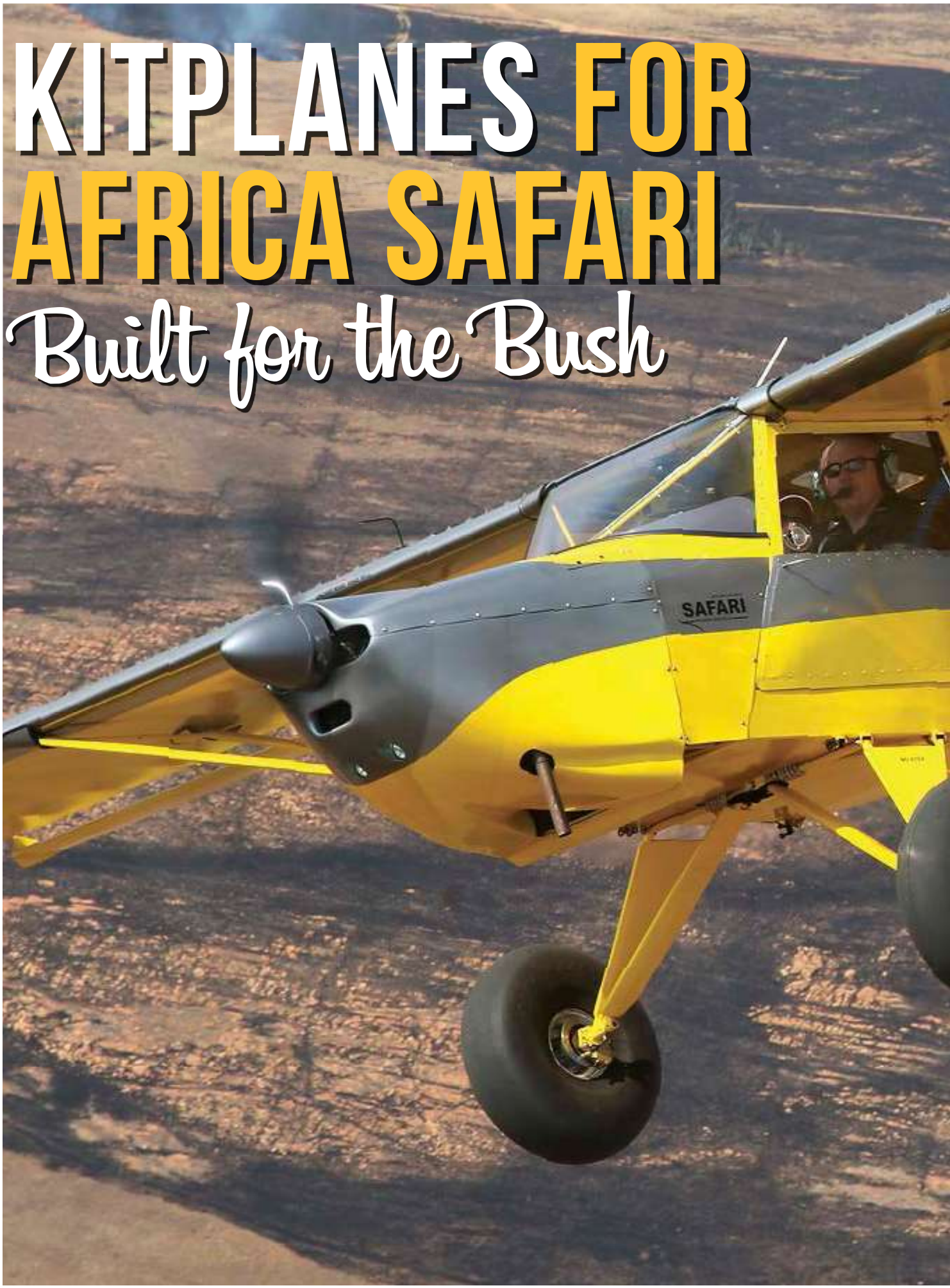
Text: Graeme Wuth

# KITPLANES FOR AFRICA SAFARI

## Built for the Bush




Bruce Perkins

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The Safari has evolved to become a fantastic African bush plane.

South African's have a knack for taking already good aircraft designs and making them better, paying special attention to the demands of flying in Africa. Take the Ravin, modelled on the Comanche, and the Bat Hawk which came from the Bantam, for example – not to mention aircraft operated in the SAAF. The Kitplanes for Africa Safari is up there with the best of them.




