feel like running it)
  - h) is **foolproof** - tests navigation skills and prevents the athletes from loosing time on unclear issues



- change of:
  - terrain type
  - rhythm
  - leg demands
  - visibility
  - runability
  - but not of mapping style ;)



# How to Transfer the CS Know-How?

- How to paint a good painting?

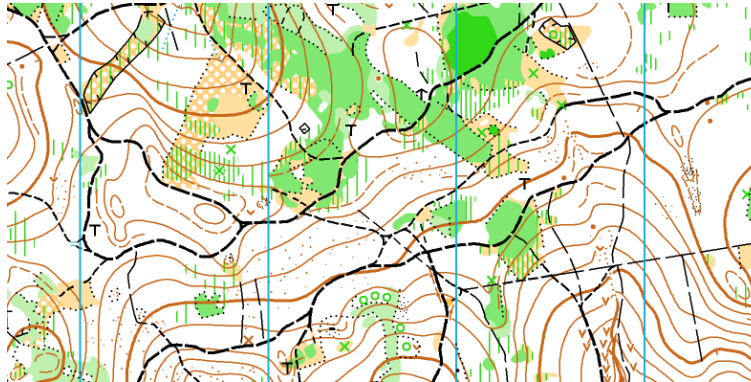


- Good courses communicate well with the terrain - using its best features and treating well its weaknesses. Each task is a bit unique though.
- Course-setting is a piece of art.

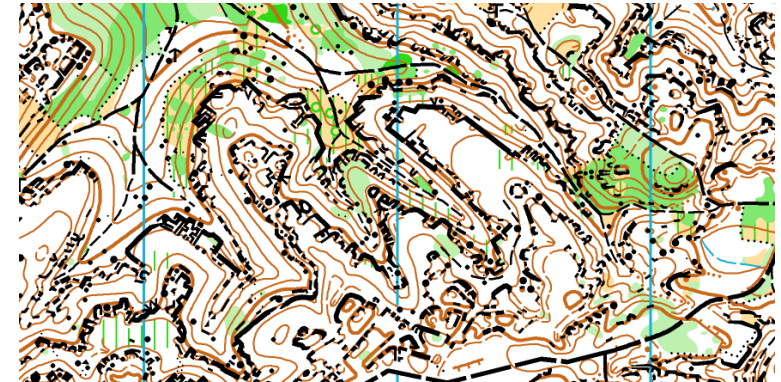
# Visibility

- a critical quality in navigation proces
- orienteering is a game based on visibility handling

