PROPOSAL TO IGC PLENARY 2017
Year 1

From USA

PROPOSAL

to change the calculation of speed points and distance points.

SUMMARY

This proposal affects Annex A.

The proposal argues that the current scoring system has several disadvantages, including:

- Promotion of gaggling
- Promotion of long delays before starting
- Suppression of bold tactics
- Predictable results
- Failure to recognize outstanding achievement
- Reversal of incentives from what is logical

and that an alternative system would solve these problems. The alternative system involves awarding each competitor speed points or distance points, but not both.

The proposal assumes that the maximum daily score is 1000 points (i.e. day devaluation is outside the scope of this proposal).

The proposal is divided into 8 sections.

1. The Current System

This section is merely a description of our current system.

Daily values of "maximum distance points" and "maximum speed points" are determined. The sum of the two is always the maximum daily score. The winner receives the maximum distance points and the maximum speed points. All other pilots receive distance points and speed points according to their distance flown and speed achieved, relative to the winner.

Presently, the boundary between maximum speed points and maximum distance points depends on the number of outlandings and the number of slow finishers (who are treated the same as outlandings).

This section illustrates this concept, which should be familiar to any contest observer.

Figure 1 depicts the situation on a day when almost everyone finishes the task:

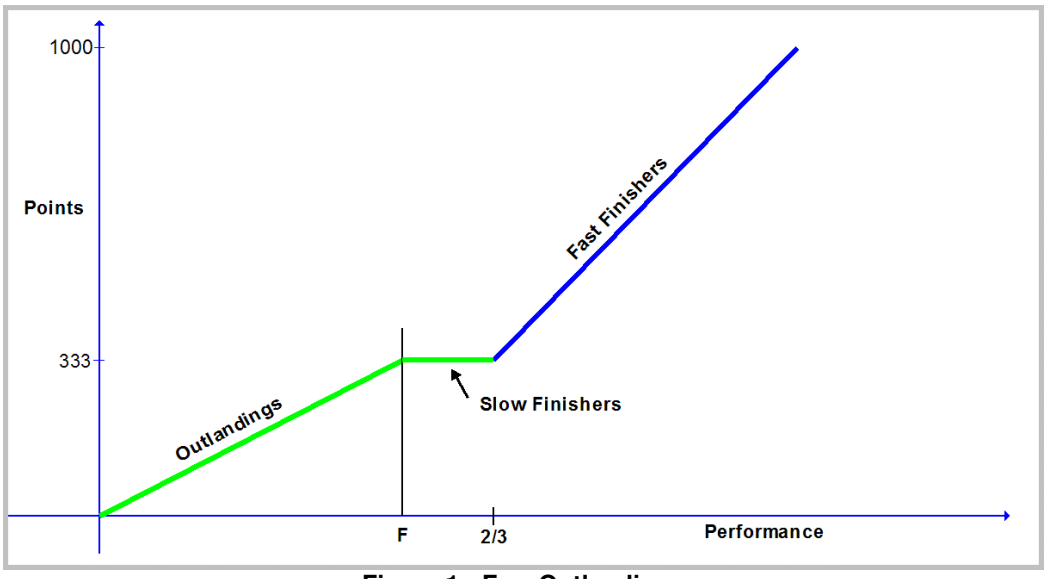

Figure 1: Few Outlandings

This is a conceptual graph, intended to show the relationship between pilot performance and points earned. On the "Performance" axis, the finish line is indicated by "F," and the "2/3" mark indicates achieving two-thirds of the winner's speed.

The green line signifies distance points only, and the blue line signifies distance points plus speed points. Slow finishers do not get speed points.

In this case, there are twice as many speed points as distance points (666 and 333).

The next case to consider (Figure 2) is the one in which 25% of the pilots land out:

