

NTCAs in commercial operation. The Madiba Bay School of Flight has placed considerable faith in the Sling 2-Rotax pairing, and has not been disappointed.



The Amazing ROTAX AND SLING 2

An aeroplane is a marriage between an airframe and an engine. In fact, a savvy designer begins by selecting an engine that will best give expression to the idea in mind.

WW2 would have been quite different without Rolls Royce's Merlin. It powered the Spitfire and

Hurricane that won the Battle of Britain. It powered the Lancaster that bombed the heart out of Germany by night. It powered the aptly named and wonderfully versatile Mosquito that generally bugged the hell out of them and derivatives powered the P51 Mustang and P38 Lightning that wrestled air superiority from the German fighters by day.

Nowadays, Continental's IO-520 and Pratt and Whitney's PT-6 are the reliable workhorses in many general aviation aircraft.

Moving to airframes, in 2012 two of my younger brothers died when they intentionally spun our Cessna 150 from 4,000 ft agl and then failed to recover. Now shouldn't a type-certified aircraft have flight characteristics that are proven and predictable? I have given over 4,000 hours of flight instruction and I can tell you that whilst a C152 will spin the same every time, a C150 is a clown. It was from the ashes of that tragedy that the Madiba Bay School of Flight arose.

That humble C150 was the school's only aircraft. I had planned to build up a fleet of C150s, mostly because fuel is a flight school's greatest expense and Continentals' O-200 engine burns only 20 litres per hour. But, the accident had understandably made me question the C150.

I got a call from someone saying that Mike Blyth from The Airplane Factory was touring the country, demonstrating the Sling. Honestly, I wasn't interested. I had flown too many of these little Non-Type Certified aeroplanes with their Rotax engines and horrible flying characteristics.

Before we took off I told Mike that his plane had to pass three tests.

1. The stall had to be a non-event, otherwise my students, which at the time consisted mostly of the rejects from other flight schools, would be scattered all over the final approach path.
2. The flight controls had to remain effective at low speed or the cross-wind in PE would send us farming on a daily basis.
3. The control harmony had to be good. The other types I had flown were all overly sensitive in pitch and unresponsive in roll.

We took-off and a smile began to spread across my face; a smile that, my wife will tell you, did not go away for two whole days. The Sling 2 was quite simply the most delightful aeroplane I had ever flown. There were issues though. I could buy three C150s for the price of a single Sling, and money was short. Also, the engineers on the field were warning me that they didn't think such a light airframe would stand up to being banged into the tarmac hour after hour, day after day, but Mike said his plane could take it and something in his eye told me I could trust him. I ordered two that day.

The other half of the story began the day I read a write up in SA Flyer about the fuel injected version of Rotax's tried and tested 912 engine that was about to be launched and which promised a 20% improvement in fuel consumption. I called Mike right away and specified the fuel injected engine for my aircraft. Mike is also the owner of Comet, which is the authorised Rotax dealer. He said he could arrange it, but there was plenty he didn't tell me and probably didn't know, for example:

No one else in the world had used this engine and it wasn't really available yet, because the boys at Rotax were still ironing out a few wrinkles.

The Airplane Factory had not figured out how to install it yet.

Also, it wasn't like a Continental or Lycoming where fuel injection, at least from a pilot's perspective, was a fuel pump switch in the place of the carb heat handle. This engine was everything us pilots had been crying for since ... well since the Wright brothers!

But finally, we had an engine just like your car engine – modern, and 1,400 cc rather than the size of a tractor engine.

What I didn't know was that the 912iS is controlled entirely by a computer. The drawback is that it needs electricity to run. No one thought to mention that when I ordered the engine. It took me a while to let go of the security of my trusty old magnetos, the way a baby finally parts with a dummy. Anyway I was won over by the fact that the engine has two alternators that automatically back each other up. The battery can also provide electricity for a while in the unlikely event of a dual alternator failure.

FINALLY, THERE WAS AN ENGINE JUST LIKE YOUR CAR ENGINE – MODERN.

I took delivery of ZU-FUS in November 2012. The 512 nm from Jo'burg to PE took 4.5 hours and I had burned 60 litres of fuel. That's got to be some kind of a record in efficiency. But what really got me was that I had enough fuel left in the tanks to go back to Jo'burg, turn around again, and make Bloem! Gone were the days of stressing about students running out of fuel when flying into headwinds or getting lost on their solo long navs. I still smile when we fly out of a strange field and call "12 hours endurance". That is usually followed by a moment's silence from the controller and then the inevitable, "Say again endurance please."

