

...CONTACT!

February / March 2023



Chapter News



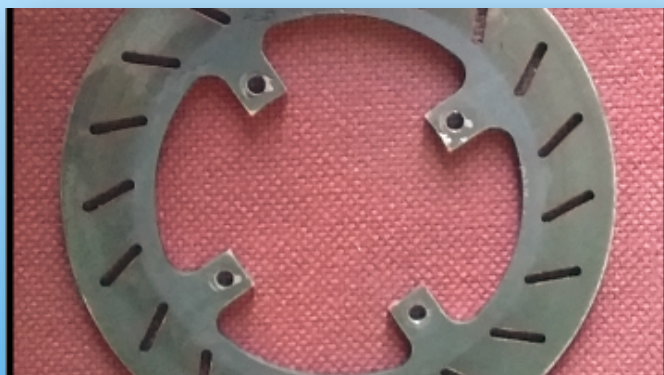
Flight Testing my CX4 – Peter How



A Mile A Minute – Brian Appleton's journey in a J2 Arrow



Buzz and Karl – The story behind the picture



Brake Discs & Why Mass Matters – Dr Robert Clark



Goodies for sale!



Young Eagles Day & Breakfast Fly-In

07h30 Saturday 25 February 2023 Benoni Brakpan Airfield

Volunteers Needed – Register Here!

...CONTACT!

PRESIDENT'S COLUMN



Happy New Year and Happy 70th birthday to our vibrant EAA and chapter members throughout South Africa and beyond!

The EAA is seventy years young this year and I'm sure the celebrations throughout the year will be testimony to the successes over the past seventy years. A huge industry has grown out of the efforts of the early EAA pioneers creating the interest for essentially the man in the street that always looked skywards, could actually get himself airborne in his own creation. The EAA gave momentum to 70 years of dreamers and doers.

The EAA has grown so that in the USA today, that homebuilders are adding more aircraft onto the FAA registry than the Part 21 manufacturers. This is staggering when you take into account the positive knock-on effect of airports, fuel, pilot supplies, maintenance etc. has on the industry. In South Africa the effects of experimental and amateur built aircraft have also gone a far way and kept the lights on in a difficult economic climate, ensuring in most cases easier affordability to continue the passion.

The change at Chapter 322 to have the monthly meeting at the Auditorium on the first Saturday of the month kicked off on the 3rd December 2022, and we have had two further meetings which I believe has been hugely successful, the turn out and the guys flying in as well as the breakfast is great. These are set to continue for 2023

Congrats to Neil and the 322 team for bringing about the change from the zoom meetings which although provided superbly during the Covid and post Covid times, it's great to have these meetings in person and rub shoulders with likeminded folk over a breakfast roll, just heightens the camaraderie.

We also attended the Aero Club Council and Strategic Review Meeting on the 17th January hosted at our EAA Auditorium.

A brief summation taken from the Aero Club meeting minutes of the 17th Jan 2023 whereby each Section provided an overview of their operations and as a summary of the discussions, Consensus was given that the strategic importance of the Aero Club as a body made up of our diverse sections is seen as an important element to maintain a cohesive front to regulating authorities, and is an important value add.

As Sections in each discipline, it is clear that focus should be maintained to support and secure Recreational based activities, and that membership growth to be in that domain, and that the commercial aspects to be separated as these tend to cause significant overhead to manage within a Recreational context.

Growth in membership however is forecast to be static given the environment of low uptake in youth, uptake in members that pass through the Sections and discontinue their activities later. The EAA numbers showed a growth in 2022 which is great, however we are concentrating through further efforts i.e. the Young Eagles program to bring more youth into the organisation for 2023.

It was agreed that the Aero Club will look at additional such meetings during the year, and will review at the next AeCSA Council meeting. Many thanks to the Aero Club for the ongoing initiatives to protect recreational aviation in South Africa.

On a sad note the untimely passing of Sean Russel from Sling on the 2nd Jan, was a great shock, he was part of the numerous awards for the great work the Sling Team do and was part of the many accolades they have achieved. Fly Safe -Paul

CHAPTER 322

January '23 Gathering



The EAA Auditorium at Rand Airport, Germiston

Two gatherings so far this year occurring in unusually quick succession – the January gathering traditionally happens mid month as many folk are still on holiday when our event would normally take place, and, getting back to normal, the February gathering is slotted into it's usual date – the first Saturday of the month. This meant only a two week gap between the gatherings!

The January gathering was planned as more of a social event, a welcome back after many of us had been away on holiday and a chance to get together and discuss our recent adventures. This was our second Saturday morning gathering which proves to be a popular change from the previous Wednesday night slot we had in the past. This format gives the opportunity for members to fly in or drive in and thanks to good weather on the day and Marie and Rand Airport's negotiations waiving



The coffee station – up and running for those early arrivals!

landing fees, a good turn out of aircraft was seen on the day, nearly 20 aircraft in all!

Once again our chefs and groundsman did a sterling job, after all the summer rain, the grounds were immaculate and the early breakfast was superb, thanks to Pottie, Ronnie and Coen! Volunteers Dean, Venessa and Belinda made sure the auditorium was spick and span, the coffee station was up and running and all would run smoothly, which it did!



Early arrivals, Andy Lawrence in his Cruiser and Pete and Celia Lastrucci in the Tiger



This month we bade farewell to Pottie who has moved to the Cape – we will miss you Pottie!

The gathering was hosted by Chapter 322 Vice Chairman, Alan Evan Haynes who did a wonderful job keeping the meeting in order!



Presenters Alan and Karl with treasurer Mark Clulow in the background

Alan brought in Rob Jonkers who filled us in on Aero Club's Airweek plans, our Young Eagles coordinator Warren Lovell who updated us on the upcoming Young Eagles day at FABB on the 25th February, treasurer Mark Clulow with a financial report and lastly Karl Jensen with a thought provoking presentation on low flying.