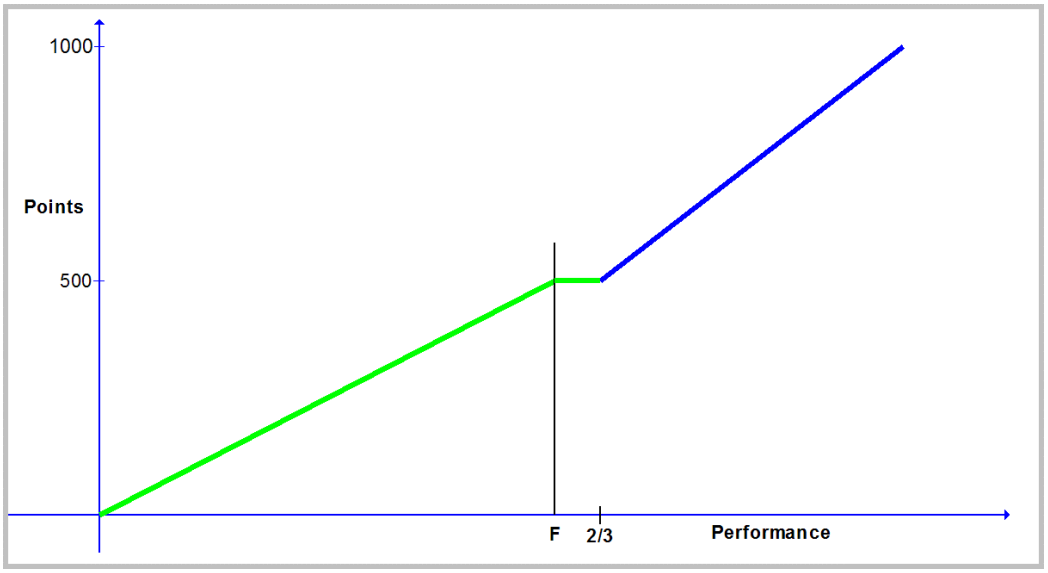

Figure 2: 25% Outlandings

At 25% outlandings, distance points and speed points are equal (500 each).

Note that the slope of the blue line in Figure 2 is less than in Figure 1.

Finally, as the number of outlandings gets very large, almost all the points are distance points, as illustrated in Figure 3:

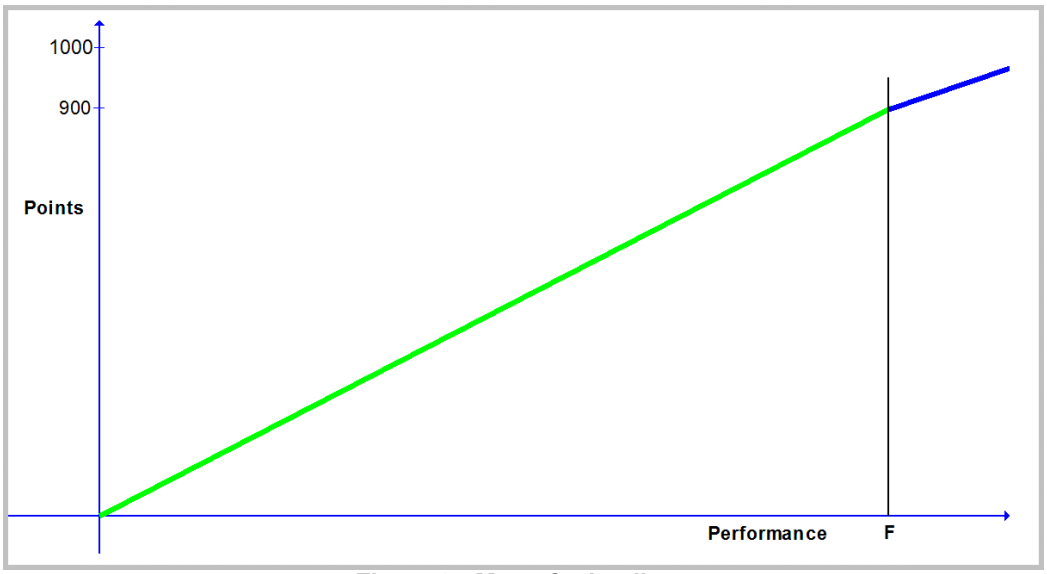

Figure 3: Many Outlandings

And the slope of the blue line is further reduced.

In the most extreme case (no finishers), there would be distance points only, and the graph would show only a green line.

Figures 1 – 3 above are not rigorous graphs. They are intended only to illustrate how, in the current system, the boundary between speed and distance points depends on the number of outlandings.

2. Problems with the Current System

The current system measures pilot performance in a roughly sensible way. However, it also creates *incentives* that are not sensible at all.

To see the problems with the current system, it is important to remember that daily placings depend on the *difference* between pilots' points, not on the total number of points. Pilots don't care how many points they have, as long as they have more than everybody else!