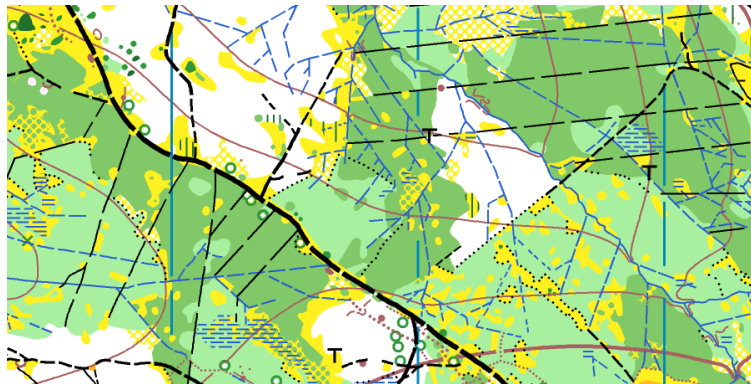
**A**



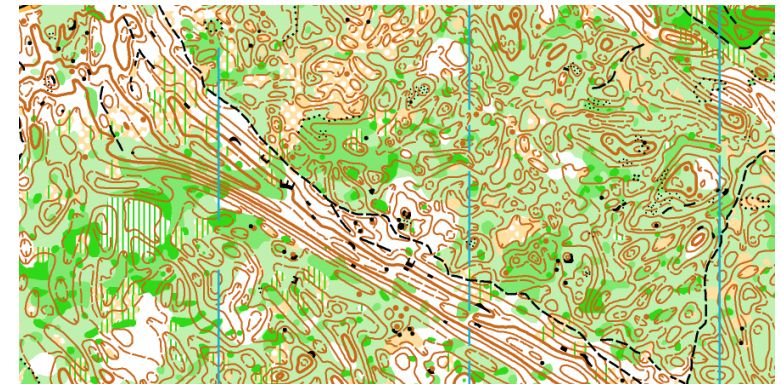
**B**



**C**

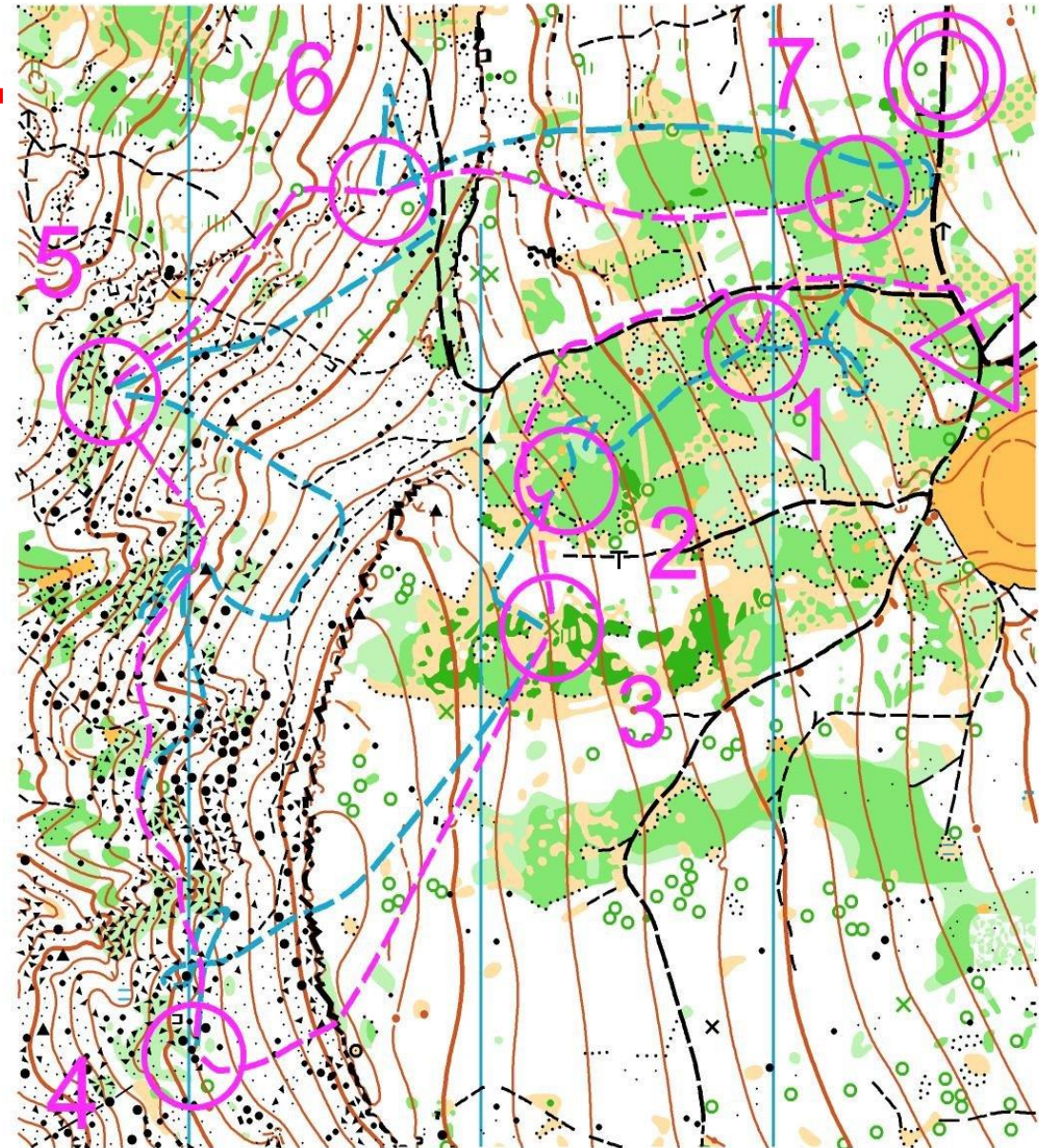


**D**

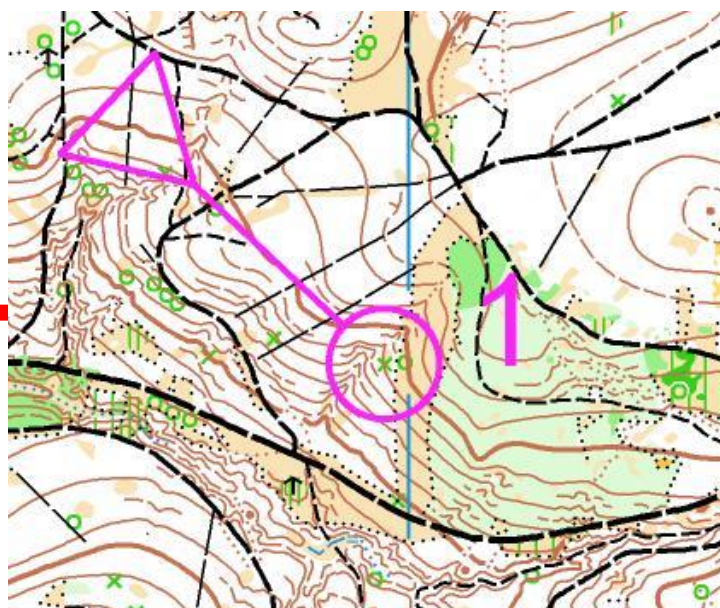


# How to Set on the Fire

- disabled line features following
- broken visibility between navigation points (horizont...)
- low visibility (thicket)
