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Tecnam's Managing Director,
Paolo Pascale Langer taking
his new Astore for a spin.
Photo: Tecnam

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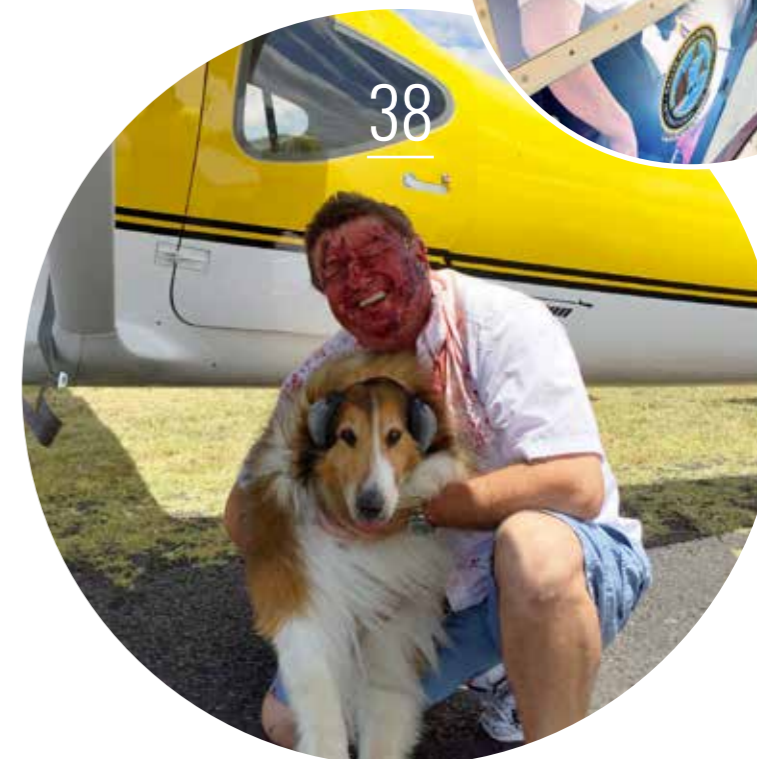
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- ★ Heritage Machinery **plus FIREWORKS**
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- ★ Vintage Tractor Pull
- ★ Fashion Parade
- ★ Childrens' Entertainment
- ★ Food/Drinks & Market Stalls



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SAT 3PM

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- ★ Heritage Car Show
- ★ Vintage Tractor Pull
- ★ Joy Flights



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Truck Show Enq: Tony Phone: (07) 4936 2260 (Office Hours)
www.oldstationflyingclub.com.au

Airfield Details
Runway 2000m x 18m wide Orientation 06/24
Co-Ordinates: 150 48' 23.8" E 23 49' 25.0" S
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Ground Frequency: 121.6 AV Gas Available
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Proceeds aid the Capricorn Helicopter Rescue Service

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Equal rights

BY MICHAEL MONCK

As I alluded to last month, RAAus is an organisation which is experiencing constant, and sometimes rapid, change. RAAus has evolved over time from a small organisation borne of civil disobedience into one which embraces entrepreneurial spirit in the aviation world, while also recognising the important role it has to play in promoting safe practices within the sector. This evolution carries on to this day.

To continue to do this we have put up a new constitution for consideration by you. The new framework will allow us to operate in a manner more conducive to the organisation we have become, but still embody the pioneering spirit from which we sprang.

We now have around 14 full time staff and a board of 13 who all strive to provide you with value for your membership dollar. In my column last month, I spoke of the difficulties in doing this given the constraints imposed upon us by our constitution. I talked about the need to relieve us of these limitations. We need to revise the document which provides us with overarching guidance and ensure it gives us the tools we need to thrive for at least another 30 years.

There are some headline topics within the document you need to particularly focus on. One of these is the board. As outlined above, board numbers almost match staff numbers at the moment. It is a very real possibility that, as the office becomes more efficient, we may return to a situation where the board outnumbers the staff. Is this a real problem? It is an issue if you look at the role of the board. We also need to understand the historical reasons for having a board of this size.

The board we have was appointed to ensure the interests of the organisation as a whole were looked after. Indeed, the law imposes significant penalties for board members who fail to act 'in the best interest of the company' with financial consequences as high as \$200,000 and imprisonment up to five years if those duties are breached. The reality is that penalties this high are unlikely to be imposed on any RAAus board member, but nonetheless, it illustrates the importance placed on understanding why a board exists.

