IntrO

Paralympic class and Open class competitors at WTOC 2013 in France

An introduction to trail orienteering for organisers, planners and participants.

British Orienteering

Sept 2013

1. Introduction

This manual is for organisers, planners and participants unfamiliar with trail orienteering or wishing to refresh their understanding of it.

It deals with **IntrO**, which is the name given to a simplified introductory form of trail orienteering.

Those reading this manual are almost certainly familiar with orienteering, as generally practised, and may have some idea about trail orienteering. But there can be misconceptions, so the essential elements of the discipline are re-stated here.

Trail orienteering is a world sport

FootO MTBO SkiO TrailO

TrailO is one of the four disciplines of orienteering, governed by the International Orienteering Federation, based in Helsinki, Finland. All four disciples have annual world championships.

TrailO is not yet as widespread as FootO but extends from the USA to Japan (via Europe).

Trail orienteering is a sport for all

Do not misinterpret the official trailO logo. Although the discipline was specially designed as a *non-athletic, intellectual* version of orienteering, in order that those in wheelchairs and others with mobility difficulties can take full part in competition, so can the able-bodied.

TrailO events are always open to all without regard to age, gender or mobility impairment, but may also have a closed 'Paralympic' class, usually on the same course.

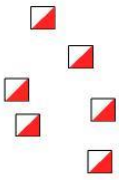
The popularity of trailO is such that the majority of participants are able-bodied including world champion foot orienteers. It is particularly attractive to those orienteers who, for whatever reason, find foot orienteering becoming too physical but wish to continue participating in orienteering.

Those foot orienteers who do participate in trailO invariably improve their skills of map reading and ground interpretation, of benefit to their foot orienteering in very detailed terrain. They also become more knowledgeable about the pictorial description symbols, again of possible benefit in very complex footO terrain. You could call this self-coaching.

So how does trailO fundamentally differ from footO?

Four major differences:

1. Competitors do not visit the controls. They stay on the mapped tracks, paths and marked routes and view the controls from a distance. Entering the terrain is strictly forbidden!! Instead, competitors have to decide, by diligent map reading and terrain interpretation, whether or not there is a flag correctly marking the control point as defined by the centre of the circle on the map and the accompanying description.



There may typically be up to five flags (very occasionally, six) associated with each control, one of which is at the centre of the circle but beware: there is a further possibility, no flag at the centre of the circle!

2. The main course is untimed, other than having a maximum allowed time before incurring penalties. The competitors are provisionally ranked by correct score, not by their times round the course. There is no merit in being the fastest.

To separate competitors with the same correct scores, there is a timed controls procedure, which measures the thinking time in solving one or more 'timed controls', extra to the main course. In this case, there is merit in being the fastest.

3. Whereas a foot orienteer usually takes only seconds in visiting a correct control, once sighted, the trail orienteer on a classic course has minutes available to view the terrain and flags and to make fine

judgement about flag position. This means that flag placement in trailO is necessarily much more precise than in footO. To permit such precision the trailO maps are at an enlarged scale, typically 1:5000, and show more detail:

1:5000 after correction

As scaled from 1:10000 base

[This example is from a timed control at WTOC 2012. To answer the sharp-eyed who notice the switching of contours and form lines, this was to improve the legibility of the small contour knolls]

4. The decision-making in trailO involves multiple choice, which affects identification and recording. To identify which flag is which, the competitor views the flags from the Viewing Point (aka decision point) and sequences them from the left as Alpha, Bravo, Charlie, Delta, Echo (Foxtrot, if 6).

A B C

On the banks of the River Dneiper at WTOC 2007, Kiev

The option where no flag is at the centre of the circle is Zero (Z).

Recording the decision is currently by conventional coded punch on a control card, although trials are being conducted with electronic systems. The card has six boxes for each control (A to E and Z). To allow the punch to reach six boxes, they are split with three on each side of the card:

A 1	B	C	Name.....	D	E	Z 1
A 2	B	C		D	E	Z 2
A 3	B	C		D	E	Z 3

… and so on for twenty or more in international competition.