In this proposal we refer to the differences between pilots' points as the point spread or point margin.

Sometimes we wish to put limits on the point spreads.

For example, days are devalued when a short task or unforeseen weather makes the results too dependent on luck. The purpose of devaluation is to reduce point spreads

so that those days will not have as much influence on the overall results. When the absolute number of points available is reduced, point spreads are also reduced.

Consider the limiting cases (Figures 1 and 3):

- If many pilots finish, then there are many speed points available and point spreads are high for them. Non-finishers must share a small number of distance points, so their point spreads are low.

- If few pilots finish, then there are many distance points available, and point spreads are high for the non-finishers. Finishers must share a small number of speed points, so their point spreads are low.

Another way of saying this is:

- The points belong to the majority.

And this is the root cause of the problems with the current system. Five specific problems are described next.

Problem 1 The majority controls the point spread.

If the points (and thus the point spreads) belong to the majority, then it is important to be part of that majority, and this means that staying with the gaggle is a good – often vital – strategy.

In the current competition environment, the best strategy for success is:

a) On most days, join the fast gaggle and stick with it;

b) on weak days, do not start until the gaggle starts (even if the weather is good and may deteriorate later) – do not abandon the gaggle; and

c) wait patiently for an opportunity to break away from the pack.

This strategy works because it keeps a pilot in contention until an opportunity to get ahead arises. This strategy can be called "defensive flying," and it is the dominant strategy in our competitions.

The current scoring formula renders other strategies too risky, such as starting early or flying independently of the gaggle. If you leave the gaggle and get home while the gaggle lands out, your reward is small (a few speed points). Conversely, if you leave the gaggle and you get slow or land out, while the gaggle gets home, your punishment is large (very few distance points, no speed points).

Weak or blue days are especially problematical. We have all seen days in which pilots wait for an hour or more before starting, then land out en masse, when an earlier start would have produced finishers. We have all seen days on which, even with a good number of finishers, the result is a virtual tie amongst the contenders. In the determination of a champion, these days have about the same value as rest days.

Problem 2 The risk/reward calculation is variable and unknowable.

(Of course, we are talking about sporting risks, not safety risks.)

Clever pilots are always looking for an opportunity to get ahead, even by a small amount. They would like to use their judgment and experience to decide when to take a calculated risk that might generate a few more points in the daily results. However, the current system inhibits them from doing this.

As part of the decision to take a risk, it is important to consider the potential reward. The reward for speed is illustrated by the blue lines in Figures 1 – 3.

Unfortunately, the slope of the blue line varies. It can be anything between 20 points per percent of winner speed (Figure 1) and near zero (Figure 3), depending on how many other pilots will finish the task. It can be very difficult to know today's slope at the time when you need to make the decision.

Late in the day you (and your Team Captain) can make a better guess about the number of outlandings. But the need to know the slope of the points/performance curve is constant, throughout the day.

The judgment and experience involved in risk taking are attributes we would like to measure – but we cannot do this because ignorance of the potential reward causes pilots not to take risks, regardless of their judgment and experience.

Problem 3 Crossing the finish line can be unimportant.

This is a "problem of appearances," and it serves to introduce the next two tangible problems, below.

On a day with many outlandings, the few finishers must share a small number of speed points, and their point spreads are very small. Instead of being treated like heroes, their reward may be a tiny margin over the longest outlanding. In this situation it doesn't matter very much whether they cross the finish line at all.

Because the majority tips the scale toward the interests of the majority, our system fails to reward outstanding performances by pilots who are not in the majority.

The finish line should be an exciting place, for all concerned. When a single hardworking pilot is the only finisher, this should be cause for celebration by the pilot and his team. Recognition should follow, in the form of a notable score.

There aren't many racing sports in which crossing the finish line occasionally becomes unimportant. Perhaps this is one of the reasons that some people consider the Sailplane Grand Prix to be more exciting than our gliding championships.

Problem 4 Slow finishers can help themselves by flying slower.

Late finishers have an undue effect on the results. If a pilot approaching the finish line knows that he will have just over two-thirds of the winner's speed, he will have the choice of being either a "fast finisher" or a "slow finisher."

By deliberately slowing down, he will become a "slow finisher," and this will shift some of the day's points out of speed and into distance. This will cost him a few speed points, but it will create more maximum distance points, and he will get them all. This may easily be worth the price of a few speed points. This is a motivation to loiter before crossing the finish line, or to land deliberately just short of the finish line.