Surely our board does act in the best interests of RAAus, right? Of course it does, but there is a fundamental breakdown between our legal obligations and the way board members are appointed. By way of example, I currently sit on the board to (using the terminology of our constitution) represent the NSW/ACT region. This representative model is implemented by allowing those members who reside in the NSW/ACT region to vote for me at each election where my position becomes vacant. This is at odds with my obligations under the law.

Despite being a representative of NSW/ACT I am prohibited by law from placing the interests of this region above those of any other. That is, I am legally prevented from prioritising the interests of the NSW/ACT region. I am compelled to act in the interests of the organisation as a whole.

What this boils down to is that I am required to consider the implications of any decisions made at the board level on the members in the NSW/ACT region as well as those members located elsewhere. I must represent all members equally. But this doesn't quite gel.

If I am required to think about the interests of those in the NT, WA, Qld, SA, Vic and Tas regions as well as those in the NSW/ACT region, is it fair the members outside of my local area have no say

in my appointment?

Furthermore, what about those regions where there is no contest for a board position? It seems to me those members have no rights. They simply get whoever puts their hand up. There has to be a better way.

In the new constitution we have made provision to allow each and every person to vote in board members regardless of where they live. You will no longer have to vote for someone simply by virtue of their postcode. If you think someone else from somewhere else can do the job better, you can have your say. You won't be prevented from having that say on whether I am a suitable candidate or not just because I don't live near you. If you think I'm wrong for the job you can vote for someone else. Everyone will have an equal opportunity to have a vote and be heard. Of course you'll still be able to vote for someone locally if you want to. The important thing, however, is that the new constitution will no longer erode your rights simply because you are in the unfortunate position of not having multiple candidates nominate in your region.

"The representative model arose out of the poor communications"

In addition, the representative model arose out of the poor communications of years gone by. The idea of local representation was born because it used to be costly and time consuming to communicate over vast distances. Local reps had the ability to canvas the views of local members and ensure these were given the attention they deserved. Is this necessary nowadays? I don't think it is.

During my time on the board I have spoken to many hundreds of members from across the country. I've spent hours on the phone to people in WA and I've copped my fair share of criticism via email from members in every state. What this illustrates is that anyone, anywhere can get in touch with me almost instantaneously and very cheaply. If you like, I'm even happy to call you back (and RAAus doesn't even pay my phone bill). Other board members report the same experiences. The tyranny of distance no longer prevents us from communicating.

So we have to ask ourselves, if we aren't allowed to have a board based on a representative model and the representative model is somewhat defunct in any event, why do we persist with the costs associated with it? Each board meeting we hold costs members somewhere in the order of \$10k - \$15k. Sometimes even more. If we halve the size of the board, we could also go close to halving the costs. Alternatively, we could have double the amount of communication for the same cost.

So pulling this all together, we know we have an oversized board which costs a small fortune to manage and which consists of members' representatives who aren't allowed to represent their regions. It becomes an obvious question - aren't we better off having a board consisting of people better suited to the role, regardless of where they come from, who are voted in by all the members they truly represent? I am certain such a model will deliver better bang for members' buck while also reinforcing their rights.

This is what we propose in the new constitution. A cheaper, more efficient model which offers much more value and allows everyone to have a fair say in who represents them. We'll be tidying up the wording based on feedback we have received so far but, rest assured, everyone will soon get to have a say on how RAAus is run and you'll all get to choose the person who is best for the job rather than being restricted to your neighbours. ☺



CALENDAR OF EVENTS



A. 13 MARCH TYABB AIRSHOW

THE theme for the show will be Winged Warriors. Aerial displays, antique aircraft, static display, new LSA display, classic cars, model aircraft. Food and drinks.

For more information, pac@pac.asn.au or (03) 5977 4406.



B. 13 MARCH CLIFTON FLY-IN

THIS has become an iconic event in the region and is the premier attraction for all types of aviation in southern Queensland. See various types, shapes, sizes and models of recreational, ultralight and home built aircraft. Come late p.m. Saturday for BBQ and drinks. Fly or drive in, see ERSA. On field camping, bring your swag. Advise for catering. For more information, Trevor Bange 0429 378 370, (07) 4695 8541 or trevorbange@bigpond.com.