A 10-control card is reproduced at Appendix 1.

Silence is golden

In competitive trailO speaking is expressly forbidden except possibly to say, "Your wheelchair is on my foot."

At IntrO events discussion is obviously of benefit but please keep the noise down.

Common myth

Before we leave this overview, there is one more common myth to erase. Although non-athletic, at top-level events it is absolutely not a doddle*.

At international and national events the competition is unrelenting and competitors often arrive at the finish physically exhausted from up to two hours or even more of intense mental pressure. At this level of competition trailO is assuredly a sport rather than just a mental exercise.

You might be relieved to learn that, at **IntrO** level, it is just a mental exercise. You may be further relieved that IntrO does not have timed controls.

* doddle *n. Brit. Informal.* Something easily accomplished

Different forms of trail orienteering

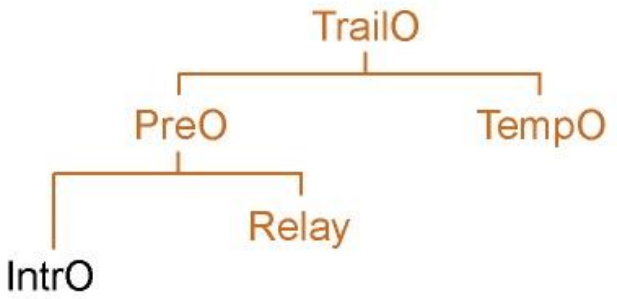
In the last twenty years trail orienteering has, metaphorically speaking, come on by 'leaps and bounds'. The first world championships were held in Vesterås in Sweden in 2004 and every

year since in different countries, often combined with WOC. Different forms of trailO have evolved and so has the vocabulary that goes with it.

It is useful to be familiar with the various descriptions and what they mean within the IOF (not always the same in different countries!).

Trail Orienteering is the over-arching name for the various forms.

The different versions of trailO that are currently provided interrelate as in the diagram:



PreO refers to **Precision Orienteering**, which is the name given to the original, 'classical' form of the discipline developed in Scandinavia. Until recently the terms TrailO and PreO were interchangeable but the IOF has decided that 'TrailO' should be the general description for all forms of the discipline and that 'Classic' is now to be referred to as PreO.

Not unexpectedly, the influence of the IOF does not necessarily reach all the forests and tracks of the orienteering world and you might find the old terminology persisting.

TempO is a more recent development and consists of timed controls only, these being clustered together and viewed from a number of successive stations on a course. Typically there are three to five controls per station.

Relay is a form of PreO competition in which there are, usually, teams of three. There are several versions under trial.

IntrO is a simple introduction to PreO. Unfortunately, before PreO was formally adopted by the IOF as the name of 'classical' trailO, the title PreO was used in the sense of preliminary and still persists in places.

2. Setting an IntrO course

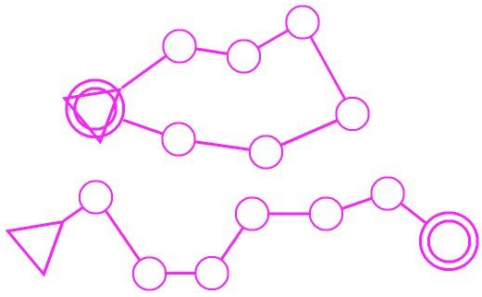
The usual (but not exclusive) arrangement for IntrO is that it is set up as an extra to a footO event with the aim of both introducing the trailO concept and providing an extra attraction at the main event.

The objective is to prove a modest sample course, easy to administer on the day and easy to participate in.

A typical IntrO course might offer six controls: two of 'easy' standard, two 'medium' and two 'hard'. The easy controls demonstrate the basic idea; the medium standard is that of map reading and terrain interpretation general to footO, the 'hard' examples demonstrate the precision of map reading and flag placement in trailO.

Other variations may be preferred, to suit the target participants, the main event and the terrain.

Course structure



A common arrangement is out-and-back, with the start and finish at the registration point.