- meeting similar situations (parallel mistake)
- radical running speed changes
- radical directions changes
- areas lacking significant unique features
- etc.

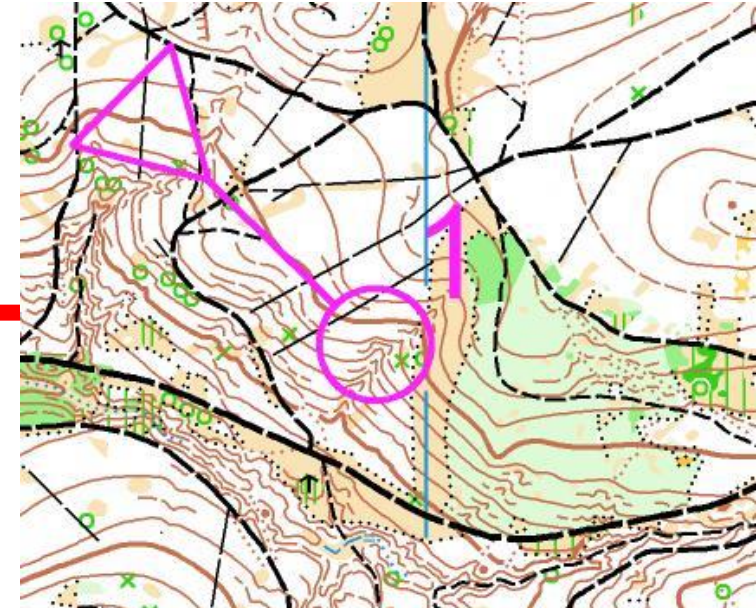


# Increasing of Difficulty Level



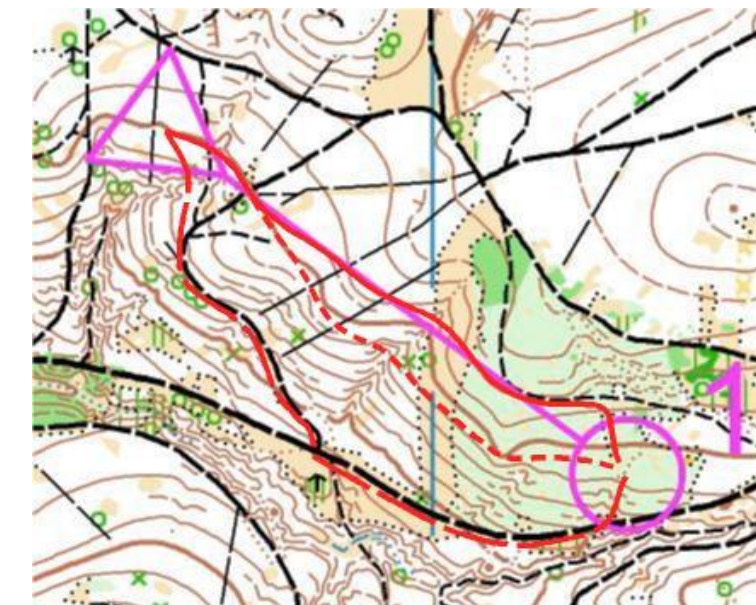
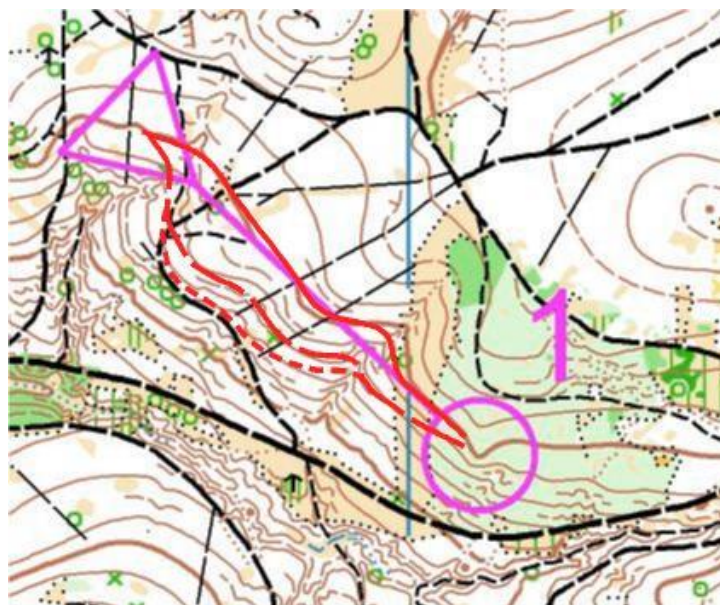
1