Initial Bushbaby was designed on the Kitfox 4 and Avid Flyer.

Bruce Perkins

THE Safari has its roots in the US kit-build aircraft, the Kitfox 4. Back in the early '90s, due to Apartheid sanctions, it wasn't easy to import aircraft, parts and kits. In the air force, these sanctions resulted in the Mirage III ultimately becoming the Atlas Cheetah (with the help of the Israeli Air Force) and the Puma becoming the Oryx. On the other end of the aviation spectrum – namely recreational bush planes – the popular Kitfox 4 was remodelled to become the Bushbaby.

From a backyard garage in Secunda, Nols de Bruin, the initial developer of the Bushbaby, used the Kitfox and the Avid Flyer as the baseline design for the Bushbaby. He wasn't striving for innovation, but rather set out to design a locally-built plane with similar characteristics to the two aircraft. One primary difference was that the Kitfox fuselage is built from 4130 steel alloy and the wing spars from tubular aluminium, while the Bushbaby fuselage is built from Tig welded tubular steel, and the wing spars are extruded from 6061 T6 aluminium.

Like the Kitfox, the Bushbaby became a popular recreational bush plane, with a particularly loyal following amongst local farmers. The aircraft was simple to maintain, handled well and was good fun to fly. Farmers love their bakkies, and the Bushbaby was a bakkie in the sky – although a little one.

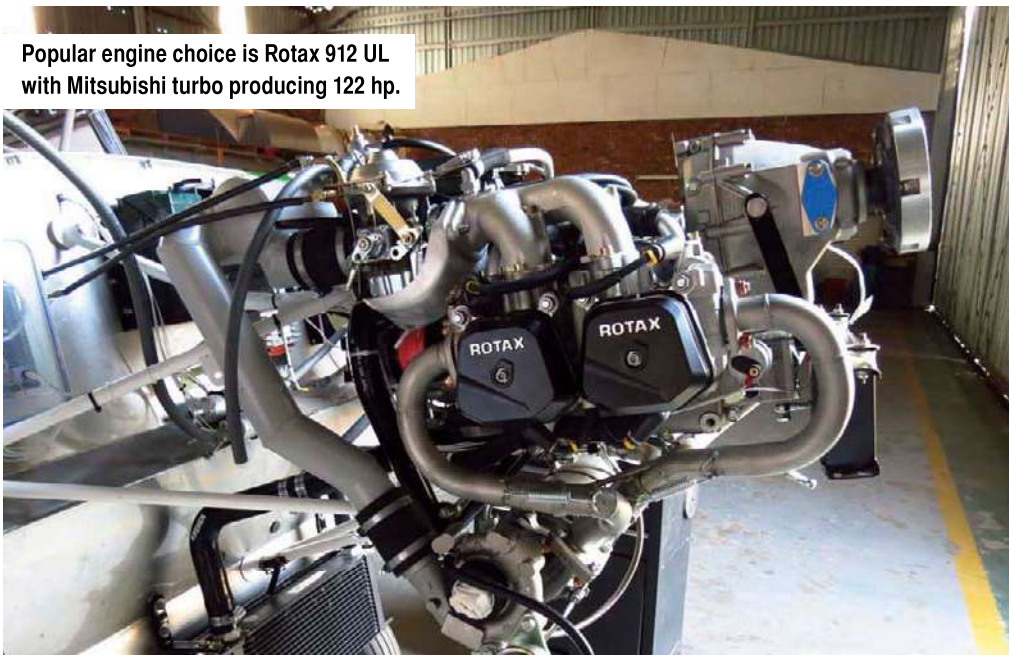
Early Bushbaby models were limited to a maximum all up weight (MAUW) of 450 kg – not due to design but due to the microlight category into which it fell, and pilot licence restrictions. That said, when empty, they weighed in just under 250 kg, so even with full fuel, they could carry a relatively useful load. After further wing load testing, the aircraft was placed in what was effectively the Light Sport Aircraft (LSA) category in the pre-Part 24, LS1 document, and the MAUW was increased to 500 kg and then again to 550 kg. Popular engine choices were VW, Rotax 912 UL/ULS and Rotax 582.

Your average South African is a pretty big guy, and although a great plane, the Bushbaby, often fitted with a little two-stroke, 64 hp Rotax 582 engine was found to be underpowered. The 80 hp 912 UL and 100 hp ULS resulted in better performance, but the cockpit is still cramped for two 'average-sized' 100 kg-plus guys.