After all the Covid years it was nice to see a filled venue once again!

Many thanks to all those who flew in, drove in, volunteered and presented – another successful EAA event!



Past Chapter 322 Chairman, Ron van Lear keeping an eye on things



Dave, Yvonne with Brian Millet all the from New Zealand



Young Eagles coordinator Warren Lovell and future Young Eagles



Coen and Ronnie hard at work at the braai



What better way to spend a Saturday morning with friends, food and flying machines?!!!

CHAPTER 322

February '23 Gathering



Pierre Carter – first person to legally paraglide off Mount Everest

February 2023 Gathering

With a mere 2 weeks between gatherings, there was no time for committee members to waste preparing for the February 4th gathering!

Thanks to our usual volunteers, planning and preparation was relatively easy as everyone knows what to do!

Our guest speaker was adventurer, mountaineer and paraglider - Pierre Carter, recipient of the Aero Club's James Gilliland award last year for being the first person to legally paraglide off Mount Everest! So, much excitement and anticipation for the event!

Predictions of bad weather on the day meant that many planned to opt for road rather than air. There was some discussion as to whether we should postpone the event, but it was decided to stick to the date. Reason for this was that the event is our monthly gathering and not a fly-in, although, the Saturday morning format does give members the opportunity to use their aircraft to get to the venue, we need to stick to the date!

Weather on the day started out fine but clouds and cool winds moved in from the east. By 08h00 the airport was IMC and, while some aircraft did get in, some had to turn back to base.

After attending to our usual Chapter business, Pierre was handed the mike and presented us a wonderful talk on his achievements and his flight off the world's highest mountain.

Pierre Carter is passionate about adventure, mountaineering and paragliding. He has been journeying around the world for his 7Summits7Flights initiative. The former X-Alps athlete first thought about the idea of paragliding from the summit of the highest mountain on each continent, known as the 7 Summits, back in 1998. After 2000, he began his ascent to adventure. So far, Pierre has summited the highest mountains on five continents: Aconcagua, Elbrus, Carstensz Pyramid, Kilimanjaro, Denali and Mount Everest. Mount Vinson in Antarctica is the last on his list.

Pierre talked us through their ascent to base camp and then to the South Col. Pierre gave us an insight

as to the the way the Nepalese people have embraced this unique world tourist attraction. Despite having both knees replaced, Pierre descended off the South Col flying over some very inhospitable areas strewn with rocks and boulders. His permit only arrived when they were near the summit but did not allow him to take off from higher than 8 000m. A Q 'n A session followed Pierre's presentation and judging from the quality and number of questions thrown at Pierre, this was a truly fascinating subject! Thank you Pierre for your time and great effort put into your presentation!



The Auditorium provided shelter from the cold wind outside!



The first in a series of quarterly boot sales at the gathering

This month's gathering also featured a boot sale, members were encouraged to bring along aviation related goods for sale. Our next boot sale will be at the May gathering.



Once again, Ronnie and Coen slave over a hot stove!



Roses amongst the thorns – Kathy, Rene & Anthea



Committee members – Karl, Mark, Neil, Marie and Alan (Photo Athol Franz)



The busy coffee station was a busy feature at the gathering!



A free Jolly Bag to anyone who attended courtesy of Ant Harris!

CHAPTER 1502

February '23 Breakfast Fly-in to Baynesfield



Baynesfield Estate - 5th February 2023

Chapter members and visitors enjoyed some great weather on Sunday morning 5th February, a few were able to fly in to Baynesfield Estate for the Chapter 1502 monthly breakfast fly in gathering. Thanks to all those who prepared breakfast and kept the coffee and tea flowing. We do hope you will be able to join us again in early March for the next one!

Jason van Schalkwyk
Chapter 1502 Chairman



Breakfast fly-in
5 February 2023

All welcome!!



@Baynesfield Estate
From 8am onwards



CHAPTER 322

Breakfast Fly-In to Kitty Hawk



Saturday 28th January 2023 – FAKH

A new initiative by Chapter 322 is the monthly breakfast fly-in occurring 2 weeks after the monthly gathering. These are informal events encouraging members to get together at various airfields around Gauteng, no big distance, just big fun and big camaraderie!

The first event for the year was held at FAKH, Kitty Hawk Aerodrome to the east of Pretoria.. Kitty Hawk boasts a nice restaurant that overlooks the runway, a great place to eat, chat and watch the aircraft coming and going.



Graham and Ronell waiting for breakfast!

Kitty Hawk has a paved 800 x 18m runway (01/19) with a slight down slope on runway 01. An aerobatic box is positioned on the western side - the box limits are from ground to 7500' and up to FL090 on occasion. All circuits are to be flown to the east.

Sunrise on the morning welcomed us with clear skies and very little wind, a nice change from all the rain we've been having here on the Highveld!



As is usual with any EAA Fly-in, a swarm of RV types are bound to be present!

A steady stream of aircraft slowly filled the parking area, while a number of members joined us on motorbikes and in cars.

Breakfast was in the form of a buffet, with eggs, bacon, sausage and pap – coffee and tea to help wash it down.

Aircraft that flew in included a number of gyrocopters, many RV types, Slings, Bosboks, an R 44, Cessna's, Pipers and Jabirus. Also a Kitfox, Ricardo's Aircam and ZU BHX, a Tri Pacer converted to a taildragger, a Foxbat, ZU DYE and a Thunderbird.