An interesting variant is for participants to try the course on the way to their main event start. It is said that the map reading practice is useful mental 'warming up'. The cards/maps are dropped into a collection box for marking and return to participants after the main event.

Equipment

At Registration/Start:
Maps and control cards.

At each control:
Flags and stakes
Viewing point stake with control number
Nearby stake with punch
Tape (only if control clusters need separation– see later note)

At Finish:
Arrangements for checking cards
Solution maps

The picture shows an example of an ultra high quality world championship viewing point and punch arrangement, at WTOC 2010 in Norway.

The punch is positioned away from the viewing point to offer competitors some privacy when marking their cards.

IntrO does not need the tape and mini flag. A viewing point stake, suitably numbered and a nearby stake with a pin punch (remember those?) will suffice.

A word about the flag in the photograph. The single flag control shown (Answer A or Z) from WTOC 2010 in Trondheim was not a joke! It is unique in that it was set at the shortest distance possible, in this case about half a metre, from the viewing point. Typically, flags are further away, but within 50m, occasionally more but it all depends on their visibility. For IntrO short range is preferred.

Map

The map is specially prepared, usually by extracting and modifying part of an existing footO map, either ISOM or ISSOM. For those familiar with Ocad mapping, this should present no difficulty at all.

The extract map is then stretched to trailO scale of 1:5000 (or, less commonly, to 1:4000).

The symbol sizes are unchanged, if expanding from a 10,000 original; or increased by 50%, if the original is at 15,000 scale.

The reasoning behind this is that the 10,000 symbols are large enough to be legible for older competitors and there is more space between symbols to allow for finer map detail.

It is quite likely that adjustments to the map to show finer detail around the selected control sites will arise in the planning process.

Corrections need only be made, as necessary, for the terrain around the control sites; the rest of the map can remain untouched for Intro purposes. A major competition trailO map does need

consistency, with respect to the sizes of mapped and unmapped features in the terrain visible from the course trail.

The course is marked in the usual way with direct lines connecting the circles. The circles are positioned to 0.2mm where necessary!

The map might usefully have introductory advice printed on the back.

To reduce printing, the IntrO map (provided the control card is separate) may be re-used but there must be enough solution maps for retention by participants.

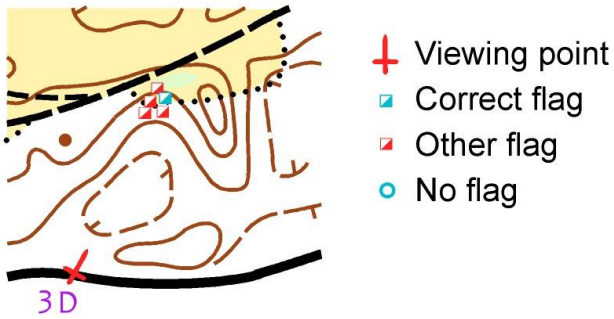
Solution map

The solutions are usually presented at two-times enlargement of the course map. The scale is 1:2500 (or 2000) and the symbol sizes are doubled.

If the IntrO area is compact, the solutions could conveniently be presented on an enlargement of the course map within A4 sheet size. This is the simplest arrangement involving less mapping.

If not so compact, requiring a solution sheet over A4, which may not be convenient, the remedy is to extract segments around each control and assemble a mosaic map solution sheet.

This example of part of a solution sheet shows the essential information for each control solution: Control 3, answer D, showing five flags. Had the answer been Zero, the 'no flag' symbol would have been at the control point.