We put 100 hours on the plane in the first three weeks. Then the following



Jordan van Eeden

Rotax gave away a free engine to the first operator to reach 2,000 hours on the 912iS. The Madiba Bay School of Flight won the competition.

Sunday morning, shortly after its first MPI, I had to go fetch it off the beach at Bluewater Bay. Antonio Merola, an ab-initio student from Italy, on a solo navex had had an engine failure. Thank God it was Antonio, because anybody else would have botched it. The nose wheel had collapsed in the soft sand, but except for that, and the prop, there was no damage. As it turned out, the clamp that held the fuel line to the engine couldn't withstand the 3.5 bar of fuel pressure and so the hose had disconnected. It was an installation problem, not an engine problem.

The support from The Airplane Factory was exactly as one would expect it to be in the circumstances. Jean d'Assonville flew down to PE in our second Sling, ZU-FVW, fresh from the factory, with the required parts. No more waiting six weeks for parts from the States! It took him about an hour and a half to change the prop and install a new nose wheel. PE being motor city, we found a fuel hose connector that would withstand 100 times the available fuel pressure. The engine did not need an inspection as it has a slipper clutch to protect it from damage during a prop strike, so off Jean went to Jo'burg in the little plane, mostly to get the ocean out of it. Try and do that with a Cessna! The last time we had a nose wheel collapse at the school, it cost hardly more than the excess to repair the damage and so I didn't bother the insurance company with it.

A little while ago I found out that unkind words were said about the school's instructors regarding the three nose wheel collapses we have had on Slings. They are wrong. Almost all of our instructors are ex 43 Air School and they are very good indeed. Only one instructor was to blame. We let that instructor go and the CFI has since done quality control and the problem has gone away. That being said, such incidents have got to be seen against 7,000 hours of training. If the aircraft is landed properly the nose gear will never collapse. If it is severely abused however, the strut is designed to fold at a pre-determined force so as to prevent damage to the engine mounts and firewall.

Teething trouble with our state of the art engines were present, but offset by the fantastic support of Rotax via Comet. The gremlins began to appear at about 400 hours on each engine – there one moment, gone the next. No one knew the answers.

We downloaded the data from the engine computers and e-mailed it to Rotax

for analysing. Slowly a pattern began to emerge. As I understand it, and electronics is black magic to me, the problem was caused by the gradual degradation of the consistency of the output from the alternators, which led to overheating of the voltage regulators. It resulted in ZU-FVW having an engine failure when the regulators melted down. Luckily, no one was hurt. That was the low point. Rotax supplied everything free of charge and paid the labour costs. By then we had six Slings, all with the injected 912iS engine and they all got new alternators, new computers, new fuse boxes and new voltage regulators. The Airplane Factory learned to place

The Sling had teething issues with the 912iS. This forced landing was due to a fuel leak.



Jordan van Eeden



Easy to operate and modern - the Rotax 912iS. It has two alternators and a back-up battery instead of dual magnetos.

the voltage regulators in such a way that cooling air could be ducted to it more efficiently.

For complex reasons the gearboxes were not getting enough lubrication and some parts showed signs of early wear. Rotax redesigned it and replaced them all free of charge, including labour.

The problems were behind us and the despatch rate went to better than 99% – once in a while we have a faulty sensor. The engine has quite a few sensors and we keep them in stock at our AMO. Douglas Wood is probably the most experienced Rotax guy in the country and it's been a hoot to see him wrap his grey head around laptops and computer programs. If a lane light flashes we taxi it to Doug after landing, who then hooks up his laptop for an immediate diagnosis.

In 7,000 hours we have never had to add a drop of oil between MPIs. How many times have you driven your motor car down the road lately and worried about suffering an engine failure? It's weird that we pilots have been brainwashed into accepting an engine failure as a normal part of life. It is not normal; it is utterly unacceptable.

At 2,000 hours FUS had done the equivalent to 400,000 km. Yet as I flew it to Jo'burg for it's major, it kept flying away from IBZ, the youngest aircraft in the fleet. There was nothing wrong with that engine and I was sad to have it overhauled. It had crashed twice in its life, once in the salt water and yet had never been opened. What a far cry from the oil guzzling engines from Continental and Lycoming that, at

The Madiba Bay School of Flight is going from strength to strength with the Sling's low operating costs and excellent flight characteristics.



Gerhard van Eeden

least in my experience, always need a half-life top overhaul and seldom make TBO. I hold my breath every time Doug does the dreaded blow-by tests on the Twin Comanche's engines. A Rotax engine has never heard of a blow-by. Furthermore, Rotax allows a 5% extension to TBO based on condition, so we actually have 2100 hours on our engines between overhauls.

