Proposal for Precision Paramotor Championships

Background:

Paramotors have capabilities and limitations that make them very different from classical microlights. Their slower flight makes them less capable in cross country flight, but it makes them highly maneuverable. Many pilots purchase and fly their paramotors to take advantage of that low level flight. The kind of low level flight that paramotor pilots enjoy, also makes for exciting spectator-friendly competition.

In 2006 CIMA voted to change the rules to allow for a "Precision Championship" for Paramotors. The following language was added to 4.24.3 of Section 10: "In 'Precision Championships' for aircraft classes PF and PL, 100% of the tasks will be Precision tasks."

However, the 2006 rule change only allowed for a Precision Championship. Once of the concerns voiced was that the proposal was incomplete since it did not include other language that would make it possible to conduct a Precision Championship. I promised to correct that. This year's proposed rule changes are my effort to make good on that promise.

Concept:

The idea of the proposed rule changes is to actually change as little as possible while making it easy for competition directors to plan, conduct and score Precision Championships. The fact of the matter is that a lot of the language of Section 10 has very little to do with the kind of championship to be held. Instead, the rules, procedures and language have been extensively reviewed on a yearly basis and suit precision championships as well as they suit conventional championships.

Therefore, the rule changes I have submitted speak specifically to problems unique to precision championships. As I see it, those problems are as follows.

Safety:

Precision Championships should be conducted as solo operations. In my estimates, that increases the safety of a Precision Championship by at least a factor of four. Having only one occupant aboard a paramotor while it is flying through a task makes it possible that only one person can be hurt instead of two. That much is obvious. Less obvious is that when you increase the gross weight of a paramotor by putting another person on board, you also increase the flight speed. The kinetic energy increases geometrically with the mass and with the square of the velocity. If you do the math, you will learn that a paramotor loaded with two people has almost twice the kinetic energy as one would have on a solo flight.

Inclusiveness:

If two place operations are not allowed, it naturally forces pilots flying PL2's into the lighter PL1 class. Physics pretty much gives the advantage to a PL1 over a PL2 because they can be built lighter and with less required power. Therefore it makes sense in the case of PL's to divide things by weight classes rather than by how many people are on board. 115 kilograms seems like a natural dividing point that can be modified in the future if CIMA sees a need.

Scoring:

Scoring is a problem since it is difficult to compare distance measurements with time, especially when the differences between same units can be great when comparing performance between tasks. A solution that has worked well in American paramotor competitions is to simply rank the scores of the individual pilots. The "winning" pilot of a task gets the score of 1 for that task, the second place pilot gets a score of 2 and so on. There are mechanisms for dealing with ties, disqualifications, penalties, and relative values of tasks that are spelled out in the proposed rules.

The basic idea is that every time a task is run, it is scored and ranked. The very same task can be run the next day and pilots can get different scores depending on their performance on the same run of a task. I actually prefer to run each precision task twice in a championship. It requires less set up time and helps show consistency of each competitor's performance.

The power of this scoring method is that competition directors can be creative while designing tasks, since there are few mathematical traps someone can fall into. It is mostly a matter of ranking the performance of the competitors.

The details a task designer has to be careful about include what constitutes a disqualification. Since a disqualification in a single task can really increase a competitor's score (Remember, increasing is bad!), it is a punishment which should be used carefully. Otherwise, competitors fly too conservatively. On the other hand, disqualifications can be quite handy in areas where you need a little extra discrimination. A great example is a precision landing. If you just measure the distance that a pilot lands from a line, you will get pilots almost all landing right on the line. But if you disqualify everyone who lands before or on the line, then pilots end up flying a little more conservatively and there ends up being more to measure.

The other tool that the task designer has is the penalty point. Penalty points are added after the ranking and raw scores are determined. This is best for tasks that have several parts to them like a series of precision landings. Hitting the line on one part of a task in that case should not disqualify someone in the whole task.

Of course all of the precision tasks in the Section 10 catalog can be used "as is" since they already take into account a lot of factors that have been determined over the years. After all, at the end of the calculations, relative ranks can be determined there, too. Then those ranks can be used as the final score for a task.

Ultimately, the scores from all of the tasks are added together to get each pilot's final score. Then, like in golf, the pilot with the lowest score wins the competition.

Team Scores

The main difference in team scoring for a Precision Championship is that once the best scores of a team are determined, their numbers need to be added together to get a final score for the team. Again, the lowest team score ends up being the best score.

The other difference from a conventional championship is the two weight categories for the PL's. That is also accounted for in the rule proposal.

Electric vs. Thermal

In order to keep the rule simple, power plants were not considered in deciding the empty weight of PL's for Precision Championships. I do not know how many electric PL's there are, nor how they may be affected by the 115 kilogram dividing point. I'm sure this will be an area that can be addressed in the future, if appropriate.

