Distance Calculations In Distance Handicapped Tasks

Experience with scoring Distance Handicapped Tasks has shown that distance calculations may cause some confusion due to the way the task is set and scored. Directors and Scorers should make sure they are familiar with these issues if they intend to use DHTs in competitions using 1000 points scoring.

There are two main issues:

- Task distances reported by SeeYou and SeeYou Competition do not accurately reflect the true distances flown for each glider, potentially leading to unrealistic speeds being reported for finishers.
- Landout distances can be distorted by the size and number of barrels used in the task. The distances reported by SeeYou are unhandicapped, and do not necessarily reflect the actual distance flown.

Finishers' speeds can be adjusted to give a more representative handicapped speed, but until this type of task is fully supported by SeeYou, the landout distance anomalies are unfortunately unavoidable.

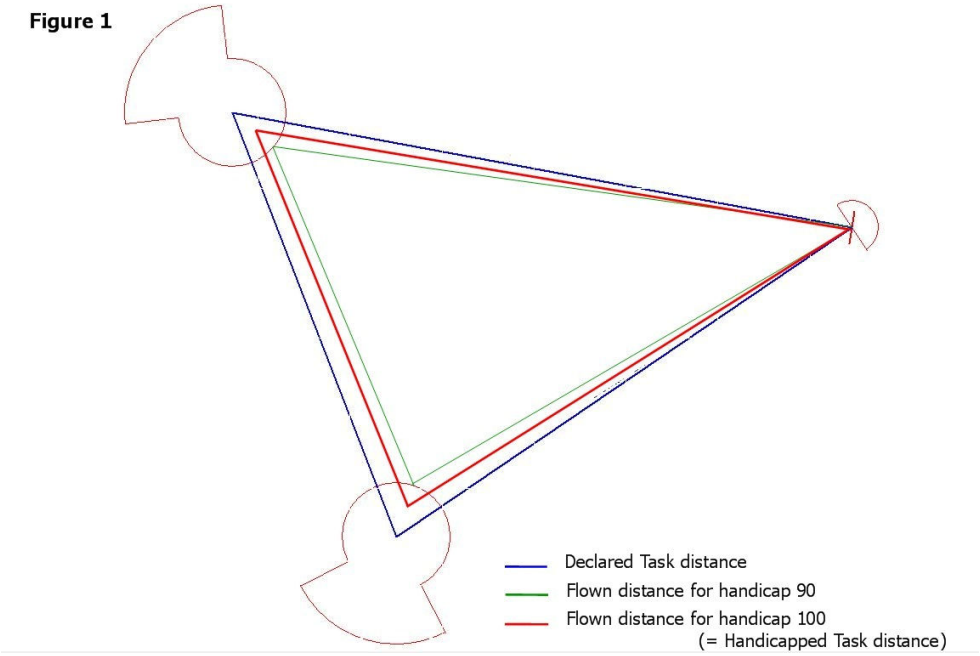
This document explains the reasons behind these issues, and the rationale currently adopted for scoring these tasks under the 1000 point scoring system.

Task distances

For a glider flying any conventional racing task, SeeYou reports the overall leg distances, and ignores Turnpoint (TP) barrel sizes (normally 0.5km). In a Distance Handicapped Task (DHT) ignoring the barrel sizes can have a significant effect on the reported leg distances.

For scoring purposes, it is important to understand the meaning of, and relationship between, three different distances (see Figure 1).

Figure 1



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The **Declared Task distance** is the full distance between the TPs (centres of the barrels) for the declared task.

The **Flown distance** is the distance to be flown by any glider between the barrels.

The **Handicapped Task distance** is a common distance which is derived by each glider's handicap being applied to its targeted flown distance. Every finisher will have flown this same handicapped distance.

When a task is set, the actual distance flown by the highest handicapped glider will be nearly the same as the distance between the turnpoints (allowing for a 0.5km barrel). For all other gliders, their actual distance flown will be less than this distance, depending on the size of the barrels that they are using for the same turnpoints.

The full distance between the turnpoints and start and finish points is the **'Declared Task distance'**.

The handicapped distance that the highest handicapped glider will fly round the task can be calculated using its handicap and any wind adjustment based on the estimated wind strength and direction for day, this is the **'Handicapped Task distance'**.

The Handicapped Task distance is used to derive a target **'Flown distance'** for each handicap. For each glider, when its handicap and wind adjustment are applied to the Flown distance, the result will be equal to the Handicapped Task distance.

For example, a task of 300km is set. The highest handicap glider is 110. In nil wind this would equate to a Handicap Task Distance of 272.7km. When any wind adjustment is applied, this distance will change and could become, for example, a distance of 280km.

The barrels sizes for each glider will now be set such that they all achieve a handicap distance of 280km. So for a glider of handicap 90 this could equate to a Flown distance of 254km. For a glider of handicap 100, the Flown distance will be the same as the handicap distance.

For scoring purposes, a fourth distance needs to be introduced, the **Marking distance**, which is the distance used to calculate distance points for each glider.

If all actual distances passed by SeeYou to the SeeYou Competition scoring script are multiplied by the appropriate factor (Handicapped Task Distance divided by Declared Task distance), then for all finishers, the result will be a distance that is equal to the Handicapped task distance, and for non-finishers, a distance that will be between 0 and the Handicapped Task distance. In scoring, this distance is called the **'Marking distance'** (in conventional tasks the Marking distance is the same as the windicapped distance). The Marking distance is used to determine what proportion of the day distance points to award to each glider. In the above example, the factor will be 280/300 = 0.9333, so all finishers will have a Marking distance of 280km, which will be used to calculate a handicapped speed for each finisher, and all non-finishers will have a Marking distance that is less than 280km.