I was very interested to see what was going to be lying under the surface when ZU-FUS went in for her major. Sean Russell and his guys at TAF's maintenance facility took FUS right back to kit form, looking for any signs of corrosion and metal fatigue. In the end they beefed up a vertical member in the rear fuselage, more as a precaution than anything else. Though we operate in salty air, and though the aircraft had been awash in the waves, no corrosion was found. That's a testimony to how good TAF is at prepping the metal during assembly. After the inspection, the major on the airframe was moved up to 3,000 hours. Those pessimistic engineers were beginning to swallow their words.

The major on the airframe cost R70,000. That's not a little, but it's not a lot either. I once had to pay R23,000 for new fuel gauges on the Cessna and they still worked badly, a true case of certified rubbish. The price tag on the school's Piper Twin Comanche's new fuel tank selector valves is R40,000 each, excluding shipping or installation.

Rotax donated the new engine for FUS, worth R350,000, free of charge. They had run a competition that gave a free engine to the first guys to reach 2,000 hours on the 912iS. We won. All they asked for was the old engine so they could check it out.

The impact of the Sling 2/Rotax 912iS on our operation has been unbelievable. We have done 7,000 hours on the type in the last two years. Average fuel burn is just nine litres per hour – which includes ground running and taxiing at PE Airport and circuit work. Fuel burn for a 105 kt cruise is 13 litres per hour, and that's car fuel, which costs about R6/litre less than Avgas and is cleaner.

MPIs cost just R5,000. I think a set of plugs on a Cessna will make a big dent in that amount.

Our profit margin per hour went up 400% compared to what it was on the Cessna 150. I am not a greedy person, so I used that to drive our prices down. Low prices combined with state of the art aircraft and our fanatical orientation towards customer service saw the school grow so that we currently have over 150 active students. We have never advertised, yet we are getting at least 10 new enquiries a day and what is truly astounding is where the enquiries are coming from. The USA, Australia, France, Belgium, Ireland, the UK, Thailand ... the list goes on. Our Facebook page is a lovely reflection of the life of the school and I believe people are drawn to that, especially as there are so many great photographs of the aircraft, all taken by the students. The school currently brings in R70 million of foreign currency into the country a year.

The Airplane Factory will never quite understand just how big a splash their little aeroplane is really making and how many lives in this country are being affected by it every day. Nor do they seem to get just how good it is. The Sling 2 powered by the Rotax 912iS is quite simply a terrific training aircraft.

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It is astounding that there are individuals at the CAA who are doing everything in their power to exclude NTCA from commercial use. The Airplane Factory just cannot get the Sling 4 by them. When someone has the guts to do what Mike Blyth, James Pitman and Jean d'Assenville have done, the words that come to my mind are support, encourage, nurture, foster, promote. It is unbelievably sad that a bureaucrat who does not know aviation and who does not love it, should be placed in a position from where he is able to stand in the way of progress.

Type Certified Aircraft are tested to a ridiculous degree before being awarded a type certificate. This process is so expensive that hardly any manufacturers have tackled it in 40 years. The technology on those aircraft is therefore as old as those airframes. NTCA in commercial operations are built in a factory and maintained in the same way as their type certified counterparts. They too are exhaustively tested prior to certification, but to a more realistic degree. There is a recognised process and it is governed by our CARs.

Recently the CAA tried to backtrack and remove the rights which the regulations

currently bestow on NTCA without consulting anyone. They clearly have no idea of the impact of the decisions that they so flippantly make. Industry needs to lead the CAA by developing the regulations that will govern the safe operation of NTCA in the future. The CAA is not equipped to do it. They are being guided by what other regulators in the world are doing. Seeing as we have a world leading aircraft in the Sling 2, I would just as soon see the rest of the world follow us. At least the CAA have indicated that they will engage industry before making the rules that govern the use of NTCA in the future.

We were privileged to have been part of the true testing process for both the Sling 2 airframe and the Rotax 912iS engine by using them in the real world of commercial aviation. And don't think for a moment that only NTCAs are proven in service. Piper's Twin Comanche killed heaps of people before they fitted those little spoilers to the leading edges of the wing, and that's but one example. Bear in mind that the only fatalities we have had at Madiba Bay School of Flight was when a Type Certified Aircraft failed to recover from something that it was certified to do, namely spin.

The guys from The Airplane Factory are putting the South African aviation industry right up there in the International market place. 



Gerhard van Eeden, Accountable Manager
of Madiba Bay School of Flight.