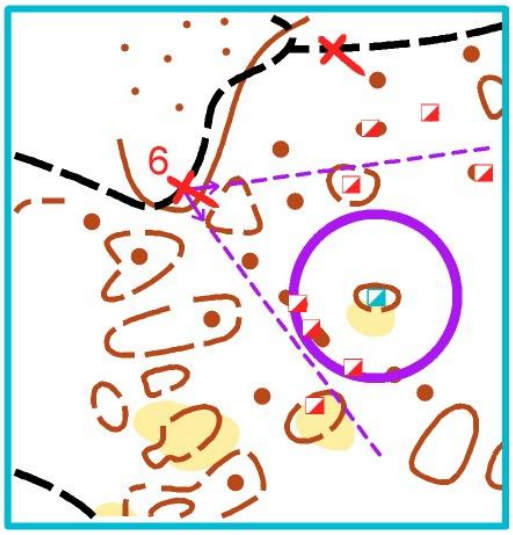
The symbols used here are customised for world championships. For IntrO purposes a simpler set is acceptable, using a cross for the viewing points and solid circles of knoll size, or slightly smaller, for the flags. The open circle for the no flag zero control is conventionally used. All of these are readily produced in Ocad.

Some prefer to add the control circle as well as the flag positions. If the circle obscures flag positions, there is the option of cutting the circle or fiddling with the colour table in Ocad.

A good idea with the solution sheet is to add planning and solution notes for the controls (See Appendix 2.)

Tapes in the terrain

If more than the designated number of flags on the description sheet are visible from a viewing point, then a short tape is laid from the viewing point stake into the terrain to 'cut off' the unwanted flag or flags.



Sometimes it is necessary to lay two tapes, with the required flags between them, as in this example from WTOC 2012, Scotland.

From the viewing point eight flags were visible for the A-E control.

Two short tapes were used (solid purple line with arrows) to define the cut-off directions (dashed lines).

3. Planning

This section includes examples of trailO control setting for the three grades mentioned. Much depends on the detail in the terrain. Even a skilled planner would be hard pressed to devise controls in largely featureless terrain.

Skills needed

The first and foremost requirement is contour interpretation, being able to transfer a contour line on the map onto the ground. In trailO this can be very precise, less so at introductory level, where it can be simply a question of which re-entrant is which?

Matching the map to the terrain is an obvious requirement but the reverse, deciding what on the ground is not on the map, is a necessary skill.

Unlike in footO, trailO uses features other than the control feature to locate the flag position. On a linear feature, for example, a nearby other feature can fix the centre of the circle. On a grander scale there may be **sighting lines** between clearly identifiable

points on the map and ground which, by interpolation or extrapolation, intersect the linear feature at the centre of the circle. The competitor has to decide that the control problem is one of sighting lines and then identifying the sighting features likely to give a reliable result.

Distance estimation along the track or out into the terrain is sometimes required to locate which of several features. The accuracy demanded is not high: 25% for range estimation, sharper along the track, 10%, because this can be paced out.

Distance estimation across the field of view is a useful skill. This needs two identifiable points at the same range to provide a base. The flag could be midway between the points or as much again to one side (or simple fractions).

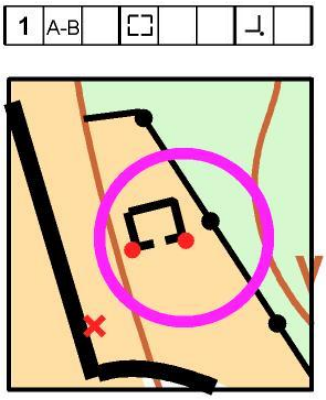
Rough compass can be useful to separate which from which. More precise compass is sometimes used, but the flags have to be at least 5 degrees apart from the sighting point (not usually the decision point). The standard orienteering compass suffices.

Examples of control sites

There are many hundreds of possible examples. The limited selection given here offers ideas for the planner to set and the participant to solve.

'EASY'

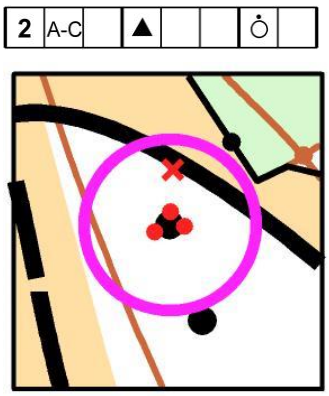
An **area** feature, large enough for its shape to be represented on the map, makes a useful introductory control.