ZU DYE - Foxbat

MACH points were awarded to all members who attended, and it was nice to welcome our 2022 MACH prize winner, Dr Kobus Stander! Kobus flew in with friends in his ZU registered R44



2022 EAA MACH winner of the prize to Oshkosh, Dr Kobus Stander (center)

Following a morning of great hospitality and camaraderie, we all headed off in different directions to our respective home airfields. Heading west to Krugersdorp I chose to use the Pinedene route between Waterkloof and OR Tambo. I don't think the ATC person at FAWK knew what he was in for when he headed to work that morning, there was a steady stream of traffic through his airspace. A big thank you must certainly go to him – he handled the situation well and accommodated everyone!

Also thanks to Frank van Heerden and the Kitty Hawk team for hosting us so well – in the words of a famous `Austrian actor – “We’ll be back”.



Bat Hawk ZU FZX



Cessna 170 ZU VAL



Savannah ZU ERJ



Jeff and Sharlene's Piper Cub ZS OXX



Piper Pacer ZU BMX



Slings ZU FTV and KIE



Brian Cilliers, Neil Murray, Derek & Maureen Hopkins



Ex Military Bosbok 953



Jeff Earle arrived in his Piper Cub ZS OXX



A Grouping of Gyros



Slightly deafened Ant Harris and Rob McFie



Ricardo's Aircam from Krugersdorp



Keaton, Alan, Kathy, Anthea hiding in the back and dog underneath table

**Q - When is the next
Chapter 322
Breakfast Fly-in?**

**A – Saturday 18th March at
Jack Taylor Krugersdorp**

THE STORY BEHIND THE PICTURE ...

By Karl Jensen

Please accept that the tale that follows was ordered by Mr Chairman and EAA CONTACT newsletter compiler.(thank you Karl – Ed)

1984 was the 50th Anniversary of the founding of South African Airways, a noteworthy event for that great airline. I had dabbled in the restoration of the Junkers Ju52 to flying condition. The aircraft was specifically acquired to represent the 1st true airliner operated by the fledgling airline. I went on, after the SAA 50th Anniversary bash, to fly the machine more than 400 hours. The 50th Anniversary event was headed by a team from the SAA PR Department, Marie Helene-Maguire at the helm. Dignitaries from all over were invited to the gala event which was held in Hangar 8 in the SAA Technical Area. It was a sumptuous affair with the No#1 guest of



SAA 50th Anniversary

honour being Buzz Aldrin, pilot of the legendary Apollo 11 which was the 1st manned flight that landed on the moon. Due to my involvement in the Ju52 project and being a young 41 year old Boeing 747 Captain, I was allocated to host Buzz Aldrin for the evening – a real honour for me. Few will recognise me, the guy on the left of Buzz Aldrin in this rather hazy picture from the cover of the SAA News magazine. After leaving NASA in 1971, Aldrin became Commandant of the U.S. Airforce Test Pilot School and now recently at age 93, he married for the 4th time.



Buzz Aldrin and new wife Dr. Anca Faur tie the knot on his 93rd Birthday

He is quoted as saying that he and his new wife Anca Faur were as “excited as eloping teenagers”. He is one of only 4 men alive who have walked on the moon. Since retiring from NASA and the U.S. Air Force, Col. Aldrin is a Global Statesman for Space and has remained a tireless advocate for human space exploration.



Apollo 11 Crew, Armstrong, Collins and Aldrin

ONE MILE A MINUTE

Have you ever heard about an aircraft called an Auster J2 Arrow?



One Mile a Minute

By Brian Appleton

Have you ever heard about an aircraft called an Auster J2 arrow?

Kind of rare and kind of special. To complicate matters it was designed by Mr Clarence Taylor (yes Taylorcraft), who is the man who designed the J2 and J3 Piper Cub.

The history of the aircraft is for another time but this aircraft was signed out of the Auster Aircraft Factory in the UK on the 12th March 1947. (We have the original paperwork, quite freaky!).

So, this is an old lady and to my mind she still has fantastic lines. She was to be flown from Plettenburg bay to Rand airport. The words below are my thoughts and experiences during the trip.

Plettenburg bay to Graaff-Reinet 1.9 hours

This sector was probably the biggest challenge of the trip. We had to fly over the Groot Swartberg



The Tsitsikamma Mountains

Mountains. As we know, the weather at the coast can change hourly. In my flying over the previous 10 days, I was briefed by the local flying community on where the best spot was to cross the mountain range. This is a spot just southwest of Uniondale. My uncle comes from Uniondale, so a few days earlier we did a little reconnaissance flight to Uniondale, took some pictures and routed back to Plett. I sent these pictures to my 96 year old uncle in Australia, who was more than delighted!

So as time to leave crept closer, so the weather deteriorated, which I suppose it the normal way when flying VFR. However within a day or so of the planned departure, there was a few hours of blue sky over Plett. Quickly packed, off to the airfield to an awaiting fuelled and ready to go aircraft. After the necessary packing and pre flighting, the prop was hand swung and the little C-75 motor burst into life.

Now this aircraft is the perfect aircraft to meander up and down the coast, she loves looking at whales and sharks but she does not like to climb. And no, we were not overloaded by any means. So we start our journey at our best cruise climb speed, about 65MPH. It becomes apparent as we



Uniondale

get closer to the mountains that the cloud cover is really heavy on the peaks. There is not much wind or other threats to worry about and I make the decision to carry on towards this cloud covered high ground with the comfort that if there is not a gap with two horizons I would be returning to Plett. Using the Uniondale route as before we slowly slowly climb to the height of the peaks. At the special place shown to me before, there is the most beautiful gap between the peak and the clouds and I can see all the way to Uniondale.

Once over the peaks the weather became hot and really dry. One more look out to the left at Uniondale and we are on our way to Graaff-Reinet. We are flying between 300 to 500agl. Are we being buffered around from the thermals. My emotions descend with each bump and I ask myself what am I doing here. This aircraft has a big lightly loaded wing and it found each bump in the road as we were making our way at one mile per minute.