3



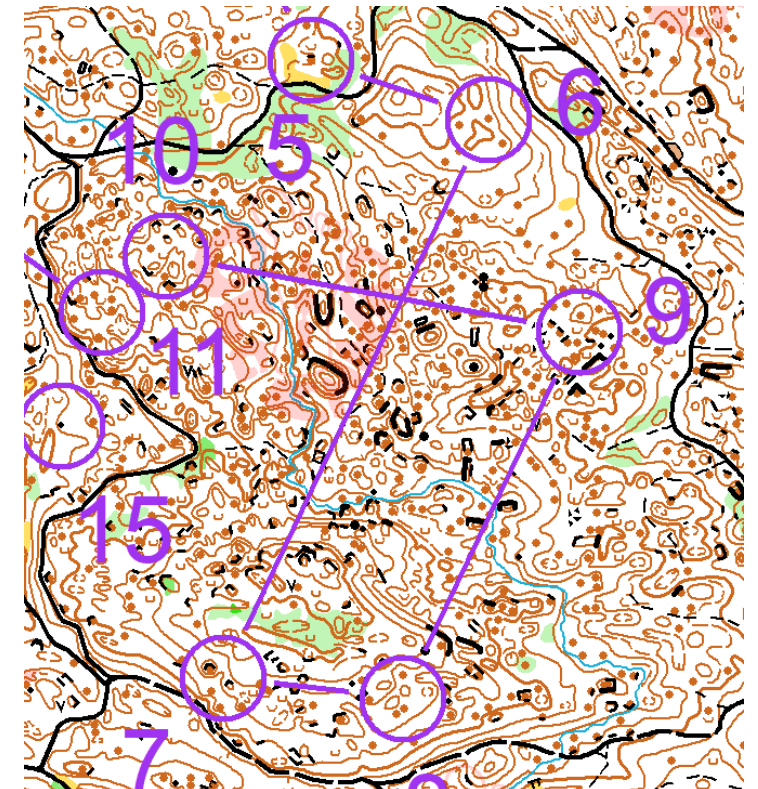
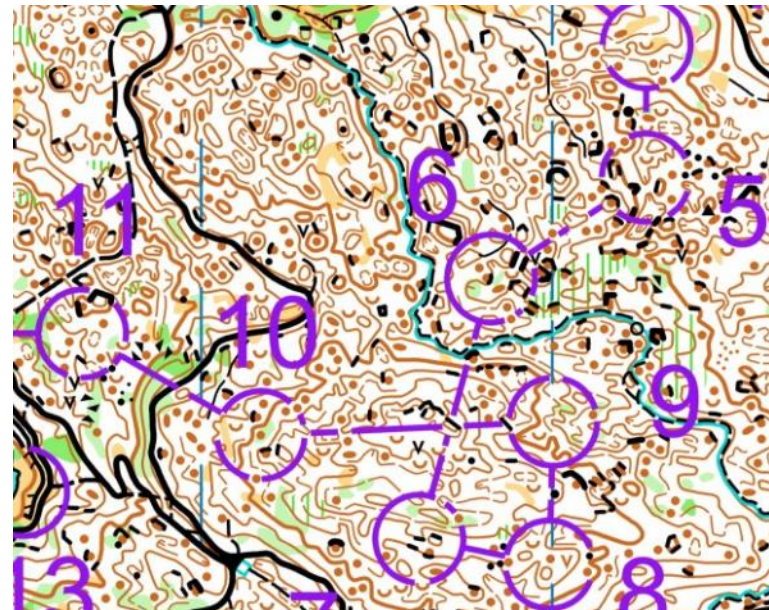
2

