

Comment on classes
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It's time to rethink the basic question: What should our racing class structure look like? What should it look like 20 years from now, and how do we get there?

Principles

I think there are three good guiding principles:

- 1) A class can be defined for pilots to race existing gliders.
- 2) A class can be defined to spur the development of new racing gliders and associated technologies.
- 3) Classes need to make sense at the regional, national, and continental level as well as for world championships.

Point 1: When faced with too few pilots and gliders that for historical reasons vary too much, the only practical answer is to put gliders together with handicaps.

Nobody really likes handicapping. The handicaps are never perfect, so shopping for handicaps and pestering the handicap committee replaces shopping for gliders and pestering their designers. Handicap strategy becomes important – do choose performance, or try to stick with the gaggle and win on handicap? A big question remains open – do we handicap only designs, and encourage modification? Or do we penalize (and if so how much) winglets, fillets, airfoil modifications, tape application, etc..?

But faced with few pilots and too many classes, there is often no other choice.

Point 2: In a development class, the point is to encourage pilots and manufacturers to buy their way to the top. As they do, we benefit from better technology that makes its way to all gliders, as well as better gliders in the chosen class. We should make sure that there are such benefits!

“Racing” is an important qualification. Better *racers* are not necessarily better *gliders*. Racers can be expensive, heavy, hard to transport, unsafe, or difficult to fly. “Development” class definitions need to be thought out carefully, so that, together with the available technology and pilot preferences, they produce good racers that are also good gliders.

For example, it's not obvious in the abstract why gliding should invest technical development to produce the best possible racer with 15 meters of span. But, historically, that limitation turned out to be produce great racers that were also not too expensive, nor too difficult to assemble and fly for typical pilots.

As a counterexample, lack of flaps might once have made sense to limit costs. But now, with standard class only about 5% cheaper than 15 meter, it's not clear at all why we should have a *development* class that focuses technical effort on building the best flapless glider. In fact, the latest standard gliders with low angle of incidence and high wingloadings have some practical disadvantages.

Point 3: There are far too many classes for national and regional competition. Most countries have given up, and their national competitions mix FAI classes with handicaps. As a result, national and international competitions are going in separate directions.

To make this point vivid, here are the numbers from the US. We are the second-largest gliding country in the world, and we are still trying to have separate contests in each class.

Year	Open	18M	15M	Std	Sport	PW5
2011	15	15	25	15	22	3
2010	8	29	30	10	44	6

Table 1. Participation in US National Championships

Our rules require 8 gliders to have an official championship. That is a low bar: Contests are not financially viable below 20 or so, and both financial and sporting considerations are better for contests with 40 or so gliders. You can see where we're headed. We too will likely have to merge some classes with handicaps.

It makes little sense for pilots to spend their careers flying handicapped contests to prepare for the day when finally they go to the worlds, and then and only then start flying a different environment. This structure also dilutes the "development" goal. Why spend lots of money for a glider that will likely spend its entire career in a mixed handicapped class?

Production, pilots, and fleet

The production numbers compiled elsewhere in this issue, are a crucial part of the story.

Standard and 15m production and development has ceased!

No manufacturer is thinking of producing a 13.5 *racing* glider. Given no demand for standard and 15m racing gliders and a lot of uncertainty about the class definition, this is a natural business decision.

Almost all production and development is in 18 meter, open, and Duo, most with motors. Racing glider production is heading in the direction once said of the US Air Force: we will eventually produce one glider per year that costs a billion dollars.

Aerodynamic innovation is slow. Most change has come by stretching existing designs over several classes.

A look at the US glider fleet, compared with the numbers of gliders in each category that fly national contests is instructive. Here are the numbers:

	New Open	Old Open	FAI	Club	Duo	13.5
Fleet	31	47	426	1,324	88	130
Contest	5	3	73	19	6	6

Table 2. US contest glider fleet, and average participation in national contests, 2010+2011. FAI includes current production standard, 15, and 18 meter gliders. Club extends from Libelle/Standard Cirrus to ASW20/Ventus. 13.5 includes PW5, Russia, L33, Silent, Sparrowhawk.

How can gliding go on with all production in gliders that cost 150,000 euros or more? Table 2 suggests an answer. Our sport is declining slowly. Gliders last a long time. It costs less far less to refurbish an old glider than to buy a new one. With little aerodynamic innovation, the only reason to buy is if you want to participate in the “new” very expensive classes.

Even in standard and 15 meter classes, a used ASW27/V2 costs much less than a new one, and there are lots of these gliders around. That’s why there is no demand for new production.

Table 2 makes another important point: Only a small and declining fraction of gliders or their pilots participates in competitions.

History which we should not repeat

The most successful “development” decision was to create the standard class. It created very popular gliders of attractive price, performance and handling. One part of its success was the yawning gulf in practicality relative to its only competitor, the open class.