Over 160 Bushbaby airframes were produced, with small structural upgrades along the way, but no major changes took place until 2003, when the Explorer was born. The Explorer is a beefed up Bushbaby. Structural changes were made to the fuselage and spar carry-through truss allowing for a maximum takeoff weight of 600 kg. The cockpit was widened to accommodate SA-sized pilots, and the roof truss was raised, making for a more comfortable flight. The vertical fin, including rudder, was also raised and widened to cater for the bigger, heavier airframe.

Then, in 2007, current owner of Kitplanes for Africa, Stefan Coetzee, bought the Kitplanes for Africa company with Rick Burrough. By this time the company had already passed through a few owners and had moved from Secunda to Petit, and then Bronkhorstspruit, before ending up in Komatipoort. The Komatipoort facility was the first proper factory where everything was manufactured under one roof. Stefan studied mechanical engineering briefly, but refers to himself as 'just a farmer', and modestly says that designing and building a plane isn't that difficult – basic physics. I suspect his background in development and manufacture of irrigation systems helped.

Stefan and Rick brought energy and direction to the team, and a year after they got involved, in 2008, the Explorer Mk2 was developed. It has a larger luggage area than the Mk1, longer engine mount




Popular engine choice is Rotax 912 UL with Mitsubishi turbo producing 122 hp.

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for better centre of gravity placement and a re-designed engine cowl.

2008 also saw work begin on the Safari LSA, and in 2010 the first Safaris were sold. It is an even bigger evolution than that of the Bushbaby to the Explorer. At 48 inches wide, the Safari's cockpit and firewall are eight inches wider than the Explorer, it has a 400 mm longer fuselage, an external luggage door which opens to ample luggage space and again a higher tail fin and rudder. In total, the complete Safari is about a metre longer than the Explorer. Maximum all up weight has been limited to 700 kg in the Very Light Aircraft (VLA) category, and the design is type approved by the SACAA. Stefan says that the team has successfully completed all the SACAA required tests and documents to qualify for South African type certification, but have yet to submit all the contents to the authority. They have also begun working with the Netherlands authority towards an internationally recognised type certification.

The Bushbaby, Explorer and Safari use exactly the same wing profile and size, though the Safari has the lift strut attachment 300 mm further outboard and an aluminium doubler inside the spar at the lift strut attachment points. Incremental upgrades continue to be made on all models, such as vortex generators, stall fences and upgraded landing gear, and the latest Explorers and Safaris are now labelled Mk3s.

In 2011, Stefan took over 100% ownership of Kitplanes for Africa. It had outgrown its facility in Komatipoort, and Stefan decided that it would be good for business to move to Gauteng – but not too close to Jo'burg or Pretoria so that they lost their bush roots. They settled at Petit Airfield on Gauteng's border with Mpumalanga, east of Benoni.

In total, Kitplanes for Africa has sold over 350 kits – mostly in South Africa, although they are also flying in Australia, USA, UK, Netherlands, Namibia, Botswana, Kenya, Mozambique and Zimbabwe.

I arrived to a hangar full of aircraft in various stages of completion. Although Kitplanes for Africa's aircraft are sold as kits, owners are welcome to get assistance building their planes in Kitplanes' hangar, and many get the company to do the finishing touches on their aircraft – especially installing avionics and doing the rigging. Latest optional extras to the standard Explorer and Safari, for a 'go-anywhere plane', are Beringer Alaskan Landing Gear, EFIS instrumentation and dual hydraulic brakes. Fitted with these, the aircraft would look at home in the Alaskan back country or remote Africa.

The aircraft I was there to fly was ZU-IJH. It's the plane used in Stefan's flight school, Komati Flight Academy. Using the aircraft for training has been valuable in determining how long parts last when used in a high wear and tear environment, and has helped to fine-tune maintenance schedules for the aircraft, contributing to the Safari having a great safety record. I got to try out IJH with 27.5 inch bush wheels, which are useful for advanced bush flying training and were cushioning of my novice taildragger skills – but we'll get to that.



Graeme Worth

Simple cockpit layout, with many owners choosing MGL EFIS avionics.

## PRE-FLIGHT

Being a non-type certified bush plane, the Safari is simple, and there are no complicated or unusual pre-flight checks. IJH stood proud on its big balloon-like bush tyres, which invite a kick and 'squish' to check pressure – usually about 0.6-0.8 bar is good for grass strips.