When I talk about we, really I am talking about me and this 76 year old mistress. One suitcase, one overnight bag, two 10L fuel cans, lunch and 1.5 litres of water.



Boesmanspoort

My word, this place is desolate, hot and unforgiving. I am delighted that our little engine has been well cared for and just keeps going.

I was really not a happy camper and was slowly being cooked, in spite of the windows being open, yes sir, this carriage has sliding windows.

Finally we reach Graaf-Reinet and it's airfield. With the windsock horizontal and about 60 degrees off the runway we manage to land. A gentleman comes out of the extremely lovely clubhouse and helps me to refuel from the cans. Soon the prop is swung and we are off again. Just a note, I paid the necessary landing fees in cash and a month later I receive an invoice for the same amount, as I did not keep the paperwork of the cash payment, just paid the landing fees again, just a word of caution.



Smiths Kraal (Karoo)

Graaf-Reinet to Gariiep 1.6 hours

Man alive this aircraft does everything but climb. I follow the road because this is the straightest line between these two towns and as usual the lowest points though the passes. The scenery starts to change as we negotiate these hills, sometimes I am over the main road, sometimes when the road meanders around a hill, I go over the hill, but we really are climbing very slowly, I am looking for thermal or ridge lift on the hills, I am planning far in advance how to attack each range of hills long before actually approach the hills.

As we climb the scenery starts to get a little greener, the air is starting to cool and my



The Karoo

emotions return to what a beautiful country we have and how privilege we are to be able to fly. The sun is setting to the west the on the approach to the Gariiep dam, how beautiful is this area. The water, the mountains and the sun setting behind the clouds. I fly over the dam wall and notice the hydro electric generators, the hotels and the beautiful houses on the ridge. Ok, FREDA and downwind checks done and we are over the field. Just as they built a solid dam wall, they built serious and solid runways. The runways are in a V pattern, my luck the wind sock was horizontal, between the two runways. Chose RWY 33 as it was uphill. As I was taxiing towards the club house and hangars, a gentleman, who I can only describe as original Khoisan, waved me directly towards a large hangar. This was the Auster's home for the night. Unfortunately I slipped up by not getting this chap's name but his hospitality was fantastic. He asked if I needed fuel, he opened the club house for me and clearly wanted me to feel at home. He assured me that the aircraft would be safe as he lived on the airfield. It was only inbound to the airport the next morning did I hear that this chap is over 90 years of age, certainly he is my hero, standing straight up and going out of his way to make aviators feel at home. In this area Jaco is

your fuel man (0826531889) and Liesl (0828226847) for clean accommodation. I can also say that the restaurant next to the petrol station is well worth a visit, the husband and wife team turning out substantial portion meals.



Vlakplaas, Karoo

Gariep to Tempe 1.8 hours

At the airfield at 6.30am after a great nights rest and off we go again. I could see a cloud mass to the north, frontal clouds not CB's. Again we have to climb to get over the Donkerpoort mountains. The wind was westerly so I climbed into the wind gaining as much height for every mile forward on the journey. The routing was Springfontein, Trompsburg, Edenburg and finally New Tempe, Bloemfontein.

Our perfectly clear day started to become cloudy several miles after the hills we had to negotiate past, the cloud base go down to about 800' agl with a light drizzle. Flat country, no wind and no embedded CB's. I could see why this was great farm land area, flat country, in obviously a rainfall area. Mainly following the road, the cars were going faster than we were and it was wonderful to be sandwiched in this little bubble, between cloud base and ground travelling north. The light was low as it is under a bank of cloud and a sort of



Hanglip near Bloemfontein

surreal feeling filled my mind. Quite exhilarating. Visibility was good and I knew that the cloud base would go up during the day and not down, so I felt perfectly safe.

About 10nm from Tempe, we seemed to have pushed forward of the front. The clouds cleared, the rain stopped and even a patch of blue sky here and there. We could see for miles with the rain having cleaned the air, the temperature was surprisingly low, around 11 degrees, we landed on a wet runway at New Tempe.

Bought oil from the ever friendly Ferreira Aviation, filled up with fuel and found a tree.

New Tempe to Kroonstad 1.5 hours

The J2 Auster is started by hand propping, when hot she can be a little challenging to start. The throttle has to be a fraction open and she will start like a dream. Having had a some experience with an over zealous throttle, I now always ask the fuel attendant to hold the tail as an extra measure of safety. This is in spite of having the breaks on, chocking and using a bungee to hold the controls back.

The terrain was waterlogged, the air cool and perfectly clear as we got airborne once again. What a delight, spirits high after the previously wonderful leg. Flying as we have done between

three and five hundred foot agl, it was wonderful to see the farmers ploughing their fields and the little towns getting started for the day.

All too quickly on the ground at Kroonstad to be told in the kindest of ways that my stay on the ground will be extended indefinitely as there is no electricity to drive the fuel pumps.

We were now in late morning and I had two reasons to get going as quickly as possible. Firstly there was lots of moisture around and the heat was increasing, I would not be able to dodge thunder showers, secondly the hotter it got, the less performance I was going to get from the little C-75 engine for the final climb onto the reef.