The history of class definition since then sounds some cautions. Classes were often created to accommodate existing gliders. But as soon as new gliders were designed to the class definition, those existing gliders were obsolete, and we got stuck with too many classes. “Don’t design development classes around existing gliders” seems like a good principle.

Standard and 15 should never have been split. The Standard Cirrus and PIK 20 were obsolete the minute the Discus and ASW20 were announced. We are stuck with two classes of nearly identical price and performance.

Manufacturers started adding extended wingtips, to offer more performance in sport mode, and to support engines. Enter the 18 meter class to give them a place to race. But the existing 18 meter gliders were all obsolete the minute the ASG29 and V2C came out.

18 and 15 are not that different aerodynamically, about the same as 15 and standard. So now we have three classes of very similar performance, and gliders designed to span classes. And even 18 doesn’t handle a self-launching motor that well.

It would have made much more sense to define a 20 meter class, which could handle the weight of a self-launch engine easily. It would have included the the Duo/Antares class, and much of the demand for the emerging 23 meter class as well. It would have been distinctively different from a 15 meter class, and both could have survived.

With this background before us, the first lesson seems pretty clear: *Don't start the Duo and 13.5 meter classes.*

Participation in 13.5m and 20m worlds is even in doubt. Few countries are already sending full teams to all classes. How many will send full teams to additional classes? And there is no chance that countries not holding separate contests for current classes will have separate contests for these classes.

Eliminate (don't start) the 13.5 class.

Why are we even talking about a 13.5 meter class?

Some of the motivation is surely historical, to give the PW5 a place to race. A 13.5 meter class doesn't work to this goal. The PW5 is instantly uncompetitive. They were designed to be a one-design class, not a 13.5 meter racer.

If we want to create a place for existing designs to race, we should form a low-performance, sub-club handicapped class.

Even this is a dubious proposition. A contest class needs pilots as well as gliders. Table 2 shows that 13.5 meter gliders are in fact quite popular – there are 65 PW5s in the US, and an equal number of the other gliders. But *the owners of these gliders have absolutely no interest in racing them.* Equivalently, pilots interested in cross-country and racing buy club or FAI class gliders – which we have in abundance.

The US experience here is instructive, because we have a “sports class” at every regional contest and a national sports class, which allows every glider to enter. The 13.5 meter gliders simply do not show up.

The IGC wants the class to stimulate development of 13.5 meter gliders. But a contest class, if successful, stimulates the development of *racers* and this is an important difference.

The small gliders have been developed with the primary consideration to be cheap, light, easy to handle and rig and only secondarily to have good racing performance. The sales numbers show they are in fact pretty popular solo gliders. But racing is pretty specialized these days. It involves much higher wingloadings and speeds than are common for everyday flying.

What will a 13.5 meter *racer* look like? If the class is defined only by span, it would probably look something like a scaled-down ASW27. And it would likely cost almost as much as an ASW27. Why do we need to work on a glider that delivers 38:1 performance and ASW27 cost, given that sales of 15 meter gliders are zero?

If the class bans waterballast, then the gliders will truly be orchids, flying at high wingloadings that make them unsuitable for club use.

One might consider wingloading limits, as the IGC is doing, or stall speed limits, fixed gear or other cost and weight lowering limitations. But now we are gradually reducing the cross-country performance

back to PW5 levels, and making the gliders less and less attractive. And uncertainty in class rules will not attract design effort.

The small light gliders are truly interesting, and I salute their development. But they have not been developed as racers, and their current owners are not interested in racing. We're talking now about developing a completely new concept. Why does the world need to focus technical development on a 13.5 meter *racing* glider?

There is a need. 18 meter gliders are outrageously expensive, but standard and 15 are so close that nobody is buying them. Something like a "Discus class" might be popular, but it has to compete successfully with the thousands of existing club class gliders (see Table 2): It has to cost no more than a refurbished Discus, perform no less well, and be no harder to fly. It's not obvious that a 13.5 meter span is the way to produce such a glider.

I'm just speculating. But the IGC is just speculating as well. If we are creating a class for gliders that don't exist yet, and are not even on the drawing boards, we shouldn't be speculating. The IGC first should talk to the manufacturers; find out where the technical niche is that produces a coherent, saleable product, which all the manufacturers will support and which pilots will buy, and race. Better, it should wait for such gliders to emerge on their own.

Don't start a 20m class

The 20m two seat class does not make much more sense.

Many duos have been sold, but it is not obvious that their owners have that much interest in competition either. There are about 5 duo discuses in the US that are ever flown in contests. (Again, thanks to sports class, there is a place for them if they're interested, as well as open class.) Karl Striedeck alone accounts for about half the entries. A worthy attempt to hold a 20m contest failed because they couldn't get more than a handful of gliders to come. These gliders are mostly bought and enjoyed for reasons unrelated to serious racing.