In this case, a building, the edges of the feature are sharply defined and flags can be precisely positioned without difficulty. To keep it simple there are just two flags, on the SW and SE corners, the answer being Flag B.

Point features, those in which the symbol on the map is larger than the object in the terrain, also can make good introductory controls but can be a little less easy. The reason is that the control circle is centred on the symbol and not displaced in the direction of the description. *Many footO planners mistakenly offset their circles.*

For this boulder control a compass helps to confirm the N side of the boulder (Flag B).

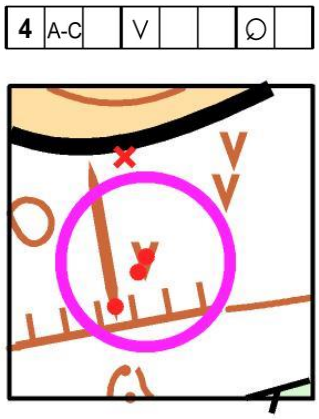


At IntrO level the flags should not be within 90 degrees of one another.

A slightly more testing control flag would be that on the E side, viewed from the same viewing point to the N of the feature. In this case the answer would be Flag A.

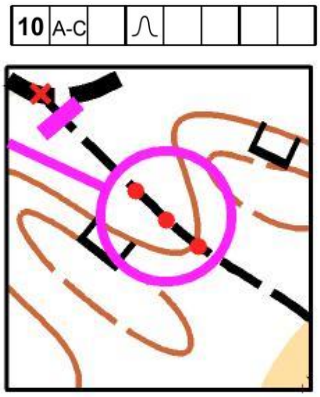
The reason this is more testing is that the viewer needs to go some way down the track to get east of the feature to confirm that the flag is set E not NE or SE.

'MEDIUM'



This is a **point feature** control somewhat more testing than earlier examples. The feature is quite large, about the same size as the symbol on the map. The centre of the circle is correctly placed on the centre of the symbol and there is a flag at the centre of the feature.
The correct flag (B) is noticeably offset in the terrain in the direction of the flag at the gully end. However the description is Pit, **SW edge** and refers to the offset flag.

Nearby features can be used effectively for fixing position in extended features.



In this example the nearby rock face acts as a position fixer, with the correct flag opposite the SE end of the rock face. Note that the end of the rock face had to be clearly visible, and high enough to be mapped (normally 1m minimum).

An alternative description could have been 'path' but contours take precedence!

Contour problems are regarded as traditional and are much preferred by the cognoscenti!

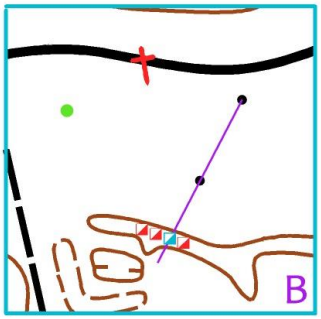
This is a good straightforward example. Four 'hills', three of which are in the circle. The problem is: which hill, which end? The viewing in a SE direction with the map set in that direction making the Column G description just that little more tricky.

'HARD'

These examples in this section are hard by IntrO standard but serve to illustrate the extra techniques for position fixing used in trailO.

Sighting lines can be used for very precise position fixing, if the anchor points are themselves precise.

In this example there is an intersection between the linear feature (spur) and the sighting line through two small, precisely positioned boulders.



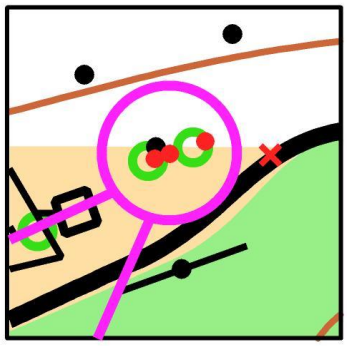
The two boulders are well positioned, being a useful distance apart and roughly at right angles to the spur, so that the angular separation of the flags, when viewed along the sighting line, is maximised.

CAUTION Beware of multiple sighting lines! Unless the map is very accurate indeed the intersection of the various sighting lines will not agree. The principle of the 'cocked hat' in navigation at sea is all very well but unsuitable for the precision required in trailO.

