



PMA recommendations to CIVL paragliding subcommittee regarding FAI cat.1 competition rules

Premises

- The PMA is convinced that having competition wings in the EN system is a bad idea, not least because it leads to a corruption of the EN classes. The PMA also thinks that having to trim a competition wing to pass EN certification MAY lead to said wing showing unwanted behaviour, not least in the deep-stall department.
- The PMA is convinced that limiting the speed indirectly by EN test results is not a sustainable situation because of the danger to test and certification pilots. Experience has already proved this to be dangerous. Test/certification pilots are not expendable, they are exposed to enough risk as it is.
- The PMA is convinced that any other mandatory flight test with pilot input will not improve the safety. Almost any glider can pass whatever test with a good test pilot at the controls and the PMA does not want to create a system based on test pilots skills.
- The PMA is convinced that the EN limitation of competition gliders is making the game less fair than it was before. For organisers and pilots alike it is almost impossible to check everything on the glider accurately. Suspicions between competitors, cheating and poor checking procedures are not helping the sport.

Goals

- I. **The PMA would like to see rules introduced for competition wings that would have a real effect on in-air safety.**
- II. The PMA would like to see the **emphasis on glider top speed be reduced**/taken out of paragliding competitions.
- III. The PMA would welcome a situation where light or heavy pilots can also compete fairly. With the current rule set in place very few manufacturers can justify the certification costs for the XS or XL size wings, this has lead to an unacceptable situation for light and heavy pilots. Many female pilots for example have been demotivated since the rule change.
- IV. The PMA would like to see more emphasis placed on pilot education (SIV) for flying high aspect ratio wings.

