2015 CIVL Plenary

Recommendations by the Chairman of the Software Working Group

First off, I apologize for my timing, and for not submitting these recommendations before the official deadline. But my hope is that there will still be time enough to discuss these matters, to put them into official requests and have them voted on.

What follows are three topics that came up during the last year, or were discussed and voted on earlier, but some adjustments seem to have become necessary.

1000 points for a 1000 points day

In the GAP scoring formula, the concept of a day's validity (sometimes also called "quality") is very important. Pilots' score points for distance, time, leading and arrival, are derived from this value. The validity is given as a percentage, which is then translated to points: a day with validity 100% is a "1000 points day", one with validity 50% only a "500 points day".

Unfortunately, the winner on such a "1000 points day" rarely ever actually scores 1000 points. This is cause for a lot of confusion amongst spectators, officials and also pilots. There are several reasons for this phenomenon:

1. In each task, we run three little competitions in parallel (four in hang gliding): Who flies the furthest, who flies at the front of the field the most, who flies the task the fastest (and in hang gliding, who arrives at goal first). To win a task, it is often not necessary to win all those little competitions, it's the sum of the points from those little competitions that counts. As a result, the task winner often times is not the one with the most leading points, and therefore, even on a "1000 points day", is awarded only, for example, 985 points.
2. In a task where no pilot reaches goal, no time points are awarded. But the GAP formula still reserves a portion of the overall points for time points, which in this case simply disappear because they are not awarded to anyone. As a result, even if the pilots flew far enough and long enough to make the day a "1000 points day", the maximum score for the winner is 918 points. An example for this is task 10 at the last Paragliding World Championships in Colombia, where the day validity is 100%, but the winner only scored 915 points.
3. In a stopped task, to create fairness for the pilots who were just about to cross the end-of-speed-section cylinder at the stop time, the time points are reduced by the amount of time points a pilot would have scored if he'd crossed into ESS exactly at the stop time. As a result, as could be seen in task 7 at the last Paragliding World Championships in Colombia, the winner's score on a "1000 points day" can be reduced to, for example, 863 points.

As a side effect of this, the day's validity as calculated by GAP is an inaccurate benchmark for each pilot's relative performance on the day, as it is relevant for the FTV formula we use to calculate overall competition scores in paragliding competitions. This leads to different interpretations of FTV, where either the winning pilot's score is taken as this benchmark, or the day quality is adjusted to the actually available points in a task. Both methods add to the confusion, because then again a "1000 points day" is not counted as such in the overall results.

The solution I propose is based on a simple declaration:

In every task, the winner's score is day validity times 1000

So effectively, on a "1000 points day", the winner is awarded exactly 1000 points, regardless whether he or she won all the small competitions inside the task, whether the task was stopped or not, or whether anybody reached goal. And on a "500 points day", the winner is awarded exactly 500 points.

This also clears up the FTV problem mentioned above, the day validity calculated by GAP is once again the perfect benchmark for each pilot's performance on that day, as intended by the FTV inventors.

To achieve this, we modify section 11 in the scoring formula definition document to read as follows:

11. Pilot score

Each pilot's score is the sum of that pilot's distance, time, leading and arrival points. This score is then adjusted to ensure that the winner's score is equal to the task validity times 1000. Finally, the total score is rounded to the nearest whole number.

$$\forall p : p \in PilotsLaunched : InterimScore_p = DistancePoints_p + TimePoints_p + LeadingPoints_p + ArrivalPoints_p$$

$$WinnerInterimScore = \max(\forall p : p \in PilotsLaunched : Score_p)$$

$$CorrectionFactor = \frac{1000 * TaskValidity}{WinnerInterimScore}$$

$$\forall p : p \in PilotsLaunched :$$

$$CorrectedDistancePoints_p = DistancePoints_p * CorrectionFactor$$

$$CorrectedTimePoints_p = TimePoints_p * CorrectionFactor$$

$$CorrectedLeadingPoints_p = LeadingPoints_p * CorrectionFactor$$

$$CorrectedArrivalPoints_p = ArrivalPoints_p * CorrectionFactor$$

$$FinalScore_p = \text{round}(CorrectedDistancePoints_p + CorrectedTimePoints_p + CorrectedLeadingPoints_p + CorrectedArrivalPoints_p, 0)$$

Note that this correction is already implemented in FS. Apparently it was introduced in 2008 or 2009 (before I became involved with the development of FS), but no documentation is available that states whether this was a change officially approved by a CIVL Plenary or not. When compiling the scoring definition document in 2014, only formula changes that could be traced back to CIVL Plenary decisions were included.