Here is an example:

Table 1

06.01.2016 Benalla, 3:00 AAT, Pdm = 595, Pvm = 405

Pilot	Time	Speed	Distance	Distance Points	Speed Points	Total Points
Winner	3:02:20	129.78	394.40	595	405	1000
Pilot X as a fast finisher (actual result)	3:08:56	87.80	276.46	595	12	607
Pilot X as a slow finisher (hypothetical). This would have changed Pdm to 619 and Pvm to 381.	3:11:45	86.51	276.46	619	0	619

In actuality, Pilot X was a fast finisher, by a small amount. If he had delayed his finish by 2.8 minutes, he would have become a slow finisher and received 12 more points.

This is not a rare situation in our competitions.

Recognizing the circumstance that calls for a tactical slowing or a deliberate outlanding will become more common in the future, as strategic tracking improves.

This is completely illogical.

Problem 5 Fast finishers can hurt themselves by flying faster.

In the current system, a very fast finisher (someone with more than 150% of the speed of another finisher) causes the other finisher to be scored as an outlanding. This reduces speed points. By shifting the boundary between distance points and speed points (making fewer speed points available), a very fast finisher hurts his own results, and for him, the proper tactic is to slow down before crossing the finish line.

Here is an example:

Table 2						
09.06.2006 Eskilstuna, 222.4 km RT, Pdm = 589, Pvm = 91						
Pilot	**Time**	**Speed**	**Distance**	**Distance Points**	**Speed Points**	**Total Points**
Winner	2:11:59	101.10	222.4	589	91	680

On this day there were seven slow finishers. If the winner had spent ten more minutes on course, he would have converted five of them into fast finishers and raised his own score by 66 points.

More importantly, he would have significantly raised his margin over all the other contestants:

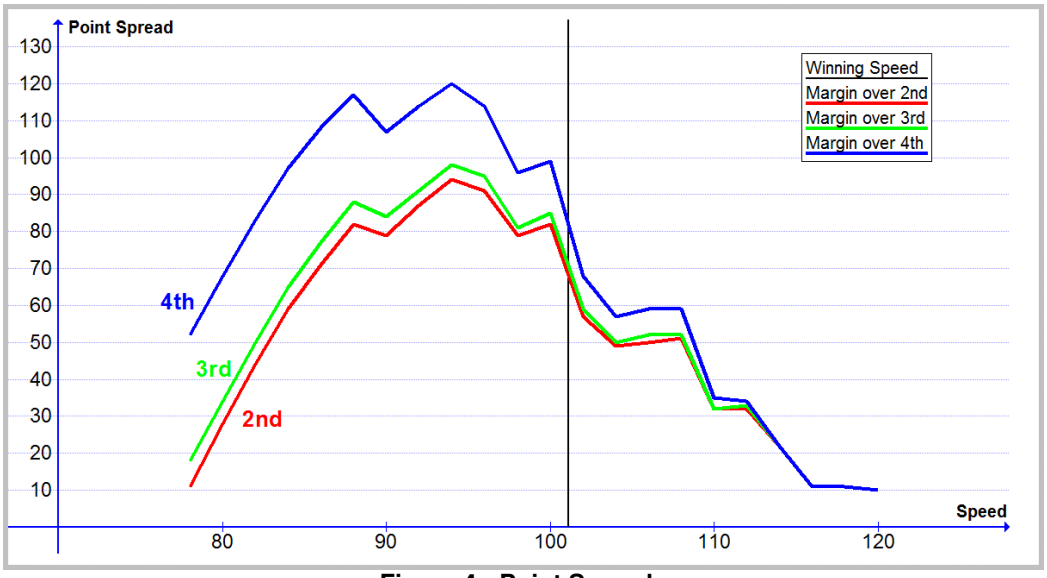

Figure 4: Point Spreads

In this graph the vertical line indicates the actual winning speed, 101.1 kph. If the winner had slowed down to 94 kph, he would still have won, but his margin over the second place finisher (red curve) would have increased from 66 points to 94 points.

This is completely illogical.

