



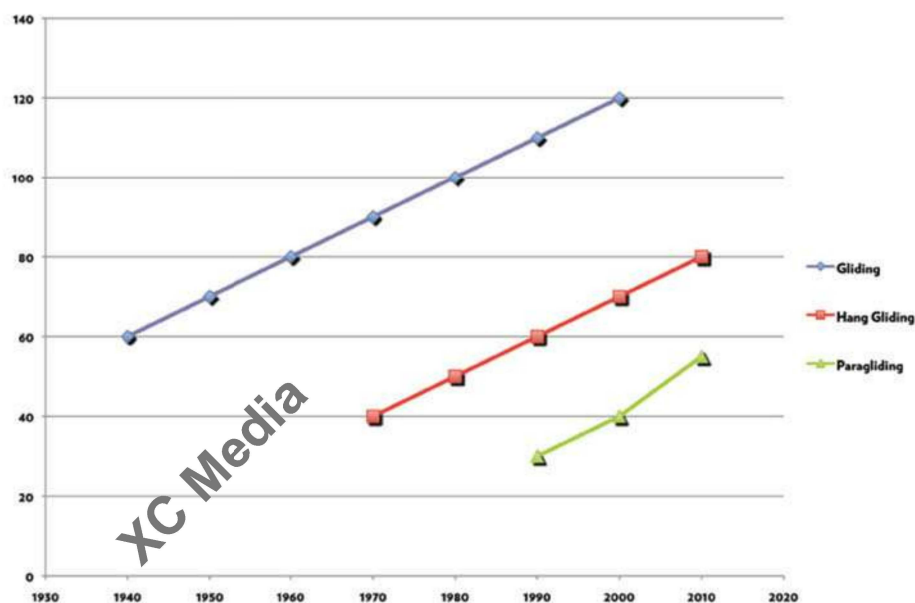
BRUCE GOLDSMITH *ICARISTICS* SLOW REVOLUTION

Forget top speed, we should focus on how slowly a glider can fly

Bruce Goldsmith has been flying since the 1980s. He has been British Hang Gliding Champion twice, British Paragliding Champion three times and was Paragliding World Champion in 2007. A paraglider designer for 20 years he is a co-owner of Airwave.

► SPEED MACHINE

Bruce's theory is that as soaring craft have developed designers have chased ever more speed. Pilot population meanwhile migrates to the simplest, ie the slowest, machines. As gliders got faster, pilots opted for hang gliders, and as they got faster pilots turned to paragliding. From 1,000 sailplane pilots in 1945 there are now 100,000 paraglider pilots. The Y-axis is in km/h.



In May 1999 I wrote an *Icaristics* called *Low and Slow*. I rounded it off by saying, “In the same way that people are now saying ‘small is beautiful’, rather than ‘big is beautiful’, I like to think the modern way to fly is low and slow.”

Flying slow, I said has a particular beauty about it that is lost when flying high or fast. “You can fly with the birds, you can land or take off almost anywhere, you can hover so close to the ground that you can touch the grass with your foot or even your hand. Flying slow also means flying quietly.”

The race for speed in paraglider design, I said, was the “logical” result of competition. “To race you need to fly as fast as possible.” But, I added, “Really, this is nothing to do with why people paraglide. People paraglide for enjoyment, and to me the enjoyment of paragliding comes from the way it allows you to appreciate the place you are flying in ... from seeing things close up, by flying low to the ground and nature, in places you could not easily get to on foot. Flying close enough to talk to hillwalkers, or see wild deer or

even smelling flowers or pine forest scented thermals.”

It also allows you to feel the air through your wing. “Sometimes pulling on a brake to slow down in a thermal can feel like you are grabbing the air with your hands and lifting yourself up like climbing on a rock face made of air.”

I concluded, “Too often you hear that faster and higher is better but I think that we have had enough of the race for speed.”

Looking at it today I still think that. Paragliding is so popular because it is the easiest way to fly. Not only is a paraglider the most portable aircraft but it is also the slowest one. This means that a paraglider pilot can take off and land just by walking. It is precisely this ability to fly slowly that makes paragliding the easiest way to fly.

So it is ironic that we have spent so much time trying to make paragliders fly faster. What I said in 1999 still holds true: competition is about racing and this in turn drives paraglider development in the same direction. Speed, speed, speed.

►► FAR RIGHT

A prototype of one of the new gliders from Airwave that Bruce is working on. Slower stall speed will mean “impressive results”.

Gliding used to be the easiest way to fly in the middle of the last century, but gliders got faster, better performance and more complicated. Then some crazy guys invented hang gliding. Hang gliding was simpler, lighter and slower. So then hang gliding development got going and hang gliders got faster and more complicated, finishing up with the ATOS, the fastest and most complicated hang glider out there. So then there was the paragliding revolution, and things got slower again.

As we look at this development of gliders towards greater speed we think of it as real progress. But if you look at the bigger picture you can see that the real progress has been towards lower speed.

This is illustrated by this graph, where the speed is my own guess at the average flying speed of different aircraft at different times. If you superimposed popularity on this graph you would soon see how the lower speeds have lead to greater accessibility and greater popularity.

This is the real result of the race for speed. Speed kills; pilots as well as our sport.

Maybe it's about time we had the next 'slow revolution'.

TRUE SPEED

When people measure the top speed of a glider they usually use km/h. However a better unit of measure is 'stall speed'.

Imagine your wing stalls at 24km/h and has a top speed of 50km/h. That's a ratio of $50/24 = 2.1$ This is what is called the speed range, and it would be reasonable for a middle-of-the-range EN B glider.

If a glider had a stall speed of 20km/h and

a top speed of 60km/h then you would be at a speed range of 3.0. This would be a great wing.

A speed range of 3.0 is in fact great in all forms of aviation. Look at a hang glider with a stall speed of 34km/h and a top speed of 100km/h.

Look at a sailplane with a stall speed of 50km/h and a top speed of 150km/h. Look at a Boeing 747 with a stall speed of 290km/h and a top speed of 910km/h. The 747 beats a paraglider by a little with a speed range of 3.14

The most impressive thing about these numbers is that they are all so close. It appears that every flying machine that has good performance flies with a ratio of around 3.0.

In paragliders I am sure we could improve our performance to say 4.0 or 5.0 by reducing the stall speed. And if we put the same effort into reducing stall speed as we have into increasing the top speed, then I'm sure the results would be impressive.

NEW GLIDER CLASSES

I recently had dinner with Hans Bausenwein of the Paraglider Manufacturers Association. We discussed the idea of changing the classification of paragliders to stall speed instead of certification grade.

That way the easiest glider would have the slowest stall speed, which seems like plain commonsense. It would look like this:

Glider classes designed by stall speed

Class 1 or A: below 20km/h

Class 2 or B: 20-22km/h

Class 3 or C: 22-24km/h

Class 4 or D: over 24km/h

Why did nobody think of that before? 