If we have it at all, why should this be a "development" class not a "fly existing gliders" class that uses handicaps? Do our manufacturers learn anything about aerodynamics and structures from these gliders that they do not learn from open and 18 meter gliders? The duo was developed as a club glider. What benefit does gliding get from spurring technical development of *racers* with two seats and 20 meter wingspans?

A "racer" needs flaps – more money. Duo class is really Arcus class now and the duo is already outdated. Unhandicapped racing also means that club conveniences such as a nosewheel will have to disappear. If anyone takes it seriously, racing will mean exotic materials to lower wingloadings. I bet we will soon see two seat gliders with removeable wingtips that can fly either open at 23 meters or duo class at 20 meters, repeating the 18/15 saga, and with costs through the roof.

Duos are great gliders. But why does every glider need its own class? Why not a 20 meter single-seat battery-powered self-launcher class? I'm sure Lange would be pleased. Why not a 14.7 meter metal single seat class? I'm sure LET would like it.

Are we not following once again exactly the mistakes that proliferated too many classes with nearly identical performance?

Maybe there is something special about two-seat racing? Then why does two-seat racing in 20 meter gliders need a special class, but not two-seat racing in open gliders? Or in ASK21s?

What to do

I sympathize with the IGC for they have a very hard problem in front of them. If we were to sit down and write classes from scratch, we might come up with 15 meters with no engines, 20 meters, and open class. But we have to take care of the vast base of existing gliders, so something that radical cannot be considered. I don't have a simple plan.

Still, a few principles seem worth keeping in mind:

First, put out the fire. *Standard and 15 meter class development and production have ceased!* Production of any racing glider costing less than about 150,000 euros has ceased. This is a crisis! Let's fix the old classes, or at least figure out why they're dying before starting new classes. Saving non-handicapped racing at the national level should be a big priority.

Second, fix the decline in participation. You can see in my Table 2, that only a small fraction of the glider fleet flies national contests. In the US, about 350 pilots fly one contest, including regionals, every three years, though 1000 pilots submit traces to OLC, and we have 2000 contest-capable gliders. Development can only happen in a growing sport.

Here's a radical proposal that addresses the first two points. Announce the end of standard class. None are being produced anyway. Any standard glider produced before x date may participate in 15 meter class with a set handicap, maybe 3%. And ban motors in standard/15 meter class. That alone keeps the cost down and makes it distinctive.

And fix the rules to make contests safer and more attractive. Much of the reason for 18 meter class is motors. Much of the reason for motors is the IGC scoring formula and tasking rules, which lead to hours of start gate games, and then going out in a big gaggle to mass landouts.

This does not happen in the US. Our rules produce much less start games, gaggle flying and much fewer landouts. As a result, the vast majority of US racing gliders— even 18 and open — do not carry motors. Our participation numbers aren't great either, but the costs of competing in the US are much lower. Most pilots don't even bring crew. And the atrocious safety record of current contests is surely not helping either.

OK, that's radical, and maybe flawed. But these are the issues the IGC should be addressing.

Given the historical fact of too few pilots and too many classes, for the foreseeable future most countries will have national and regional competitions that mix some classes with handicaps. Regularizing this procedure would help. An international handicap table, a decision on whether modifications trigger handicap changes or not, and pulling together the best practices from all the national experiments with handicapping ought to be a big focus for the IGC.

Do not create new classes for every kind of glider. Not every glider needs an (unhandicapped) contest class. The widespread practice of handicapped racing allows a better way to let new classes emerge. Make sure there is a spot in the handicapped racing scene for every type of new glider. Then, gliders which become popular in the handicapped racing scene can qualify for their own classes, with our knowledge that there is a sufficient base of gliders and pilots to make a successful class.

The natural place for Duos/Arcus is right in with the FAI gliders. Let the handicap reflect any perceived advantage of two heads in the cockpit, and with handicaps, let the gliders stay simple and suited for club use. If the day comes that we have a superabundance of duos proven to want to fly in regional and national competitions, then they can form a separate class for international competitions.

The natural approach to the PW5 and other light gliders is a handicapped class for all gliders below club class performance. If a combination of price, handling and performance that attracts many pilots emerges there, then it deserves to emerge as its own class.

The IGC may be following the “build it and they will come” idea that pilots and manufacturers will only become interested in a class if it has sanction as a world contest class. That view is contradicted by experience both positive and negative. Pilots have to like flying a glider and be willing to go to regional and national competition if it is going to be successful. All of our current innovations happened outside the class system – flaps, 18m, 20m, and asked for class sanction afterwards. On the other hand, offering world competitions in the PW5 did not attract racing pilots to this glider, even though it proved a hardy solo glider for clubs.