There's a flap in the cowl to check oil and water levels – that the engine is water cooled hints at what's hiding beneath the cowl. The Safari flies well with the Jabiru 3300 and CAMit's six-cylinder engine – Stefan's next project is fitting a 137 hp Verner radial – but most popular is the Rotax 912 UL fitted with a Mitsubishi turbo charger which boosts the horsepower from 80 to 122. IJH is limited to the maximum continuous power limit of 115 hp, and because that comes from a turbo, those horses are available up on the Highveld and at altitude. With a MAUW of 700 kg, that's plenty of power.

Also, the Rotax 912 is happy to run on both Avgas and Mogas, and sips it at around 20 litres per hour at 35 inches manifold pressure with the in-flight adjustable prop spinning at around 5,000 rpm. With 116 litres of fuel in the main tanks, plus the 5 litres in the header tank, that gives you four hours endurance with VFR reserves, cruising at over 100 kt.

But, even more appealing is its useful load. With an empty weight of a well-equipped Safari sitting around 380 kg, you have well over 300 kg to play with. Throw in full fuel of 120 litres, and you are down to around 240 kg for people and luggage. In other words, two 100 kg guys can still carry the maximum luggage weight permitted on scheduled domestic flights. That's if your aircraft is fitted with standard landing gear and operated in the VLA category. With the Alaskan Landing Gear, the MAUW is bumped up to 750 kg, so you have another 50 kg at your disposal if you are moving house. IJH, however, is licensed as an LSA, so it can be used for Part 62, National Pilot's Licence (NPL) training. It therefore only has a useful load of 220 kg. But that will still carry two 80 kg people, and allow for 60 kg, or 85 litres, of fuel.

Back to the walk-around. The Safari

Graeme Wuth




Beringer Alaskan Landing Gear with 27.5 inch tyres are a 'land anywhere' option.

Graeme Wuth



Span length flaperons separated from wing contribute to impressive STOL performance.

Graeme Wuth




Large horn balance on elevator for improved pitch control.

is fitted with 'flaperons' that are separated from the main wing and span the full length. Maximum deflection is just 12 degrees. There are a few reasons for this. Firstly, you need to maintain roll authority with full flap deflection. Secondly, the Safari is already fairly draggy, so going down and slowing down isn't a problem, and the flaps are primarily to augment lift, to allow for slow stall speeds, thereby improving short field performance – a rule of thumb is that 10 degrees flap provides optimum lift/drag – ask CC Pocock. And finally, with flaps that span the entire trailing edge of the wing, there is plenty of surface area to increase drag and improve lift. In terms of span-length ailerons, something to look out for during the flight would be roll sensitivity.

Further indications that the Safari is built for STOL performance are the vortex generators that run the length of the wings on the upper surface. On most Safaris there are also stall/wing fences on the end of the flaperons to improve stability during slow flight at high angles of attack. These weren't fitted on IJH during the test, so I was advised to be nimble on my feet in the stall to prevent the wing dropping.

The elevator has a large horn balance to assist with pitch authority. This was a modification from earlier Safaris and Stefan says that pitch control is now more responsive and better harmonised.

The only unusual pre-flight check is to ensure there is some play on the control rod at the base of the control stick when it is held fully aft. Other than that, and once you have done all the other standard pre-flight checks, give the wing a shake and listen if there are any loose nuts rolling around, and you're good to go.

With its big bush takkies, the Safari's seat is fairly high off the ground. The doors open upwards against the underside of the wing, so they're well out of the way, and there is a step on the gear strut to give you a foot up – you can also step on the tyre and swing you bum onto the seat. From there, pull the control stick back and towards the door, lift your leg over it and get settled.

## IN THE AIR

Starting the Rotax 912 UL is as easy as it gets. If it's the first flight on a chilly morning, open the choke and close the throttle, otherwise, it's crack open the throttle, MGL EFIS back-up power on,