4

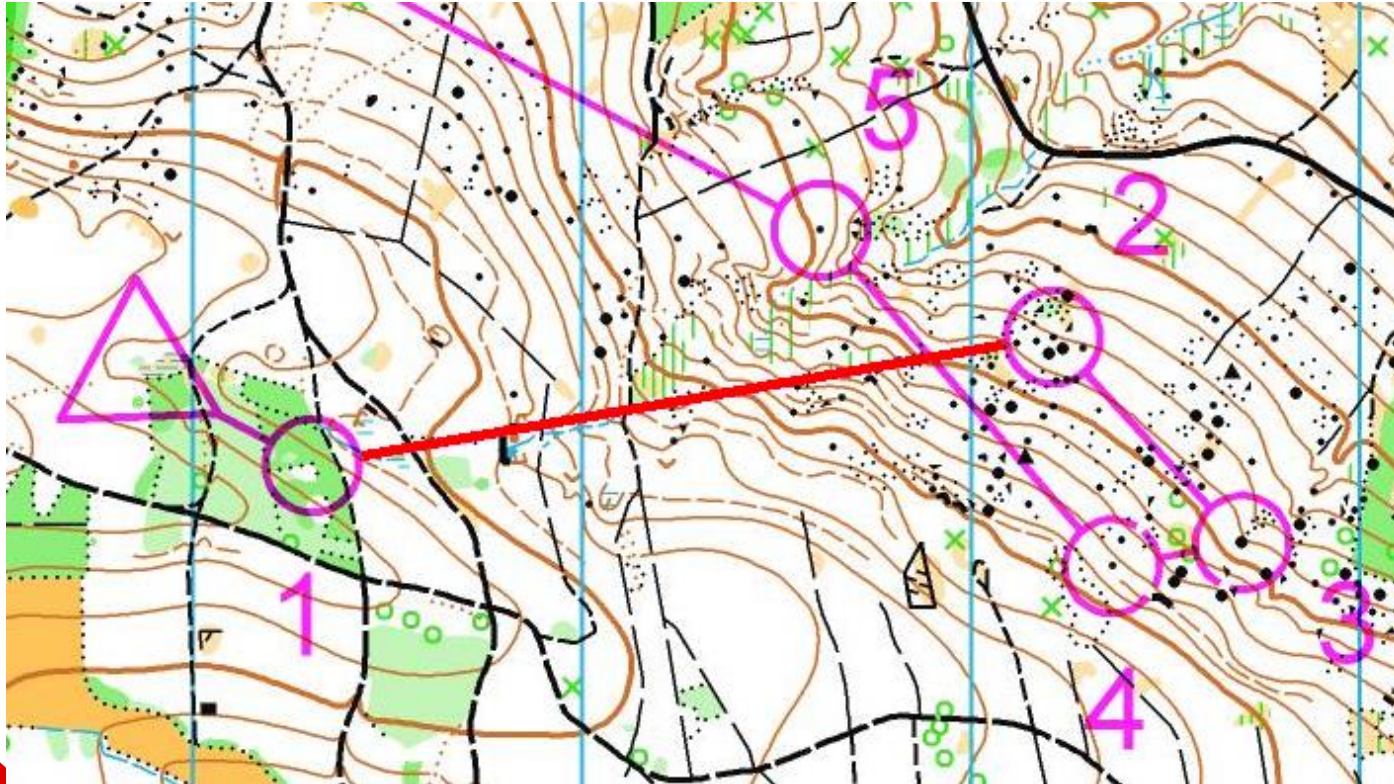


# Longer leg vs. shorter legs?

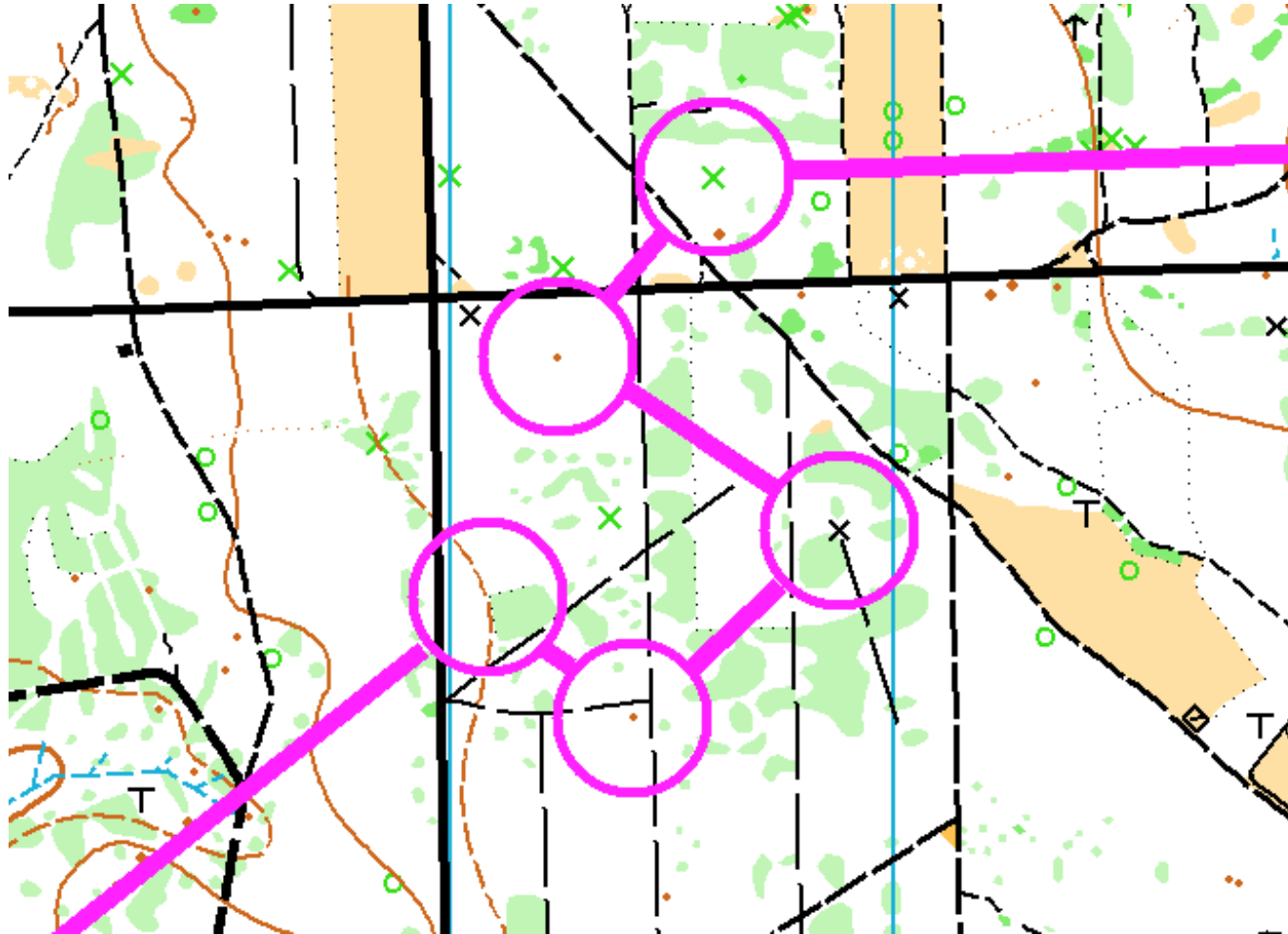
- paradox: short legs in detailed terrain make the navigation LESS demanding. Why?
- ex.: WOC 2023