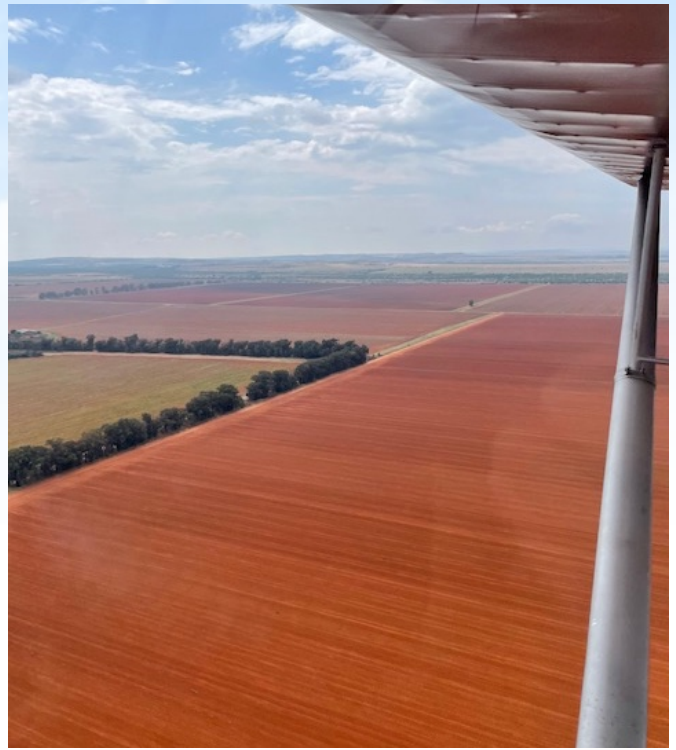
So after some discussion and the realisation that I only needed twenty litres, the plan was for me to get the 10L jerry cans out of the aircraft and to man the manual pump and start pumping. With no meter on pump, we used the little line on the cans for the 10 litre mark. Once again our host was very friendly and went the extra mile to help.



The Vaal River

Kroonstad to Rand airport 1.4 hours

At one mile a minute this became a little monotonous. Flat as a pancake, nothing really to see and the horse really is not galloping back to its stable. Boring, boring, boring as the little lady



Theunissen

clattered onwards. A north westerly wind had settled in and this was also not helping. The local locust patrols were calling me a road hog as they flew by. Then over Loch Vaal, this is pretty. This last part of the flight was probably the longest journey of the whole trip, from the Vaal to Rand, it just seemed to never end.

Finally came the big moment to call into Rand. Some misunderstanding on what an Auster J2 is, until I said that we were made (the aircraft that is) in 1947. So base RWY35 and finally cleared to land.

As we taxied in my aviation home for 20 years, I started to reflect on the journey and the privilege of flying old aircraft. But it was not over yet. As I taxied to the hangar, my friend Brett happened to be standing there, eyes wide open and tongue hanging out.

I said the fatal words, Brett I am still in the groove, would you like to go for a quick flight. Bags out, Brett in and off we go again.

Take off RWY29 quickly we could see that that little lady is not a champion in the hill climbing event, we routed down the valley and after a short while we returned for landing. This time it was embarrassing for us, for some reason the

controller's new favourite aircraft seemed to be us. Possibly she could not believe that such a small old aircraft could fly or maybe to make up for the previous discussion when we called inbound or she could just have felt sorry for us, but she put everyone else in the circuit into orbits while this little J2 Auster made her way to RWY 35 at one mile a minute. I am glad that I was not flying the King Air that was in the circuit!

The final thoughts for the trip was that it was a journey of highs and lows. I always feel that it is a privilege to fly these vintage birds, which are often in showroom condition. These slow VFR trips give us time to reflect inwards while we watch our great country go past. 8.2 hours low and slow with the mistress, just fantastic. My thoughts are also that we should do more cross country trips, supporting the people that are supporting General Aviation, taking in our country's best.

A final note is that we are fitting a different propeller to the J2 and hope that she will learn how to climb a little more enthusiastically on the Reef.

Brian Appleton

Thatcher CX4 – Last Hurdle Done!



“Finally got my first ATF. Now to start getting out of the Karoo” – **Peter How**

The final phase of Peter's project was completed this month when he received the first ATF for his Thatcher CX4, ZU ITS, a scratch built all metal VW single seat. This is the third or fourth one flying in South Africa. Well done Pete, we hope to see you and the plane at one of our fly-ins soon!

Flight Testing my CX4

By Peter How

Late 2020 I wrote about my plans-built Puddle Jumper V project, the Thatcher CX4. At that stage the structure was almost complete, but there was still engine installation, wiring and painting to do.



The engine was built up at home from a kit of components from Great Plains, during the covid hard lock down period. It is bored and stroked to 2180cc, has enlarged oil ways, large oil pump, remote oil filter and large cooler (too large!).

The fuel system comprised a 50L metal tank behind the firewall, feeding two electric pumps in series with one way bypass valves, water trap and then onto a Zenith carburetor, which is described in sales literature as suitable for small farm implements! Only ground adjustable mixture was possible.

There is no mechanical fuel pump. The first set of rotary vane pumps created too high fuel pressure, so eventually I used two lower output Facet pumps. At least now I could hear the pumps running. To reduce the pressure further, I fitted a fuel feedback line to the tank to help bleed off vapor bubbles on hot days. On the ground at low throttle setting, gravity feed without pumps was possible, and due to the forward-facing vent, half throttle cruise is possible on gravity feed as well.

Due to the electric pumps, I implemented a dual battery system. The main battery was a 7,5Ah lithium starter battery charged from the 3 phase stator on the motor, through a 30A rectifier regulator, and over voltage protection relay. From that network, I charge an auxiliary lithium battery through a current limiting resistor and Schottky.

diode. This means that the backup battery is always fully charged. Both batteries together weight less than 2,5Kg. I did get to use auxiliary battery on one test flight, when a fuse blew when I stalled the electrically operated speed brake.

I had intended to just polish the whole 6061 airframe, but I had read of an RV owner who claimed he had to replace his canopy twice due to sun reflection off the wing causing warpage. So I decided to spray. But the Karoo in winter is not a good spray painting environment. Nevertheless, the white and John Deere green design looks very pretty.