3. Summary of Problems

The general problem is that each contestant's results are too closely coupled to the performance of all the other contestants. The principal consequences of this are

- Strong incentives for defensive flying – staying with the gaggle
- Strong incentives for delaying the start, even at the cost of landing out
- Suppression of independent decision-making
- No significant recognition of outstanding performances
- Illogical incentives – slow down to get a better result

4. General Approach to a Solution

The problems can be solved by changing the way speed points and distance points are calculated, and by putting separate limits on them.

The most important thing to do is to stop allowing the number of outlandings to affect the relative importance of speed and distance performance.

We propose to achieve this by calculating speed points and distance points independently, and then giving the pilot the better of, rather than the sum of, the two measures:

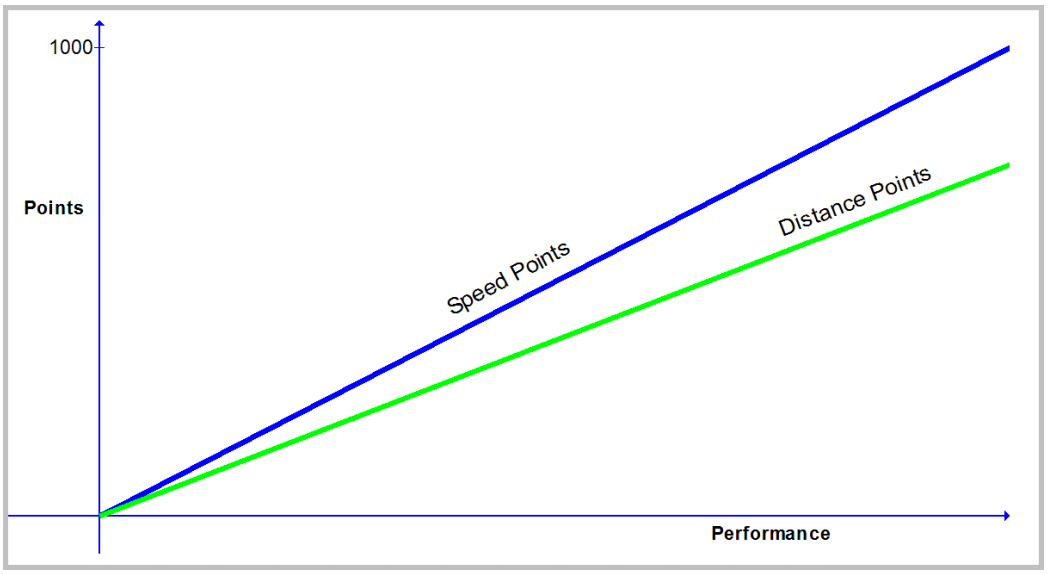

Figure 5: Proposed Independent Distance and Speed Points

If we do this, we will remove the coupling between each pilot's performance and the group's performance, while preserving the desirable feature of scoring each pilot relative to the best performance.

Furthermore, the proposed system eliminates the scoring anomalies. Finishers should always do better by flying faster. Anything else is nonsensical. A higher average speed should always give the pilot a better result.

5. Specific Proposal

The proposal is to give each pilot distance points or speed points, but not both. There are two steps:

1. Calculate each pilot's distance points and speed points as follows:

$$\text{Distance points} = 750 \text{ x } \frac{\text{Competitor's Credited Distance}}{\text{Best Distance}}$$

$$\text{Speed points} = 1000 \text{ x } \frac{\text{Competitor's Credited Speed}}{\text{Best Speed}}$$

2. Give the pilot a score equal to his distance points or his speed points, whichever is greater.

The proposed scoring system has these features:

- The number of outlandings is not important to strategic decisions.
- It creates an incentive to start early when the weather is good, to break away from the gaggle, and to finish when nobody else finishes.
- The speed of every finisher is compared to the winner's speed in the same way every day.
- It ranks fast finishers in the same order as the current system.
- For slow finishers, there is no large benefit for crossing the finish line. This is qualitatively the same result as in the current system.
- It eliminates the moving boundary between distance points and speed points, thereby decoupling each pilot's performance from the performance of the group.
- The slope of the points/performance curve is fixed, removing the uncertainty in risk/reward calculations for finishers.
- It gives a big reward to finishers when there are few of them.

6. Devaluation

This proposal does not address day devaluation. Before the proposed system can be finalized, it must be integrated with the existing and planned devaluation schemes in Annex A.

