The World Pilot Ranking System (WPRS), for all Hanggliding and Paragliding disciplines.

This version of the WPRS formula was accepted at the CIVL Plenary meeting in Tallories 2007.

The formula is used for all disciplines in both Hanggliding and Paragliding.

The main aim of the WPRS is to rank pilots around the world in a fair manner, so the rankings will show the strength of each individual pilot, based on the competitions in which they have participated.

This version of the formula takes effect from March 1st 2007. All rankings from that date will use the new formulas and show the competitions in the last 3 years recalculated using the new formula.
Older rankings are unchanged and are accessible and visible in the WPRS system.

The pilot (participant) points are based on the sum of 4 best competitions in the last 3 years with time devaluation (Td) as it has been. Time devaluation is important in the formula because the value of the competition should decrease over time, otherwise we would have an "all time best in last 3 years" ranking instead of a current ranking

Main improvements in the formula from previous versions:
- Rewarding Category 2 competitions with 80% of the ranking points is dropped. This means that the winner can get up to 100 points in the strongest competitions (which could be in a Category 2 competition). This is because the quality of the competition part of the formula is improved and the real strength of the competitions is used. This is very noticeable in strong competitions like the Paragliding World Cup competitions, which score at a similar level as continentals and worlds. Also lower strength competitions will reward pilots with fewer points than before.

- Ranking points are 1 decimal instead of whole numbers (for example 67,4 points instead of 67).

- Pilot points within a competition are not a linear function of pilot places in the results, but normalized proportional to the winners score (total score in the results). By doing that the pilot points are relative to their performance within the competition, rather than just their place in the results.

- Improvements in using factors based on information from the last competitions in that discipline (for example average number of pilots in competitions in last 12 months instead of fixed numbers for average number of pilots). Also eliminating steps based on fixed numbers (for example rather than using fixed steps of high ranking pilots, it used the ranking points directly). The result of those improvements is to use the same formula for all disciplines as the formula adjusts automatically based on changes in competitions.

The new formula will serve Paragliding Accuracy and Paragliding Aerobatics much better as they have been using the HG XC formulas, with the built in factors designed for HG competitions.

On following pages, the formula and issues are described in detail.

More detailed explanation of the WPRS formula

Factors to consider:
1. Position ranking (**Pp**):
   The value of a participant's effort in a competition relative to the other participants in the same competition. This is normalised from the actual total scores from the competition (Gap or other scoring formula)
2. Competition ranking (**Pq, Pn, Ta**):
   The value of the competition relative to other competitions in the same ranking (using the competitions in the last ranking prior to the competition as benchmark).
3. Time devaluation (**Td**):
   The value of the competition should decrease over time, otherwise we would have a "all time best" ranking instead of a current ranking.
4. The number of results that should count for a participant in the ranking. It is sum of the points of 4 best competitions in the last 3 years.

The actual WPRS formula:

WPR = Pp*Pq*Pn*Ta*Td

To make the points more readable it is multiplied by 100 and round to 1 decimal.

WPR = round(Pp*Pq*Pn*Ta*Td*100, 1)

The participant's place in a given ranking (at a ranking date) is decided by the sum of the top 4 results in the last 3 years.

The **competition ranking factor** will be different for ALL competitions and based on **real differences** in the number of top-ranked pilots participating and the number of pilots participating in the competition relative to the number of pilots in the ranking and in the average competition for the given ranking.

Pilot Points (Pp)

The value of a person's effort in a competition relative to the other participants in the same competition is decided by the person's score in the final result list.
Pp is the actual total scores from the competition normalized to 1.0 points for first position and
0.0 points for the last position.

Pp = (score-last_pilot_score)/(winner_pilot_score-last_pilot_score)

Assuming that the scoring system used does actually in some way show a fair difference between pilots in the competition then this is the most fair and objective way of handing out Pp for the effort.

Competition ranking (Pq, Pn, Ta)

In a perfect competition with all the top pilots participating **c** should be 1.0.
So, what to do with all those other competitions? Winning a competition with only beginner pilots or a competition with only one participant should give a **c** close to 0.0.

We use three factors to measure the value of a competition:
1. The quality of the participants (**Pq**).
2. The number of participants compared to other competitions in same ranking (**Pn**).
3. The success of the competition (**Ta**).

Pq*Pn*Ta

Participant quality (Pq)

Presumption: A competition with maximum quality of participants would be a competition where all the top ranked pilots participated.
To find **Pq** we use the last ranking prior to the competition and find the sum of ranking-points for all those pilots that are entered in the competition. Then we find the sum of ranking-points as it would have been if all the top ranked pilots had entered. This gives us 1.0 if all top ranked pilots are actually entered and 0.0 if no ranked pilots are entered.

To avoid **Pq** = 0 for comps with no ranked pilots set a lower limit of 0.2.

Pq = Pq_srp / Pq_srtp * (1 - Pq_min) + Pq_min

Pq_srp = "sum ranking-points of the participants"
Pq_srtp = "sum ranking-points if only the top-ranked pilots had entered"
Pq_min = "minimum Pq"

Virtually no competition will get Pq = 1.0. Top competitions may get between 0.7 and 0.8 and there will be a difference between these.

Number of participants (Pn)

Pn = "number of participants" / "avg. number of participants in competitions last 12 months"
if (**Pn** > Pn_max) **Pn** = Pn_max

Pn_max = 1.2, saying that a competition with slightly more than average number of participants is a good benchmark.

Looking at WPRS data on 01.01.2007 the average number of pilots in PG XC competitions is 69 pilots.
In HG class 1 the average number of pilots in competitions at that date is 43 pilots.

This formula solves the issue of **Pn** on the average in competitions for each discipline. It will also take into account change of average number of participants in competitions, like increasing interest in Paragliding Accuracy and Paragliding Aerobatics. No formula change is needed if the average numbers of pilots change in the next years.

Success (Ta)

One last thing one may consider is the success of the competition (**Td**), ie was it a fair competition. There are many ways to measure this, none is very objective or accurate.

As competitions in hanggliding and paragliding mostly involve a number of tasks we tend to use this as a measure of success.

At the Plenary in Tallories in 2007 following values were decided:

Suggested values for **Td**:

0 tasks: 0
1 task: 0.5
2 tasks: 0.8
3 tasks: 1.0

This really means that a competition has full value if there are 3 valid tasks.
Note: Currently (2007) in Section 7a a HG XC competition is only valid if it has 2 valid tasks.

Time devaluation (Td) (as current formula)

$Td = 1/(1+ Td\_a \char94(DaysSinceEndOfComp/1096* Td\_b - Td\_b/2))$

This gives an s-curve with x in the range 0 to 1096 (days or 3 years) and y going from 1.0 to 0.0.
Td_a = 2, **Td_b** = 20 (changing these will change shape of the s-curve).

A sample graph that shows how Pp are distributed (from real data in WPRS)

This is just to show how points are distributed within a competition (that has a certain value as shown in samples).

The pilots get Pp relative to their real score in the competition.