Although two intersecting sighting lines can be used to fix a point in an area feature, such controls are not recommended for IntrO. A single well-defined sighting line intersecting a linear feature, such as a fence or long spur (as above), for example, is to be preferred.

Between is often found as a description in trailO. It has a precise definition. It is at the mid point of the shortest line between the **edges** of the features.

Good features for between problems are boulders, thickets and good-sized trees.

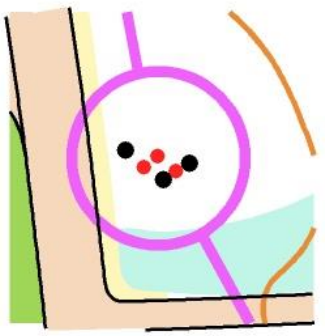


By 'good-sized' trees is meant those with their foliage well above flag level so that the trunks are clearly visible. Between is mid point trunk to trunk.

Note that, in this example, the point symbol green circles are much bigger than the trunk diameters.

Note also the viewing point is deliberately set to give an oblique view of the flags

It is a requirement, when planning a 'between' control, to be able to view the flags square on (at right angles) to the line connecting the features so the mid point can be judged.

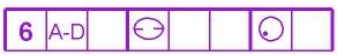


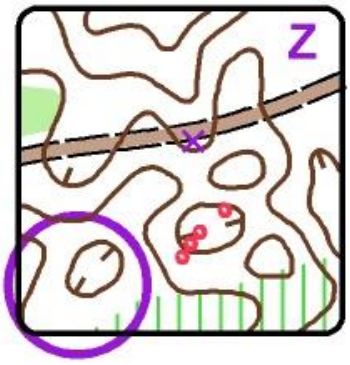
'Between' controls are often set among a cluster of similar features, in this example from Finland, three boulders.

Note that the description indicates that it is the N pair of boulders, between which the control is located.

Very important. The features described must be within the control circle.

Zero controls, when neatly planned, can be rewarding but can also give rise to controversy unless the golden rule is followed. This rule requires zero controls to be **clear** zeros, such that competitors can be advised that, if they are not sure it is a zero, it is not a zero!





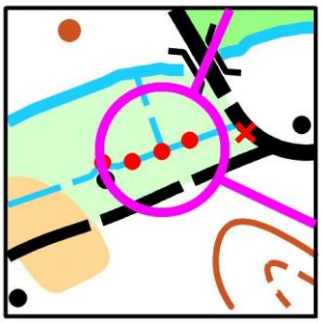
This control, from WTOC 2006 in Finland, is a good example of a clear zero, with the centre of the circle on a near-identical parallel feature some distance away.

On paper, the example seems very easy but, in the terrain, it was not easy to be sure about position along the track.

The parallel feature zero is suitable for IntrO planning.

N.B. Never permitted, at any level of competition, is having a flag correctly positioned at the centre of the circle but wrongly described. It is possible that there may be more than one valid description for a flag position, but a deliberately incorrect description seeking a zero answer is forbidden practice.

Secondary viewing points feature in trailO. Although all the flags can and must be visible from the viewing/decision point, it is often necessary to view the flags from different points to determine their precise positions.

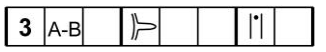


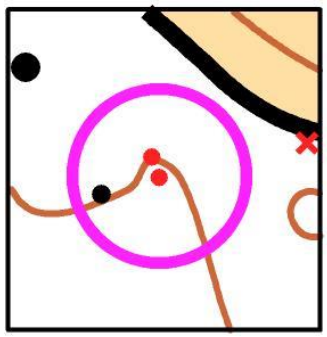
In this example the four flags are set along the EW ditch, confirmed by viewing the length of the ditch from its E end. However, the junction with the NS ditch is not readily visible from the viewing point and it is necessary to move along the S path to determine which flag is at the junction (Flag C).

Note that, if Flag C was absent, this would make an acceptable zero control.