7. Counterarguments

This section lists a few arguments against the proposed system. Each is followed by our rebuttal.

Counterargument 1

> Point spreads will become smaller, especially on good days. This will change the way pilots think about moving up or down in the standings.

Yes, point spreads will become smaller on good days. But this does not matter.

Under the proposed system, point spreads on a good day may seem unfamiliar at first. Pilots familiar with the current system will notice that 950 points in the new system will mean the same as 900 points in the old system. But this has no effect on ranking or on the effort it takes to catch the leaders or to protect a lead.

What does change is that the translation of percentage of winner speed to point spread will be the same on all days, no matter how many pilots land out. This will place greater value on speed on weak days, and lesser value on small differences in speed when everybody finishes. Flying the whole task becomes important, not just the final glide on racing days. We think this is an advantage.

Counterargument 2

> The statement that slow finishers can help themselves may be true, but it isn't possible to know that you are at 2/3 the winner's speed before crossing the line.

In fact, the conditions that call for tactical slowing are easy to recognize (and it will become easier as tracking systems improve). It is usually the case that the winner's speed is already known, or can be estimated. It is easy to determine the time at which there will be no more fast finishers. It is also likely that late finishers will be arriving in a gaggle, and the power of slow finishers to control the point distribution is multiplied by their collective behavior. The arithmetical precision required in this situation is not high. In the current system, conspiracies are possible, and it is possible for a team to degrade a rival's win. The proposed system eliminates the loophole that rewards these tactics.

Counterargument 3

> Changing the slow finisher cutoff from 2/3 to ¾ will increase the number of finishers scored with only distance points, and this will produce many tie scores.

The choice of 750 as the maximum value for distance points is not crucial for this proposal. We believe that 750 is the right choice. Lowering this number would make all outlandings more costly. Avoiding ties at the far bottom of the scoresheet is not as important as preserving the chance of a good pilot to recover from an unlucky outlanding.

Counterargument 4

> When there are few finishers, the gap in score between the slowest finisher and the longest outlanding will be too large.

The proposed system is designed to reward finishers. We consider this to be an improvement over the current system. Also, this counterargument ignores devaluation. One of our challenges is to differentiate between finishers who are particularly skillful and those who may have been lucky. A careful integration of this proposal with a logical devaluation scheme will produce an appropriate reward for pilots who complete the task. Devaluation is outside the scope of this proposal.

Counterargument 5

> When there are no finishers, this proposal devalues the day.

Yes, and this is a side effect of the proposed system. Whether this is desirable is an open question (IGC is currently considering the devaluation of "distance days.") Again, the integration of this proposal with an agreed devaluation formula will take this into account.

Counterargument 6

> The change is too radical. We will lose our ability to compare past and future championships.

We do not compare past and future championships by comparing point totals or point spreads. We do this by comparing winners and placings. The effect of the new system will be to induce pilots to win with slightly different strategies, and to select champions among those who are most successful at those strategies, namely to fly the fastest and to make the best decisions about taking sporting risks; not to play the start and gaggle game well and to keep track of how everyone else is doing.

Counterargument 7

> We have not practiced this. We know how to take advantage of the current system, and we don't want to change. *[The wording used in this counterargument may be different.]*

Teams have spent a lot of time and energy learning to fly tactically to exploit the strange incentives of our current scoring system. Many teams have invested resources in tracking other gliders, quickly reporting outlandings, finding start times of other teams and so forth. These practices will become less valuable. That is the whole point of this proposal. We anticipate objections from those whose hard-won skills will be devalued. But the improvements contained in this proposal will benefit our sport, and that is our duty.

8. Conclusion

Flaws in the current system encourage gaggling and late starts - and produce strange incentives for the pilots.

Here are some common sense principles that should be true, that most people assume to be true, but are in fact <u>not true</u>:

- Taking a sporting risk and being successful is always beneficial.
- Flying faster always gives you a greater margin over the slower pilots.
- Finishing is always better than not finishing.

The flaws are due to the fact that each competitor's performance is evaluated with respect to the best performance <u>and</u> the average performance of the group. We should preserve the former and abandon the latter.

Rather than belonging to the majority, the points should be equally accessible by everyone.

The proposed system eliminates the disadvantages of the current system. It is much simpler, easier to understand, easier for spectators and pilots to understand where their points come from, and it provides no opportunity for tactical exploitation of a flawed formula.