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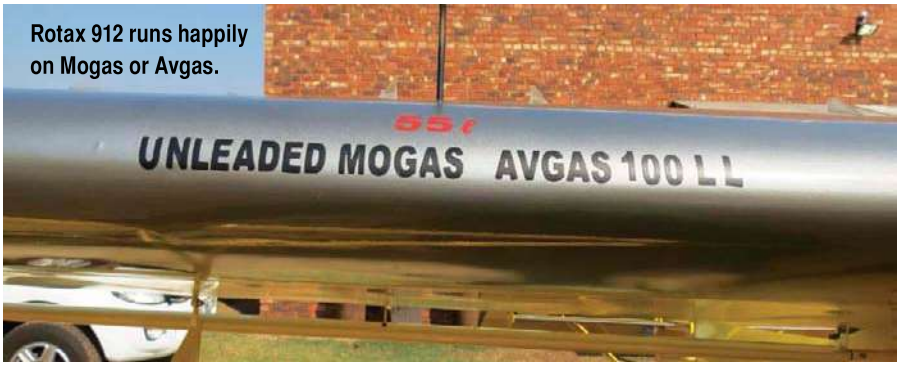
Vortex generators run the length of the upper wing.

Graeme Wuth




Rotax 912 runs happily on Mogas or Avgas.

Graeme Wuth

mags on and turn the key. IJH needed no convincing to spin to life. RPM to 1,800, EFIS to main power, pressures and temps in the green, radio on and it was time to taxi – but where?

I couldn't see anything over the nose, thanks again to those big takkies. So we snaked our way along the taxiway, the full length of the 1,000 m runway to the threshold of Runway 03. I'm a taildragging newbie, so this gave me a chance to get used to the unusual attitude and extra footwork. I found it simple enough.

Stefan took care of the takeoff. There was no need to power up against the toe-brakes. With flaps set to eight degrees and a full 37 inches MAP, after a few brief seconds the tail came up, directional control wasn't an issue and we were comfortably airborne in less than 100 m – easy to judge as the windsocks at Petit are 100 m from each threshold.

Best rate of climb speed is between 60-65 kt and we were seeing about 800 ft/min on a warm morning on the Highveld. However, this results in a high nose angle with little forward visibility. Lowering the nose for 75 kt is a more comfortable attitude and still yields about 650 ft/min. With thicker air at the coast, I would expect a best climb rate closer to 1,000 ft/min.

Once settled and trimmed, Stefan handed me control. It was a blustery day, and it was immediately evident that you can't fly the Safari smoothly with lazy feet.

Roll control is sensitive. To prevent over-controlling, it's helpful to rest your forearm on your leg and fly with a light touch on the stick. The Safari quickly tells you when you are slipping or skidding. There's no need to watch the ball; you can feel it through the seat. Of the planes I have flown, the Safari has given the most meaning to 'flying by the seat of your pants'. That said, it won't punish you for lazy flying.

After a few gentle roll-reversals and some medium to steep turns, I felt I was getting the hang of it, and was starting to love the feeling of real stick and rudder flying. So we set up some stalls.

With ¾ tanks, no baggage and Stefan accompanied by just my light frame in the cockpit, we were well below MAUW, and unable to produce a fully developed stall – whether in the clean configuration or with flaps. Provided I kept the ball centred, at around 40 kt, a gentle mush would develop but the wings kept on flying. Only once, with a little power and eight degrees flap, did a wing drop. Stefan kindly said that the lack of stall fences on the edges of the flaperons were to blame, but I'm sure being more alert on the rudder would have prevented it. It was gentle enough, and a good reminder for the landings to come.

Right downwind, Runway 03, we slow below flap limiting speed of 80 kt and get set up for the landing. The Safari carriers a fair amount of drag and sinks fast with no power, so tight circuits are comfortable. There are no indents for degrees flap deflection, just markers next to the flap lever. You 'eye-ball' eight and 12 degrees flap as you turn base and final, depending on your preference, and aim to fly a steeper approach than the usual three-degree glideslope. Approach speed is 65 kt, slowing to 60 kt across the fence for three-pointers. Another thing to bear in mind is that lowering flap results in a pitching up moment, so you have to push forward to maintain speed and attitude. However, stick forces remain light and, with neutral trim, the pitch change is a non-event.

It's quite an attitude change transitioning from short final to the rollout and flare. Visibility during the approach is excellent, but landing in a three pointer with big bush tyres means you touch down with no visibility over the nose. With standard tyres I'm told there is some forward visibility. I plopped it in a little high on the first landing, but the plane was well-mannered and soaked it up comfortably – cushioning my ego – and was in no hurry to reverse direction. Wheelers, too, are straight forward. My second and third circuits went progressively better, and I felt that after an hour or so, I would really start enjoying myself – not that I wasn't already.