A word about **parallax**. If the viewing/decision point were near the bridge, the correct answer would be Flag B. But from the secondary viewing point it is Flag C. This change of order is referred to as parallax. This may be used with caution with IntrO controls.

Contours are the base currency of trailO. When planning trailO the first search is for potential contour interpretation controls.

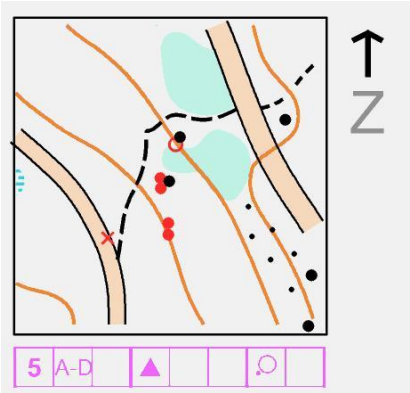




Only one contour line? Do not dismay! It may be possible to make a good IntrO control. In this example the contour line is fixed by the boulder and passes through one of the flags. Viewing the layout from the N allows the contour to be traced horizontally from the boulder to the base of the lower flag.

Unmapped features make an often-valuable contribution, provided they are legitimately unmapped, i.e. less than 1m high.

In this example, from WTOC 2012, the ring knoll of the control was substantial enough to be mapped. The other four flagged positions were knolls not high enough to be mapped but all were clearly seen as knolls.



Here is another example of legitimately unmapped features from WCup 2001 in Finland. The two southern flags were placed on a good-sized boulder but under the 1m height threshold. The two northern flags were placed on a mapped boulder. At first sight the flagged boulders appeared to be the mapped pair but the control boulder was hidden by the thicket, although visible from further along the track.

This would make a legitimate 'hard' zero control in IntrO.

4. The next stage

Those planners and participants seeking advancement to elite level trail orienteering might find two IOF documents of help.

These are accessed at **orienteering.org/trail-orienteering/event-organising/organisers-guidelines**

'Technical Introduction to TrailO for Experienced Foot Orienteers'.

This IOF document contains photographs of the control sites on a sample course. Several of the examples have been used in this IntrO manual.

'IOF Technical Guidelines for Elite Trail Orienteering'

A comprehensive document detailing the current technical understanding of elite level competition.

Help and advice available from brianhenryparker(at)gmail.com

Acknowledgements

This document prepared by Brian Parker, IOF Trail Orienteering Commission, with encouragement and assistance from Anne Braggins and Anne Hickling.

Sept 2013

Appendix 1 - Control card for IntrO

A 1	B	C	Trail Orienteering Name.....	D	E	Z 1
A 2	B	C		D	E	Z 2
A 3	B	C		D	E	Z 3
A 4	B	C		D	E	Z 4
A 5	B	C		D	E	Z 5
A 6	B	C		D	E	Z 6
A 7	B	C		D	E	Z 7
A 8	B	C		D	E	Z 8
A 9	B	C		D	E	Z 9
A 10	B	C		D	E	Z 10

Appendix 2. Guidance on the back of the map

How to tackle an IntrO course

You must not leave the tracks or marked route.

Go to the vicinity of Control 1 and find the Decision Point (not on the map).

Carefully study the map, control circle and description. The descriptions show the number of flags assigned to each control, e.g. A-C (indicating 3) and not a code, as in FootO. Then look at the terrain.

Identify the centre of the circle in the terrain. You will almost certainly find it helpful to move up and down the track to get better or different views. This is permitted, but do not cross any tapes laid across the track.

Is there a flag at the centre of the circle? If yes, keep an eye on it and go back to the Decision Point to label its position in the cluster. These are labelled **from A on the left** through to E, if the description is A-E.

If definitely no flag at the centre of the circle, the answer is Zero (Z).

Using the nearby pin punch, mark your card in the row for Control 1 with your choice.

That's it! Simple in principle but possibly not so easy in practice.

Complete the course. Hand in your map and receive a solution map with comments on solving each control.

We hope that you enjoyed this taster and will do more TrailO.