As for conventional fixed course tasks, the points awarded for speed and distance are in proportion to the winner's speed and Marking distance. Therefore, the distance adjustment has no effect on the allocation of distance and speed points and a non-finisher cannot gain more distance points than a finisher.

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Although it may seem counter intuitive for the Marking distances to be less than the reported actual distance for a low handicap glider, this is due to the leg distances reported by SeeYou being larger than the targeted Flown Distance for that glider.

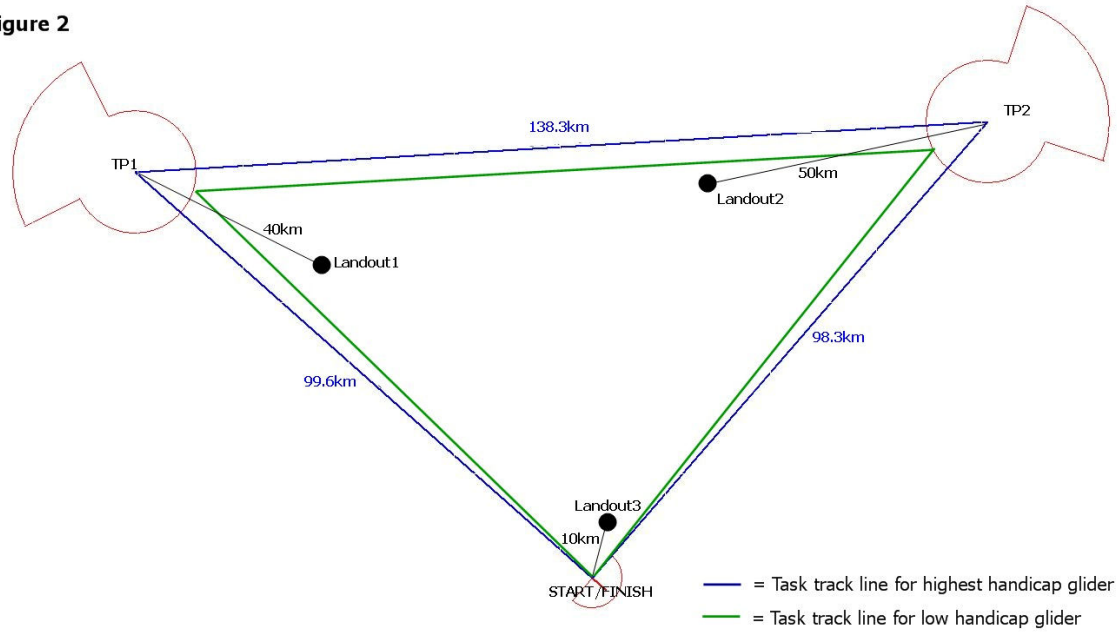
It must be noted that, as SeeYou and SeeYou Competition cannot currently report the Flown distance, any reported actual distances will not necessarily reflect the true distance flown by any glider.

Landout distances

Unlike conventional tasks, the handicap advantage is not applied in direct proportion to the distance flown, but is applied in discrete amounts, as each TP barrel is reached. This can lead to some apparent anomalies in landout distances and scores, particularly on the first leg, before any handicap advantage has been gained and at, or near a TP barrel.

For landouts, SeeYou will report the incomplete leg distance as the full leg distance less the distance from the point of landing to the coordinates of the next TP, and not to the barrel edge. Therefore, in some cases, the leg distance given for a landout, may vary significantly from the flown distance, depending on the geometry of the task and the position of the landout in relation to the track lines.Figure 2 shows three landout scenarios for two gliders, one with the highest handicap and one with a lower handicap.

Figure 2



Either glider landing at Landout1 on the first leg will be given the first leg distance (99.6km) minus the distance from the landout toTP1 (40km). i.e. SeeYou will give both gliders the same distance, 59.6km.

For a landing on the second leg at Landout2, SeeYou will give both gliders the same first leg distance (99.6km) plus the second leg distance (138.3km) minus the distance from the landout to TP2 (50km). So SeeYou will give both

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gliders a distance of 187.9km, however the lower handicapped glider will have gained some distance advantage at TP1 and so will have covered a smaller flown distance.

For the landing at 10km away from the finish point, SeeYou will give both gliders the full task distance (336.2km) minus the 10km, so 326.2km. The lower handicapped glider has received all of its distance advantage.

In each of the above cases, the scoring script used in SeeYou Competition will take the distances given by SeeYou and adjust them all by the same proportion to give a Marking distance, which cannot exceed the Declared Task distance, and then award distance points in proportion to the day distance points. In example of the gliders landing 10km from the finish, if the highest handicap glider has a handicap of 110, and if the Handicapped Task distance was 302.7km, then their Marking distances will both be (326.2*302.7/336.2) = 293.7km.

In DHTs, gliders given the same distance by SeeYou will always be shown to have the same Marking distance and will score the same points, regardless of handicap. This is a feature of DHT scoring and a limitation of SeeYou and its current scoring capabilities.

The Marking distance for landouts in DHT scoring is not equivalent to the handicapped or windicapped distance in a conventional fixed course task.

If pilots wish to know their true flown distance, this can best be achieved in SeeYou by using the distance measuring tool. They can look at their flight trace themselves, and manually find the distances between each point where they touched the TP barrel, and for landouts measure the distance to the next barrel to determine the incomplete leg length.

End