





FACES: MR 'TOP 80'

Bruce Goldsmith meets the designer of the legendary Top 80, Diego Cecchetto

Renowned as the man who invented the paramotor engine, Diego Cecchetto is the designer and owner of 'Per Il Volo'. His first dabbling with motors began back in 1987 when he put together the Miniplane mk1 using a home-made 180 cc water cooled engine with chain reductor. He moved on to a Comer go-kart engine with a clutch and belt reductor, then finally settled on a Vittorazi mini-motorbike engine. From those early days, Diego's passion and prowess for paramotor design flourished and in 1997 he released his own motor, the famous Top 80. Over the last decade Diego's motor has set something of a benchmark to which other designers aspire. Over the years several other manufacturers have adopted the Top 80 to power their own machines, as its simplicity and reliability are legendary. In the hands of PAP, Ramon Morillas and Mathieu Rouanet it has scooped every major title, several times over.

I first noticed Diego at the Italian 'Sportorno Festival del Vento' this spring, as a mechanic enthusiastically running around the beach helping pilots with any technical problems they were having with their engines - a trait he's famous for, and one that's a godsend to pilots at the many events he visits through the year. I just was wondering who the energetic, ever-helpful guy was when Michel Carnet enlightened me that that was the engine fanatic who ran the biggest paramotor engine company in the world. Finally I got a chance to meet 'Mr Top 80' and learn a few of the secrets behind his success.

What's your flying background?

I'm 50 years old now and have been flying hang gliders for 32 years. I started when I was 18, then I got into paragliders and now paramotors are my passion.

What about Per Il Volo?

The company has been going for 20 years. We were the Falhawk dealer for Italy years ago, then in 1987 we decided to make a paramotor. Luckily in Italy there was a lot of expertise in motocross, karting and scooters to help us develop an engine.

The first prototypes were very heavy, but I believed it was possible to make a lighter engine that was more designed towards paramotor use, like with a diff-lock clutch so that the engine disengages from the propeller when you start it. I've worked on both the frame and the engine

together to try and remove weight. Our machine now weighs only 19 kg.

From the beginning most manufacturers wanted as much power as possible. I didn't agree. I only wanted 15 hp, now we have it up to 18 hp, but in the lightest possible engine to make this power.

You need thrust from your engine, not just power. With this in mind I designed a more efficient machine, improving pilot position and prop efficiency. The result is we now have so much thrust that we can fly with 110 kg, no problem.

When I began with the Top 80, people said that 15 hp wasn't enough. But I was sure that wings would improve very quickly and make my motor even more effective. They did, they were wrong, and I was right. I'm so happy that modern wings are safer and more efficient and we now can fly with less power. Personally, I want lighter engines that are easier to use and more efficient.

How big is Per Il Volo nowadays?

We make 800 engines a year. 300 go into our own machines and the other 500 get supplied to PAP and companies in China and Korea. It's a full-time job.

We have one engine in our range, the Top 80. We are working on other designs, the Top 100 has been in development for four years now, and we are also working on an electric motor.

There are about 4,000 motors sold around the world every year and I'd say we are the largest manufacturer. Most of the engine manufacturers are Italian: Simonini, Vitroazi, Sky Engine, JPX, Snap. The two-stroke engine is in our blood!

Europe is the biggest market. France in particular is very good and we sell a lot in Belgium and Canada. Ironically, we don't sell that many in Italy.

What is the main difficulty when developing an engine like the Top 100?

Firstly, while the base for the first Top 80 was a proven scooter engine, the new Top 100 has been created from scratch on a CAD system. It's a completely new engine.

Most of the problems we encounter are mechanical. The most difficult thing is keeping on top of the standard of production. Everything has to stay within a certain tolerance for it all to work. We have many different component suppliers, all of whose quality control can affect us. Then, as we develop the motor, each small change we make

has a knock-on effect on the rest of the engine, so I have to change other things in the design. Change one single thing and you need to change many others. Developing an engine is about developing solutions to problems.

Paramotoring is a very strange form of powered aviation. Every manufacturer hits the same problem: balancing engine vibration against power. In a scooter, we have 10 hp in an 80 kg frame that is permanently attached to a hard surface, the ground, to minimise vibration. With a paramotor you have 20 hp in a 20 kg frame that is free hanging. The vibrations are huge and can shake the thing to pieces. A paramotor is a unique mechanical challenge.

What common issues do you hear about from pilots who experience mechanical problems with your engines?

Some people use homemade propellers. They are never very well balanced and so they vibrate badly and before long they rattle the engine apart. Another big problem is the different standards of gasoline across the world. Our engine is a two-stroke, so the right oil mixture is essential to make it run correctly and without damage. It's difficult to get the mixture right when you have such widely varying quality of fuel and conditions.

Is electric the future?

I like it a lot, but I think it'll take a while until it really takes off. The technology is quite simple, but there's nothing on the market now that you can buy to start making one. Everything will need developing specifically for paramotoring.

Before we do that we need to decide exactly what to design. Pilots want different things. One wants to fly one hour, one needs to fly to 2,000 m, and another says they need a short take-off. They all need different machines.

Another issue is that most people think electric motors will be more ecological, but this isn't the case. We need to produce the energy for the battery in the first place, plus there's a lot of pollution involved in producing the battery itself, and then their lifespan is short. I think that there's actually less pollution with a two-stroke internal combustion engine than an electric motor.

However, I still believe it's the future. These problems are difficult, but eventually they'll get solved. In two years' time the cost of an electric paramotor will hopefully have been halved. ☐