Conclusion:

This is by no means a perfect rule or even the only way to go about a Precision Championship. However it does have the advantage of being a proven method with five major championship events being run with similar rules. I believe that if these are adopted and tried, that they may be at least as useful as the rules that have evolved for conventional FAI paramotor championship events.

Respectfully Submitted,
Roy Beisswenger
USA CIMA Delegate

Proposed Rules:

Proposal Title:
Defining Aircraft Classes and Weights for Paramotor Precision Championships

Existing Text:
None

New Text:
4.13.9 For the purposes of a paramotor precision championship, all aircraft will be flown solo. Paraglider Control Landplanes (RPL1T, RPL1E, RPL2T and RPL2E) will compete based on the empty weight of the aircraft. Empty weight of the aircraft will include the weight of the entire airframe and wing, but will not include the weight of the pilot or fuel.

RPL (sub 115) –are aircraft that weigh 115 kilograms or less.

RPL (over 115) –are aircraft that weight more than 115 kilograms.

Reason:
Precision flying for safety reasons should only be flown solo. Two place ships are typically at a natural disadvantage (simply due to physics) since they are built heavier to accommodate an extra person. This proposed rule first states that the precision championships will be flown solo and it puts in a mechanism which allows the heavier machines to at least have a fair competition with each other.

Proposal Title:
Clarifying World Record Results Resulting From A Precision Championship

Existing Text:
None

New Text:
4.13.10 Any records set during a precision championship will be based on the class of aircraft as defined in 1.5 and not on the weight classes for wheeled paramotors as defined in 4.13.9

Reason:
The purpose of 4.13.9 is to create a framework for a new kind of competition. It is not to create new classes of aircraft for Section 10. This proposed rule makes it clear that any new records resulting from a precision championship would only count if they beat other records for paramotors in their class as defined in 1.5.

Proposal Title:
Teams in a Precision Championship

Existing Text:
None

New Text:
4.10.7 For the purposes of a paramotor precision championship, NAC's may enter a PL1 team, an RPL (sub 115) team, and a RPL (over 115) team.

Reason:
This rule makes it clear what kind of national teams are allowed in a Precision Championship. It follows from 4.13.9.

Proposal Title:
Scoring a Precision Championship

Existing Text:
None

New Text:
4.29.12 The specific scoring system to be used for the paramotor precision championships is outlined below. Scoring for all tasks will use the same basic formula.

4.29.12.1 After an individual task is completed, each competitor will be ranked in that task. The first place competitor will score one (1) point, the second place competitor will score (2) points and so on. Tie scores will each get the same point scoring. For example, if four people tie for fifth place in a task, all four people will get five points. However, the ranking will not resume in this example until the 9th place. The competitor coming in 9th will get nine points. Disqualifications will all score the same score which will be one point higher than the last valid score. For example, if there are 100 competitors and eight are disqualified, then those eight disqualified competitors will receive 93 points apiece.

4.29.12.2 If a task includes penalty points, those points will be added to the competitors' scores after the ranking for the task is complete. If a competitor's score is higher than the highest rank for a task (including disqualification scores), the competitor's score will instead be taken as that high score.

4.29.12.3 If a competition director believes that a particular task should be weighted higher than a basic task, a factor can be used to multiply the ranking of that task. The factor is applied after the competitors are scored and ranked for a task and the penalty points deducted. For example, say the first five scores are 1, 2, 2, 4, and 5. If a weight of 1.5x should be assigned to that task, then the first five scores would become 1.5, 3, 3, 6, and 7.5.

4.29.12.4 Final championship ranking is taken by added up each competitors scores from each task. The competitor with the lowest total is the champion for his class, the competitor with the second lowest total is the second place winner and so on.

Reason:
The language above is the heart of the precision championship. Typically, the raw scores from a task end up being a combination of times, distances, and/or penalties. The system above has been used several times with events I have organized and works very cleanly. It is based on golf, in that the lowest score wins.

The lowest possible rank for a particular task is normally 1, which corresponds with first place. The second person gets a rank of 2 and so on. This is a direct measure of how a person has done in a task compared to his contemporaries. After the ranking is complete, there are a couple of refinements such as what to do with penalties, disqualifications, and the relative importance of tasks. All of these factors can be calculated easily with a spread sheet and (if done quickly) even provides for real time scoring for competitors.

At the end of the competition, all of the scores are added together for each competitor and the lowest score wins the class of the championship. Team scores are calculated the same way.

Existing precision tasks can be used with this scoring method since ultimately they provide a ranking for the competitors. The advantage is that those are proven tasks. However, the real benefit of this scoring system is that new precision tasks can easily be integrated into it without complicated formulae.

Proposal Title:
Scoring a Precision Championship for Teams

Existing Text:
None

New Text:
4.29.12.5 A team score is calculated by adding up the team members' total scores. The team with the lowest score wins for their class as listed in 4.13.9.

Reason:
This provides a simple mechanism for scoring a team at a Precision Championship.