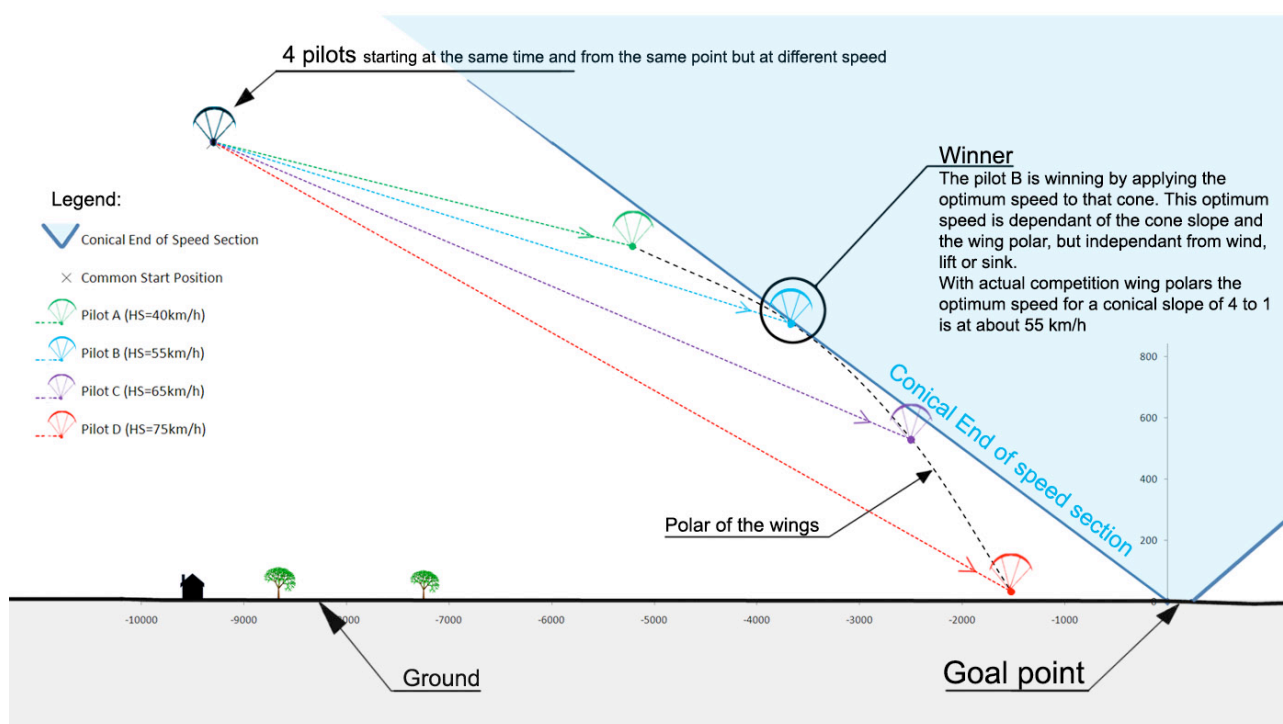
Proposals

- A) The PMA recommends to create a new Competition Class outside of the existing testing regime. The parameters of the new class are described below.
- B) The core of the PMA proposal addresses point I. above. In short, the PMA recommends to change the way paragliding tasks are concluded by changing the End-of-Speed-Section as we know it now (the ESS cylinder) to an ESS inverted cone, or alternatively to award altitude bonus to pilots entering the ESS cylinder. By doing this, and tweaking the angle of the cone or the amount of altitude bonus points awarded, the optimum speed for the final glide can be adjusted. Any pilot who goes faster will be punished on points. In all, the race will more or less be concluded in the last thermal BEFORE the final glide, and there will be

PMA recommendations to CIVL paragliding subcommittee regarding FAI cat.1 competition rules absolutely no motivation to race into goal at high speed. This should lead to competition paragliders being designed with the emphasis on different properties, namely good handling/climbing characteristics and good performance in the optimum speed range. At this stage the PMA has come to the conclusion that the cone should have a slope of 4:1, but this may be adjusted in the future to match the required optimum speed.

Note: The PWC is actually working on conical end of speed section principles and envisages applying it to a competition soon.

Cross section showing the Conical End of Speed Section principle



- C) The first parameter of the new Competition Class is a limitation of the maximum top speed. At this stage the PMA recommends setting a top speed limit of 65km/h, for the following reasons:

Analysis of track logs from the last 4-5 years has shown that even in the Open Class days the gliding speed during the task, but before the final glide, only very rarely exceeded 60km/h. In fact, with the current technology paragliders are punished too heavily on altitude to fly effectively above 60km/h. This leads the PMA to believe that by setting the top speed at 65km/h it will effectively be beyond the scope of use for the great majority of situations if **a conical end of speed section is applied.**

Track logs also show that the gliding speeds during tasks didn't change significantly with the advent of EN D-only comps. But since these wings don't go any faster than maximum 60km/h, and still have acceptable glide figures at their top speed, there was great emphasis on eeking that one km/h more out of them to gain an advantage, especially on final glide – with the race into goal being gone, we believe that this emphasis will be replaced with the above-mentioned emphasis on good climbing ability and good overall performance figures at the normal speeds.

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At 65km/h a proficient pilot has a higher chance of recovering their wing in the case of a full-frontal collapse or an asymmetrical collapse compared to the 70+ top speed of the last generation of Open Class wings.

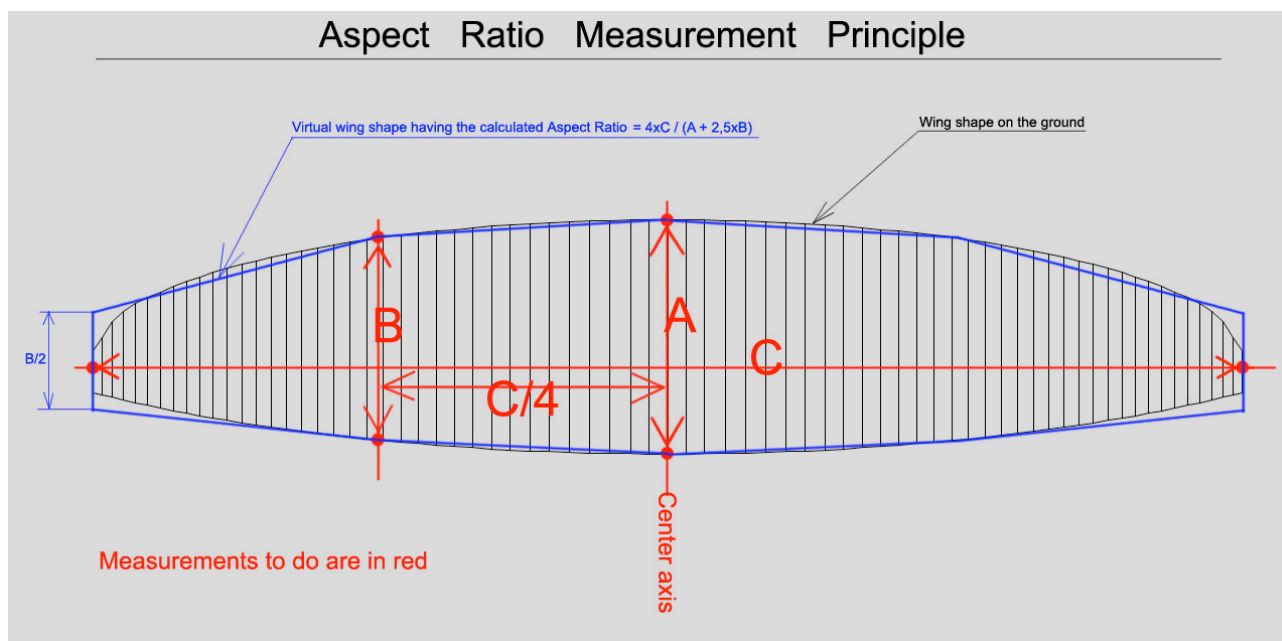
At this stage the PMA does not consider the fact that **True Air Speed** cannot be 100% reliably measured as a great obstacle – the PMA simply doesn't think that the top speed will be sufficiently relevant for it to be a major issue, as competitions will no longer be decided by maximum speed capabilities. If real world practice proves this to be wrong, then we have it on good authority, that several instrument makers are working on improved systems based on a combination of differential GPS and pitot tubes – the expected accuracy of these is around 2%.