The empty weight was 263kg and things like light weight lithium batteries and a simple instrument panel perfectly positioned the C of G.

I applied for Proving Flight Authority in November 2021 and in January 2022 I began the obligatory 3 hours of ground runs. Then lots of taxi tests. It is a tail-dragger and I did not want any surprises. I had set up the main gear and homemade tail wheel assembly to give me a theoretical 3-point landing attitude for slow high drag landings – there are no flaps. The result is that there is no forward visibility of the runway over the nose when the tail is down. I did have to play with the tailwheel springs to get a good balance between rudder and tailwheel. The best seemed to be just snug, with no tension on the springs.

I was using AC-90-89 for my test flight plan. So after the low speed taxiing, came some high speed taxi tests, to just below expected takeoff speed. Being a VW motor, the aircraft veers to the right during the ground run, but the rudder is very effective and it is best to apply power slowly to reduce the swing. By lifting the tail at 30 kts, good runway visibility is achieved. Aileron effectiveness

is good well before takeoff speed.

The first flight day arrived, and I embarrassed myself in front of Lood Engels, who came to witness the flight, with a bad mag drop during pre-flight runup. To remove the magneto, one has to remove the engine! The fault turned out to be a broken impulse coupling spring. The magneto was an unused gov surplus one and the spring looked suspiciously second hand.

By mid March I was ready again for the first flight. The goal of this flight was to check handling and to get an idea of what the indicated stall speed might be, which would determine my approach speed. Pre-stall was just above 45kts, with good aileron effectiveness, so I decided to approach at 70 for the first landing.

Climb out RPM at 70kts was 3100. Bleeding off speed after rounding out resulted in a gentle 3 point touch down, helped by the low-wing I guess. Motor temperatures were excellent, in fact the oil was too cool at 79 deg C.

By now I found that a really effective ANR headset was essential. My 2180 75hp VW has two equal length pipes into one on each side, so two exhaust pipes with no space for a muffler.

On the second flight I explored the handling and recorded engine parameters over a wider speed range. At 90kts the rpm was 3400. The stall measured at 45kts IAS with no buffet, just a nose drop. Even the ailerons were effective. The CX4 handling is really super. Stick movements are quite small. Hardly any rudder is required. The elevator trim is effective down to 60 kts. On round out, even at low speeds, there was plenty of elevator authority left.

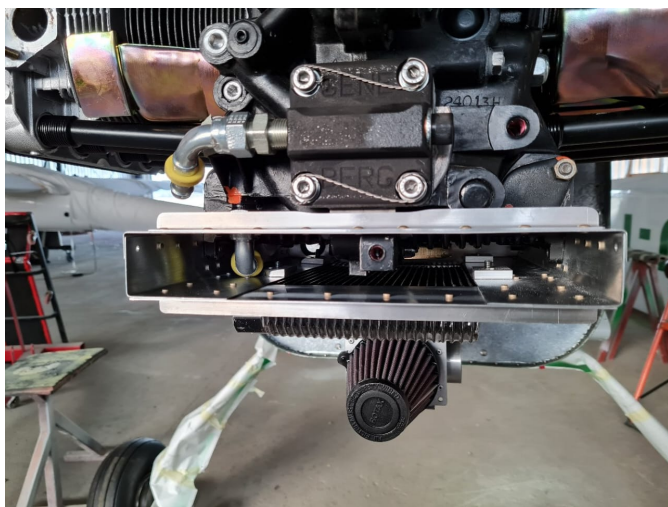
The third flight was a succession of circuits and landings – lots. I wanted to explore different landing techniques. For a three-point landing, a 63 kt approach was best. For a wheel landing 70 kt was best. Touch and goes were easy. The airframe was pretty clean, so it was important to stabilise the downwind speed to 70kts.

On further flights I checked the effect of the electric speed brake under the belly. At approach speeds it had very little effect. However, at 80 to 90 kts it did increase the descent angle. At the same angle of descent, at 90 kts, the speed decreased by 10kts. There was a small pitch downwards on deployment.



downwards on deployment.

The Kanardia EMS was recording all engine data every second, stored internally, so from time to time I downloaded the data onto an SD card and checked through large spread sheets for anomalies. CHT was remaining below 130 deg even after long climbs, and the oil never went over 74 deg C. Past projects had always high oil temperatures, particularly with a new motor, but this time I had over-compensated with too large a cooler. The oil circuit is also quite long through a large remote filter. So I fitted a blanking plate to cover half the inlet and managed to raise the oil temperature to around 85 degrees.



After 10 hours, full throttle level flight speed was 110kt TAS at 3300rpm.

As noted before, there was no in-flight mixture control and although I had set the needle to a position recommended by others, the plugs indicated that it was running rich. So I connected a car speedometer cable to the needle and made a series of high power runs with the aircraft tied to a ring in the concrete apron. Watching the EGT I was able to peak this, and then leave it 50 degrees

onto rich if peak. EGT was highest during climb out, around 800 deg C.

Next came the static port position error test. I had already found that the underwing pitot/static probe had a low-speed position error, so I had moved the statics to the fuselage sides, halfway between wing trailing edge and the leading edge of the stabiliser. My Kanardia primary flight display shows GPS speed and TAS. I made test runs in 4 directions, 90 degrees apart, at approach, cruise and max level speed. The indicate airspeed error across the whole range was now less than 1,2Kt. Now that is pure luck, finding such a good static port position.

Next test was to determine speeds for best climb rate and best climb angle at gross weight. Initially I tried the prescribed pitch up and maintain a steady climb speed and measure the time to pass through 1000ft. In a single seater this does not work well. So I used an old gliding flight recorder which has a precision barometric sensor. Then I just established the different climbs through a 1000ft and used gliding software to determine the climb rates at different speeds. Best climb angle speed was 60kts and best climb rate speed was 65kts.

