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Glider
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Wilbur Wright described flight as: 'A sensation of perfect peace mingled with an excitement that strains every nerve to the utmost.'

Uys Jonker (Jonker Sailplanes): 'You almost feel like the aircraft has got a personality, you've constructed with your own hands, you feel attached to it, almost emotionally attached to the aircraft, like some live object that we've made.'

Bonita Gorrie-Nuttall (Carte Blanche guest presenter): 'What would you expect to find in Potchefstroom? Hordes of students, beautiful oak trees? But you probably wouldn't expect to find two brothers with a boyhood dream that led them to create a high-tech flying machine that's now taking on the world. And no, it's not the Wright brothers - it's the Jonker brothers.

Attie Jonker (Jonker Sailplanes): 'We grew up in a family where it was gliding family. So, every Saturday we were in the airfield flying or playing around with little kids and then my father decided to build his own glider. So we grew up in the garage and house environment where continuously we were talking and building gliders. And that was the normal thing to do.'

Attie Jonker and his brother Uys were just boys when they first took to the sky. Their father Tienie was a schoolteacher in Christiana in the then Transvaal. And, for him, gliders were the cheapest way to feed his passion for flying.

Tienie Jonker (Jonker Sailplanes): 'On the salary of a teacher there was no way that I could afford to buy a commercial glider. So I looked around and I decided, 'Well, if you can't buy it you must build it.' And I decided to build my own glider.'

Tienie purchased some plans from a designer in America and slowly but surely the Miller Tern began to take shape.

Tienie: 'I didn't want to take short cuts. We imported wood from America, plywood from Scandinavia, the special steel also from America, all the nuts and bolts. And for the next five years I was working away in my garage in all the spare time that I had. And it took me five years before I made the first flight.'

From a young age Tienie's boys learned all about the finer points of glider flying and Uys clearly remembers his first solo flight when he was only 16.

Uys: 'It was just awesome because suddenly you're actually still a boy and you're sitting in the control of a fairly large aircraft at that stage. And nobody is telling you what to do... all the decisions you have to make yourself.'

Bonita: 'When did you eventually start thinking, 'Okay, this is something I can actually make a career out of'?'

Attie: 'It was never a career decision thing. It was always a dream-chasing thing. I was in about Standard 5... 6... 7 when I thought I could redesign my dad's glider into something more modern. So, I started looking at the plans and drawings and started reading engineering books and realized this is more difficult than it seems. And at that point I decided I will study engineering for the sole purpose of designing my own glider.'

Bonita: 'And did you take your brother along for the ride? How did he become involved?'

Attie: 'Uys was always more sports involved, I was always... the gliding thing was my thing. And eventually Uys told us he joined the gliding thing because he thought me and my dad had something going [that] he was missing out on. So, he started flying and eventually he latched onto the thing and became much more passionate than I was about the thing and told me, 'Let's do this!"

And so in 1999, with a dream of building the perfect glider, the brothers teamed up with an enthusiastic engineering student, Johan Bosman, who later became their aerodynamic engineer. Together they started the JS1 project.

Bonita: 'This little factory in the North-West started out as a glider repair and refurbishment business, but today it produces internationally sought after high-tech gliders.'

The prototype was funded by the repair business, the DTI and the University of the North-West. It took a decade to complete, and earned itself the name the JS1 Revelation.

Uys: 'The amount of work is absolutely a revelation - we did not realize by a long shot how much work is involved in this.'

Uys: 'This fabric [on screen] consists out of Kevlar. Now we use this in the cockpit area. What this does is its like shatterproof, the Kevlar keeps it all together.'

The JS1 Revelation was 10 years in the making, and the science behind it is was being delicately refined every step of the way.

Attie: 'We started with a blank piece of paper without any legacies. We said, 'We will continue to design this thing until it's the best.' Refine, refine, refine - a half a percent here, a quarter of a percent improvement here, we really refined to the point where we thought further refinement is not possible.'

Uys: 'This little section is the winglet. The winglet is a very important part of the aircraft. This is getting bonded into position at the correct angle.'

Then came the ultimate test - would the JS1 Revelation stand up to the stringent requirements of the Civil Aviation Authority?

Uys: 'Certification is all about proving that you meet the specification. Now the specification is quite a thick document and each little paragraph of those has to be addressed and proven without doubt that we make the specification.'