I therefore recommend to the 2015 CIVL Plenary to approve the above change to the documentation, so that in the future, the winner of a "1000 points day" does indeed score 1000 points.

Altitude measurement

For the 2014 CIVL Plenary, the Software Working Group recommended a change in how altitude is measured for scoring purposes. At that time, we proposed the adoption of Daniel Dimov's "True Altitude" as a way to improve on the inaccuracies of GPS altitude as it is used until now.

The 2014 CIVL Plenary approved this change, but due to resource constraints and a growing number of concerns from various sides, the adoption was postponed. In the meantime, Daniel Dimov has taken it upon himself to implement True Altitude in FS. But adoption in flight instrument firmware,

which is crucial for such a change, has not been achieved to date. The scientific and engineering staff both at Naviter and at Flytec voiced strong and well-founded reservations towards the introduction of an altitude measurement scheme that is apart from anything else used in aviation.

From what we can tell, the absolute accuracy achieved by True Altitude is indeed very good in the cases demonstrated so far. But this is beside the point. Currently, aviation rules and laws worldwide rely on pressure-based altitude measurements, including the definition for all airspaces. Introducing a measurement method like True Altitude, which is a combination of geometric (GPS) altitude and pressure altitude, could cause serious security and legal problems.

Experience over the past few years has also shown that it is important to use one single altitude measurement for all scoring purposes. A mix will cause a lot of confusion and potential frustration amongst pilots, spectators and officials.

In 2008, a CIVL working group researched this matter, and recommended the use of QNH for all altitude measurements in competitions (see also http://www.xcmag.com/2011/07/gps-versus-barometric-altitude-the-definitive-answer). At that time, the use of general purpose GPS receivers was still very widespread, and these devices are not capable of recording pressure-based altitude. For this reason, the recommendation was not followed at that time. Nowadays, at least in Category 1 events, the vast majority of pilots use two or more dedicated flight instruments as main and backup devices. So we are now in a position to follow the original recommendation and adopt QNH altitude measurements for our competitions.

In sailplane competitions, QNH has been the standard for altitude measurements and recording from the start. The procedures established there, which ensure that pilots are all judged fairly by the same altitude measurements, and are all able to see this altitude at all times and act accordingly, should be easy to adopt to our own needs.

In 2015, we are in a fortunate position: We have quite a bit of time until the next Category 1 events take place. Therefore, I propose:

1. The 2015 CIVL Plenary agrees in general to using QNH as the altitude measurement basis in future Category 1 events.
2. A working group, consisting of representatives from the Hang Gliding and the Paragliding Committee, the Software Working Group and of the flight instrument manufacturers is formed. The purpose of this group is to create, document and validate the procedures required for the introduction of QNH as altitude measurement basis, along with any necessary rule changes and requirements towards flight instruments.
3. The procedures are tested and validated during the two Pre-European XC Championships in 2015.
4. The working group submits the rule changes and procedure documentation to the 2016 CIVL Plenary for approval.
5. Starting in 2016, CIVL's FAI Category 1 XC events use QNH as the altitude measurement basis.

I hereby gladly volunteer for heading up this working group and for ensuring the successful transition towards altitude measurements in our competitions which are easy to achieve, accurate, fair, transparent and in line with aviation standards.

Distance calculations

The 2014 CIVL Plenary, upon recommendation by the Software Working Group, approved a change in the way distances are calculated in our competitions. Unfortunately, due to resource restrictions

both within the Software Working Group and at the various instrument manufacturers, this change could not be implemented to date.

The working group for altitude measurements mentioned in the previous section would be a perfect platform for bringing all instrument manufacturers together and discussing a solution that is feasible for them as well.

Until this work is completed, as an interim solution, all distance measurements in our competitions should remain based on the FAI sphere, and the 0.5% tolerance for turnpoint cylinders should stay in place.