Although the engine was still fairly stiff, I flew 150NM to the limits of my proving flight area to determine fuel consumption at a 90kt IAS cruise at 3275rpm. This came out at 14,5L/hr, giving me a 2hr 50 min cruise speed range with 30min reserve. Indications are that at 80kt and 3000rpm, fuel consumption drops to 10L/hr.

The motor employs a magneto with impulse coupling driven off the end of the crank shaft and a secondary ignition system comprising a fixed advance low profile Hall Effect switcher, using the original VW distributor drive, and connected to two double ended coils. Engine starting may only be done using the magneto, and I had wired in an interlock to prevent start if the secondary ignition was on. But by now there was a larger than acceptable mag drop of the secondary ignition caused by some wearing in on the distributor worm gears and the advance had reduced by 5 degrees. So the only way to time this ignition is to apply some drag to the rotor while setting the timing. Since then, the secondary ignition timing has not changed.

Next came stability tests, and without boring you, there were no surprises.

On a windless day at near gross weight, I determined the takeoff distance at rotation to be 400m and the landing distance 500m. Airfield elevation is 4000ft, there are no obstructions and the surface is compacted gravel.

Using a portable oxygen system and the flight recorder, I managed to climb to FL152 where the OAT was -3,5 deg and the MAP 9,7 inches.

I used the descent to demonstrate airframe strength and control. I could not pull more than 2,6G in straight pull ups. Trying for more, the plane just mushed. I tried steep turns at high power, but got the same result, and with a wing drop. I don't think the latter method is safe, since one does not know the spin behavior.

By now the engine had 20 hrs and the maximum level speed at 8000ft was now 105kt IAS at 3600rpm, i.e. maximum allowed for engine and prop. I guess the prop is a little fine. A nice cruise speed is 90kt IAS at 3260rpm, 13,5 inches MAP.

The final flight test was a VNE test, again a little risky without a parachute. Still, over 600 plans had been sold and many have been flying safely world wide. I gradually dived to 135kts, tapping the stick sideways and trying small rolling maneuvers left and right. I bit scary but there were no adverse trim or control responses.

By now the 25hr engine inspection had arrived. Oil and filter showed no metal and the valve gaps has hardly changed. There were very little sign of oil leaks once I had changed to cast aluminium rocker covers with proper flat gasket surfaces. The crankcase vent was not pumping oil, the only mess came from a filtered drain at the bottom of the carburetor which dripped a little after engine shutdown. This drip was oil diluted with petrol. I still have to solve this one day.

Now I was just trying to fly off the rest of the 40 hours, but after landing at 30 hrs I noticed that the impulse coupling clack was not occurring at the same point. The motor had to come off again! The problem was a cracked puck which connects the crankshaft to the impulse coupling. This puck had to be 40mm long to reach the dogs on the impulse coupling on this old-style Slick magneto. My analysis was that it had developed a wobble and



E-Mag

touched the sides of the bell housing. By now I was fed up with this magneto. The puck needed to be much thinner for stability, which meant that the impulse coupling had to be extended somehow into the bell housing. Besides this, magneto drive pucks on other makes of VW aero engines do have to be replaced every few hundred hours due to wear. So I needed a better solution and I found this with the E-Mag. It looks a bit like a magneto, mounts the same way, but it is timed to TDC and advances the ignition automatically to wherever you want, set by the factory or with free software. I had a friend machine an extension onto the shaft for a ½ inch drive puck, where the dogs overlapped at 90 degrees to each other, minimizing any wobble. No impulse coupling meant no sudden shocks into the drive puck. A nice feature is that it has an internal alternator, so except for engine start, it needs no external 12v supply. Timing can be checked visually through an LED on the casing. I had to change the spark plugs to resistor types. The spark is huge, but now all ignition noise on the radio had disappeared. 20 hours later, the timing is still spot on.

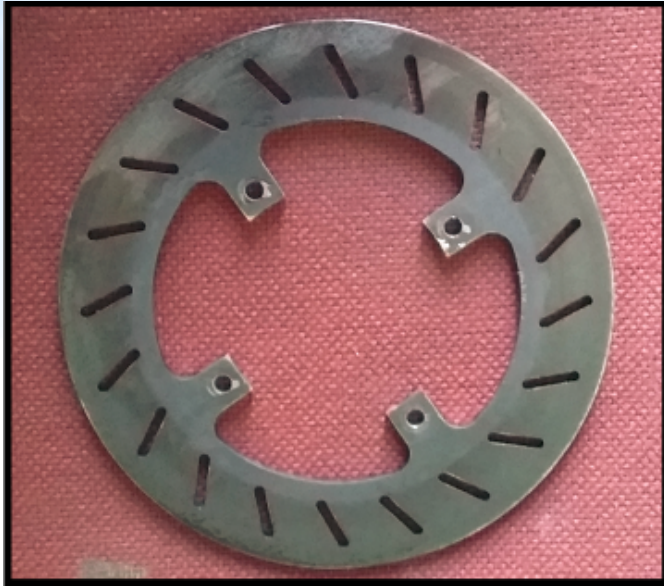
After over a hundred takeoffs I noticed stone chips under both sides of the elevator. I guess one of the reasons is the straight tail spring and RV style tailwheel assembly making the tail quite low. I don't like test flying with wheel spats, but now it was time to fit some. They look nice, but big surprise, the top speed never changed.