- D) The second parameter of the new Competition Class is a flat aspect ratio (A/R) limitation of 7.0 or less. Current designs have already shown that it is possible to build very nice wings for competition within this A/R limit and it is our belief that there is currently no need for more A/R to fly rewarding tasks. The A/R of a wing is determined according to the following formula:

$$\frac{4C}{A+2\frac{1}{2}B}$$

where C is flat span measured from wingtip to wingtip, A is the centre chord as found when the wing is folded wingtip-towingspan to find the middle, and B is the chord at one quarter of the span, again found by folding the wing one more time.

Please note that in order to work, this rule depends on a restriction on planform design. No leading edge or trailing edge concave sections WITHIN THE CENTRE HALF of the wing are allowed in the proposed competition class – the wingtips, since not measured, are still free to be designed at the manufacturer's discretion.



- E) The PMA recommends to use the OCTWG definitions for load calculations (23 G calculated strength for new lines in each level of lines; minimum strength for each individual line 40



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daN). The PMA will assume responsibility for acquiring reliable absolute values for the relevant lines from relevant manufacturers and making the numbers available for all to see – **this is intended to insure fairness inbetween manufacturers by getting away from test value random variations.**

- F) Any wing found to be within the parameters mentioned above (top speed lower than 65km/h; A/R lower than 7.0 according to the equation above; line strength calculation using the OCTWG definitions) may be flown in accordance with the new Competition Glider Class rules under the condition that it's checked and stored by a test laboratory. It should not take long however before manufacturers have designed wings specifically for this Competition Glider Class and PMA expects these to outperform the non-specifically designed wings soon enough.
The PMA recommends the creation of a registration protocol for any new model or new size in the Competition Glider Class. The registration would require to give a glider to a test laboratory that will check the max speed, the flat A/R and the 23G line strength calculation rules before stocking the glider.
- G) The PMA recommends that NACs and competition organisers be encouraged to strongly encourage their competition pilots to have SIV training ON THEIR CURRENT glider/harness combination before showing up for a FAI cat.1 competition. PMA at this stage is not in favour of an absolute rule saying this MUST be in place, as PMA thinks this may not be practically implementable, but encouraging pilot compliance with this recommendation is a very important point.
- H) The PMA recommends making a second reserve mandatory for FAI cat.1 competitions. The PMA does not wish to go into any detail on precisely what and how, but all pilots should carry the current mandatory reserve parachute PLUS one more, the latter must be deployable with the opposite hand compared to the main reserve or even better with both hands. Harness manufacturers will be able to supply owners of existing competition harnesses with pods with integrated reserve parachute container (for example as front container in the place of a cockpit). Pilots would not necessarily need to buy a complete new harness.
- I) The PMA recommends that wings wishing to compete in the Competition Class be delivered with comprehensive manuals explaining the finer points of dealing with non-standard flying configurations. It is in the best interests of manufacturers and pilots alike that the pilot understands as much as possible about the product they are flying and knows how to manage the wing once the wing has ventured outside of the normal flying envelope. The recommended SIV maneuvers shall be mentioned in the manual as well.
- J) The PMA recommends that ALL wings flown in FAI cat.1 competitions should be commercially available to all competitors – commercially available can be defined as having been on the market for no less than one month before the competition starts.
- K) The PMA recommends that the absolute values (top speed, A/R restriction) in this proposal should be in place for two-year periods, beginning with 2014. During 2014 they MAY be revised, to take effect from 2016 and so forth. Revised values must be published before December 31st of the year in which they took effect, so that manufacturers have no less than one year to design new wings in accordance with the new values.