During testing the design performed outstandingly to the point where, as this wing stress test

shows, the test rig actually failed (rig breaks) at a force of two tonnes, which is equivalent to a 16G load - double the certification requirement.'

Attie: 'Well, you need to show that every piece of the structure is 50% safer than ever required in flight.'

And the team did just that and were awarded the first ever certification of its kind in South Africa .

Bonita: 'The JS1 Revelation is the 'Formula 1' of glider technology. It's a racing machine that uses solar energy to soar for hundreds of kilometers at a time, at speeds of up to 270km/h. This baby is at the pinnacle of aerodynamic design.'

Word has spread in the international community and the orders are starting to roll in. Already Jonker Sailplanes' 13th glider is set to spread its wings.

Uys: 'This aircraft is not in final assembly; it's going to a client in England. We hope to ship it during next week. We expect the test flight to be tomorrow.'

Bonita: 'How much do one of these retail for?'

Uys: 'The basic model is around €75 000, so it's around R800 000 without instruments and accessories.'

The 18m wingspan class of glider may seem like an expensive toy, but those who race it take the sport very seriously.

Bonita: 'Attie, how safe is the glider?'

Attie: 'Structurally a glider is extremely strong. I mean, if you take for example, a glider like this can take a 12 - 14G pullout whereas with a Boeing they limit it to 4G. So it seems it's about 4X stronger than a commercial aircraft.'

Bonita: 'What's it like in the air there, just you and the glider?'

Uys: 'No, it's amazing! Why don't you go up and I'll give u a bit of a feel?'

Bonita: 'Okay.'

The JS1 is a single-seater, so Uys took me up in a twin-seater training glider. Little did I know what I'd signed up for.

Uys: 'Parachute first.'

Bonita: 'Oh my hat... okay. Mom - I love you.'

A quick safety briefing and the glider is attached to a little Cessna aircraft that will be towing us into the heavens.

The tow-plane would take us up to about 1500ft. Uys will release the towrope and then we're on our own - no engine, just the wind beneath our wings.

Uys: 'Now that's the beauty of aviation - gliders are designed that they have such efficient profiles that they don't need a lot to stay up. So what we're doing basically is we fly the aircraft and when we encounter lift, that is rising air. We start circling like any vultures or birds that you will see and then we're slowly going up - sometimes fairly quickly, we may go up as much as 5m per second or more on good summer days. And then we convert this height again into distance by gliding slowly down. So the whole gliding flight consists of climbing up like the birds and then flying.'

Bonita: 'We're going up!'

The beeping noise is an audio climb indicator lets the pilot know when the aircraft is ascending. And, as I soon discovered, Uys had a few tricks up his sleeve.

Uys: 'What about one loop?'

Bonita: (screams)

And that was called an inside loop with G-forces equivalent to a space shuttle launch.

Bonita: '(hand shaking) I'm not kidding.'

After that I felt I'd had enough and Uys offered to take us in for a gentle landing. Without an engine this is a skill that requires extensive training and, naturally, Uys aced it.

Uys: 'Bonita is okay, it was just a little bit of unnecessary aerobatics.'

Back on mother earth it took about 20 minutes for me to find my land-legs again.

Uys: 'The scream was so hard...'

Bonita: 'Did you hear me scream, you must've heard me?'

Uys: 'I think they heard you down there.'

Attie: 'Oh, did you do a loop? (laughs)'

The JS1 Revelation has won a number of local and international competitions but Attie still dreams of the big one.

Attie: 'Well, if our glider could win a world championship that would be spectacular.'

Bonita: 'Do you think that your glider the best in the world?'

Attie: 'I don't have to think anymore - it's now sort of a known fact. Internationally it's the best. There are different classes and in its class it is the best, it's a known fact, which is a great feeling.'

In just three years the factory has expanded to employ a staff of 50 - and it's growing.

Bonita: 'How do you feel about the fact that it's affected so many people's lives?'

Uys: 'Sometimes when you can just stand back and look at what's been achieved over a few years then you do feel proud. You really feel you have achieved something in your life that was a dream.'

Attie: 'The best part is when another pilot gets out of the glider with a big smile and tells me it's the best glider he's ever flown - that's the best!'