Late November 2022 I applied for my first ATF through the Aero Club Aero Assist program. On the day the Proving Flight period expired, I received an ATF at the end of January 2023. **Peter How**

Brake Discs & Why Mass Matters

by Dr Robert Clark

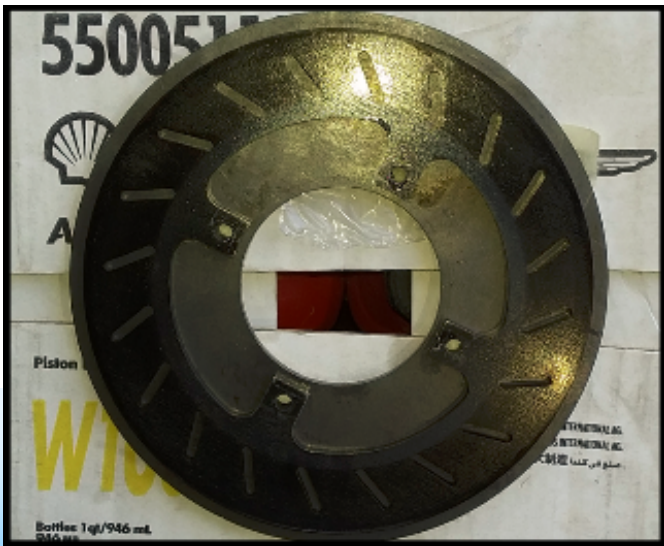
Take a looking at the photo. Would the brake disc be rotating clockwise, or anti-clockwise?



If you said clockwise and you were flying a Jabiru, you would be wrong (Source: Jabiru construction manual Drawing number 6A037A0D-2).

Have you ever wondered how disc brakes work? In simplistic terms, a hydraulic caliper pushes one, or more pads onto a rotating disc. The disc is attached to the wheel, rotating around a solid axle that is attached to the under-carriage. In the case of a Jabiru 430, with the Mark 2 brakes, dual calipers per wheel push pads onto the disc.

The rotating part of the brake, being the brake disc, comes in various forms. The standard Jabiru brake system uses a solid disc, and there is also the ventilated disc, which is slightly thinner and smaller in diameter, but said to improve the



cooling of the disc during braking conditions. The photo below shows both types of discs available for Jabiru aircraft.

There are many other varieties of brake discs available in the market, but not normally used in the general aviation industry. These include the drilled, slotted/grooved, waved, carbon ceramic, “J hooked” and dimpled varieties.

During a routine maintenance intervention, I looked at my solid brake discs and noticed a very slight warp. I decided to replace the brake discs in the interest of safety. New discs were sent up from the factory in George, and the discs were fitted with new brake pads. The new discs were of the ventilated design, which, as mentioned, are marginally thinner and smaller in outer diameter than the original solid discs.

Research suggests that solid rotors are cheap to manufacture, and, for the general aviation industry, there is nothing wrong with them. The type of braking pilots use is very different to driving a high-performance car, so why incur additional expense on a component, if it has no real benefit.

When brake pads are applied to the disc and allowed to heat up, they release gases. This gas layer can partially separate the pad from the disc. When this happens and the brake disc has not had time to dissipate the heat, the brakes fade, and the braking effectiveness of the aircraft is compromised and becomes less responsive. Holes or slots are often put into the discs to help the gases to escape, but in doing so, metal that can absorb heat is removed from the disc. The disc can furthermore be structurally compromised. In the case of the Jabiru ventilated disc, it is of paramount importance that the webs joining the disc to the hub are always in compression during braking. If the webs are in tension, they could fracture.

Another phenomenon on disc brakes is called brake judder. If there is an inconsistency in the disc thickness variation (DTV), the two braking faces are no longer parallel, which will cause the brakes to judder (shake or vibrate rapidly).

As the new brake discs on my aircraft are thinner, smaller in diameter and ventilated, they heated up quicker. This accelerates the onset of brake fade.

An added problem is the brake pads are not in full contact with the smaller disc, which lessens the effectiveness of the brakes. The result was seeing the end of the runway on every landing, even if I landed below the recommended approach speed. Whilst ventilated discs look more appealing to the eye, one must consider that any loss of mass will allow the disc to heat up quicker. This is never a good idea, especially within the aviation industry. It is true that thicker discs do take longer to cool down, but once the aircraft has taxied back to the hangar, or holding point, the discs have had sufficient time to dissipate the heat.


At the end of the day, you decide what brake disc to use on your aircraft. Research what options are available from the manufacturer. If the thick, solid brake discs work on your aircraft, be cautious if you decide to try out ventilated discs that have less mass. The results may not be what you expected. In my case, you may need an extra-long runway to stop an aircraft that should be stationary in 400 meters.

I have subsequently fitted new solid brake discs supplied by Jabiru. The difference noticeable!

Dr Robert Clark


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This month's e mail promo from EAA USA promoting Oshkosh 2023. It was good to see a South African featured – the pilot flying in the GeeBee formation is Jesse Jeffrey, Neil and Carolyn Bowden's grandson!



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Falcon EP-002	EGT probe	Green silicone	1040,00	500,00
Falcon EP-002	EGT probe	Braided stainless steel	1040,00	500,00
Falcon ER-001	EGT 1400Deg F	Gauge and cable	2600,00	1250,00
Falcon ER-002	CHT 700 deg F	Gauge	2600,00	1250,00
Falcon TR-003	Tachometer 2"	8000Rpm with cable	1800,00	750,00
Fascor	Rivnut puller X 2	Pullers and rivnuts	2 x 200.00 each	400,00
FINI Compressor	Air Compressor	100L two stage	N/A	3000,00
FINI Compressor	Air Compressor	150L two stage	N/A	3500,00
Garmin	Bits and pieces	Garmin 95	N/A	100,00
Made in China	Water temp Deg in F & C	Second hand	1500,00	250,00
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Unknown	EGT probe	Egt probe	1040,00	500,00
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Contact Dale de Klerk +27 82 556 3592

Peter How has the following items for sale:

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- UMA 1 1/4" fuel press gauge R150
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