Stefan then took control for two more circuits. He first put us down in a ploughed field next to the runway, showing just how at home the plane is on unprepared strips – fit the optional Beringer Alaskan Landing Gear, and there is almost nowhere the Safari won't land – and finished our sortie off with a wheeler which he took to the end of the runway, near the hangar.

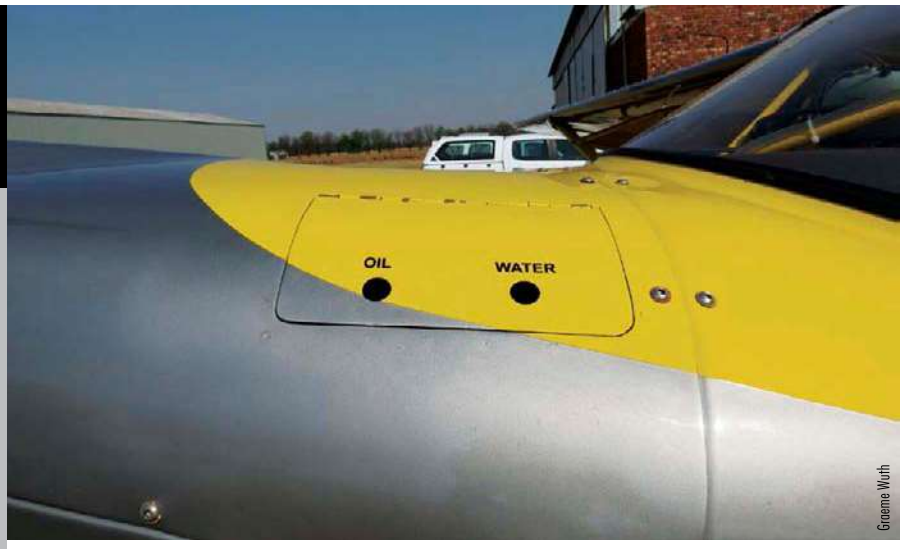
## FINAL IMPRESSIONS

In less than an hour I had become a Safari fan. It's not a luxurious cross-country cruiser, but it can carry an ample load at a reasonable speed, in a comfortable roomy cockpit, a couple hundred nautical miles into the African bush. For those who dream of sleeping under the wing in remote places and want to have a 'jol' getting there, you won't go wrong with the Safari.

Stefan and his team at Kitplanes for Africa have evolved a good kit design into

# SAFARI VLA SPECIFICATIONS

**Max. Engine Weight: 110 kg**
**Wing Span: 9.31 m**
**Wing Area: 12.13 m²**
**Total Length: 6.36 m**
**Wheel Base Width: 1.71 m**
**Cabin Width at Shoulders: 1095 mm**
**Cabin Width at Knees: 980 mm**
**Cabin Height: 980 mm**
**Firewall Width: 940 mm**
**Empty Weight: 320-390 kg**
**Usefull Load: 310-380 kg**
**Max. Takeoff Weight: 700 kg**
**Design Loading at MTOW: +3.8 G -1.9 G**
**Max. Fuel Capacity: 120 litres**
**Never Exceed (Vne): 140 mph (121 kt)**
**Max Level Speed (Vh): 124 mph (108 kt)**
**Engine: Rotax 912 UL, 80 hp, turbocharged to 122 hp.**



Graeme Wuth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Bruce Perkins

**ABOVE -** Neat flap in cowl to check engine fluid levels.

**MIDDLE -** Doors open up towards wing for easy access to cockpit, and allow flying with the door open.

**BELOW -** ZU-IJH fitted with Safari's standard simple bunjee cord landing gear with non-standard 27.5 inch bush takkies.

a fantastic recreational African bush plane. The only minor frustration is that you can't buy a factory-built Safari – you have to build it yourself or find a second hand one. Kitplanes for Africa will, however, take much of the effort out of building your own plane by providing hands-on support throughout the build and registration process.

Don't be surprised if you see me doing a tailwheel conversion onto a Safari and sharing stories with other Safari enthusiasts over a boerie roll at Petit on the weekends.

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Bruce Perkins

Safari was built to fly into unprepared strips.


KITPLANES FOR AFRICA

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Average build times for standard kits: 600 - 800 hrs depending on the builders skill level. • Different quick build options available.
Most advanced quick-build will save the builder about 300hrs of work. • No special skills or tools needed.
No fabrication of parts, all parts are either pre-bent, CNC cut or welded. • Explorer kit starts from R220k and Safari from R250k excl VAT.

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