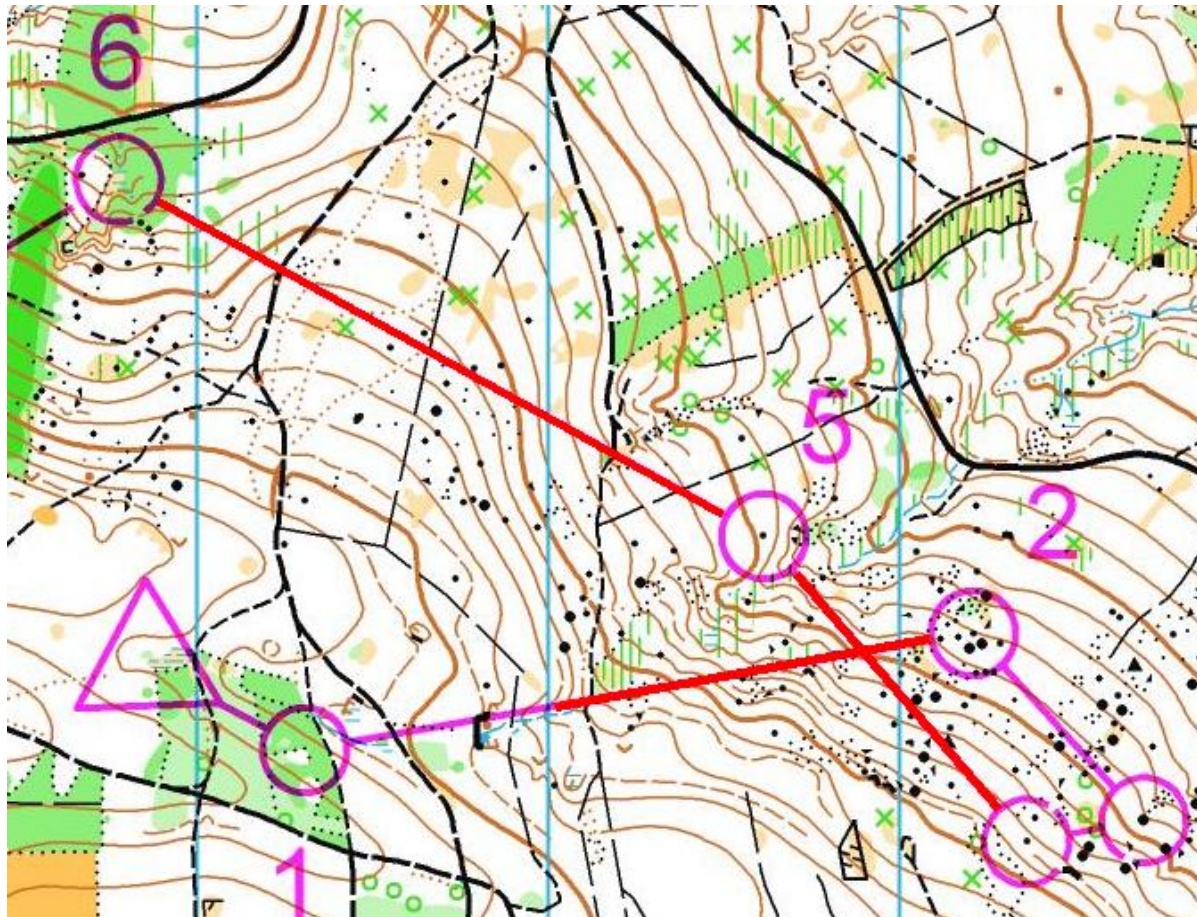
# Longer Leg Trap



# Short Controls Breaking Stereotype



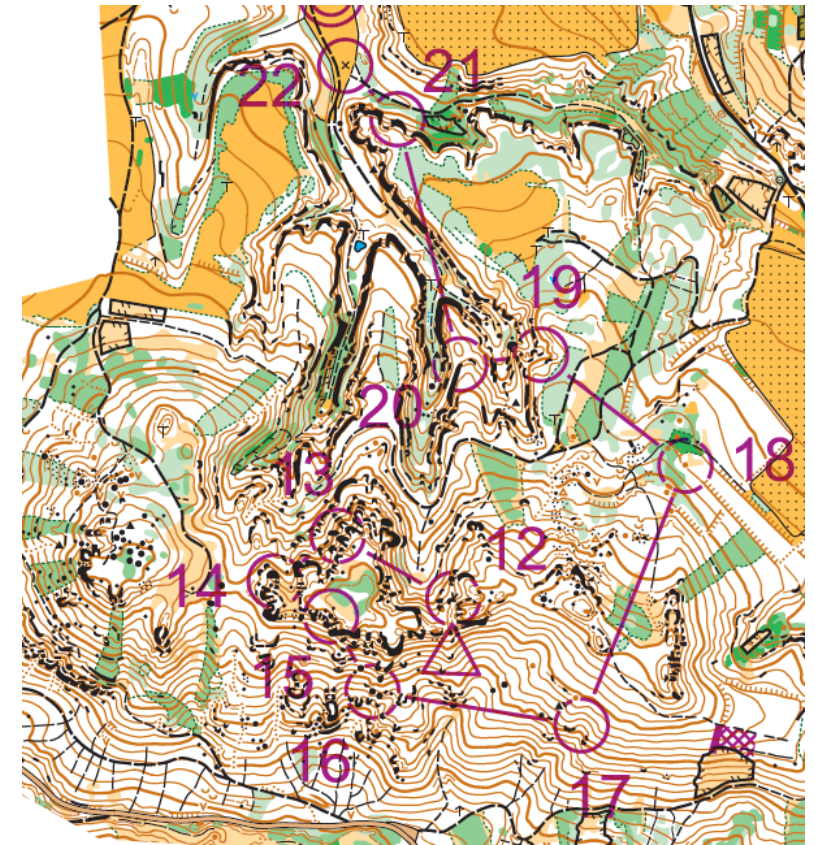
# Slantwise Across Contours





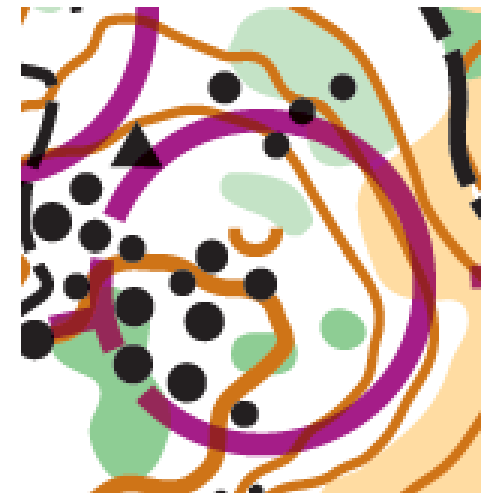
# Map Flip

- enables to re-enter the best part of terrain
- ex.: WC 2023:



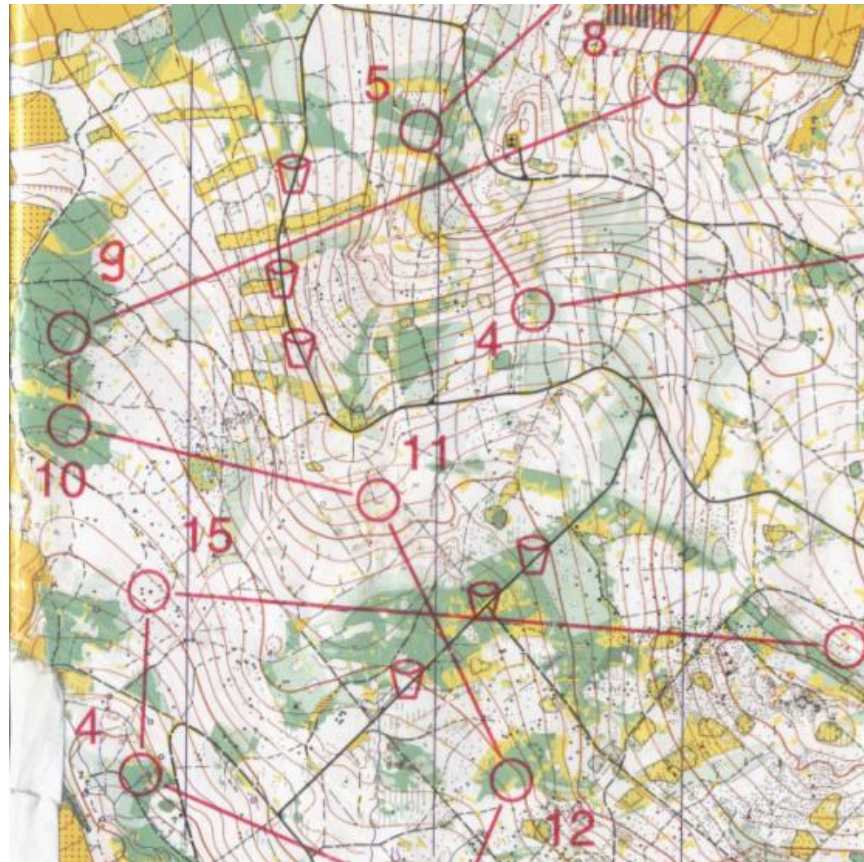
# Control Places & Control Descr.

- control place
  - rather a bit easier than tricky control
  - flag well visible when arrived on spot, not hidden behind bushes or trees, not dumped into ground
  - control codes of adjacent controls as different as possible
  - different objects when close to each other! (not only formally)
  - nice to have controls in the green - but map must be perfect and task doable
- control description
  - better choose the control which is easy to understand from the map
  - control description should make things easier, not more complicated! ;) athletes don't read complicated CD anyway...



# Refreshments

- at control preferred



# Summary | My CS Principles

---



- CS is developing of traps
- every single leg should have its meaning
- rather easier than a tricky control
- variability and surprise
- system
- map adaptation
- long is not a long middle
- readability critically important
- good ballance of secrets and transparency
- time losses caused by navigation mistakes, not CS faults
- I feel like running the course I made, I like it, I am inspired



**Orienteeering**  
**Austria**

**Danke für die Aufmerksamkeit!**

---

Hodně úspěchů a stavitelské radosti!

**Fragen, bitte.**