D. 17 APRIL HECK FIELD FLY-IN

GOLD Coast Sport Flying Club welcomes all aviators. Catering at field, vintage cars and plenty of aircraft activity. 27.46S—153.20E Freq. 119.00 MHZ. For more information, Brian Howard 0401 060 613, Jason King 0418 986 609 or Tony MacMillan 0417 745 800.



C. 15 APRIL AAAA NATIONAL FLY-IN

THE national fly-in at Echuca is the premier event for the Antique Aeroplane Association of Australia. More than 100 beautifully restored and cared for aircraft are expected to be on hand to be admired. Food and drink available. For more information, www.antique-aeroplane.com.au.

E. 26-27 MARCH BACK TO HOLBROOK FLY-IN

HOLBROOK Ultralight Club reminds you to put its annual event in your diary for Easter. Forums on Saturday afternoon and a planned local fly-out Sunday morning. Dinner plus award presentation Saturday evening and BBQ breakfast Sunday. Underwing camping and transport to and from Holbrook township for accommodation and fuel available.

For more information, John Harley 0456 357 735 or www.holbrookultralightclub.asn.au.



F. 23 APRIL MERIMBULA RED BARON BALL

GALA Night. Oompahpah band, cabaret, fancy dress, comedy, food. Other planned activities will be oyster tours, golf tours, Eden whale museum tour and Bega Valley cheese tour. There's also a fly-in at Frogs Hollow planned on Sunday. Big ANZAC activity at the Merimbula RSL on Monday. For more information, (02) 6495 1306.



G. 23 APRIL DENILQUIN ANZAC WEEKEND FLY-IN

THE Denilquin Aero Club will celebrate the achievement of local people in aviation, World War II, agricultural aviation and the long standing contribution of Macknight airlines. Field Air will demonstrate fire bombing and low level spraying with its Ag planes and aerobatics in a Pitts Special. Special guest Michael Smith will speak at the dinner about his Around-the-World adventure at 80kts in a SeaRey (See his blog at <http://www.southernsun.voyage>). Denilquin Airport has plenty of tie-down space. Avgas and transport will be organised for the day. Breakfast available Sunday morning. Tickets need to be pre-booked. For more information, www.denilquinaeroclub.com or Ian 0418 452 521.

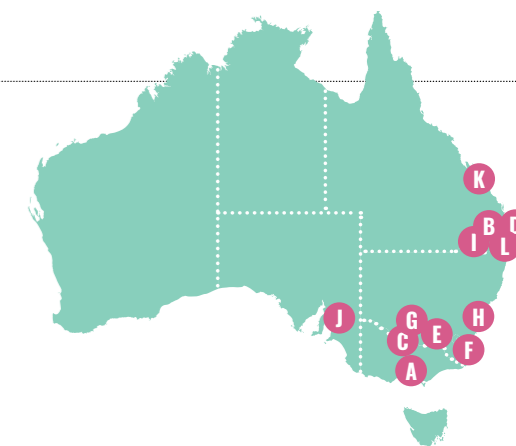


H. 30 APRIL-1 MAY WINGS OVER ILLAWARRA

BIG crowds attend this fly-in, primarily because of the big noisy jets. See aerobatics, warbirds, vintage aircraft, jets and formation flying. For more information, www.wingsoverillawarra.com.au.

I. 8 MAY GATTON AIRPARK BREAKFAST FLY-IN

ENJOY a hot breakfast and capuccino with friends and a stroll around Australia's most popular residential airpark. See classic and modern aeroplanes, and classic cars. From 0730. Details in ERSA or Martin 0419 368 696.



J. 14-15 MAY BAROSSA BIRDMEN

FLY-IN at Truro Flats Airpark. Check ERSA. Limited accommodation. Dinner Saturday night. Avgas and Mogas by prior arrangement. Pilots should be aware of restrictions regarding overflying neighbouring properties, particularly to the SW of the airfield. For more information, Dennis Martin (08) 8263 0553, Roy 0408 802 667 or roy1948@gmail.com.

K. 22-24 MAY OLD STATION FLY-IN AND HERITAGE SHOW

AVIATORS and campers are welcome from Friday afternoon. Truck show, joy flights, vintage tractor pulls, heritage machinery, children's entertainment, fashion parade, air display including Matt Hall and fireworks. Licenced bar, food, drinks and lots more. Weekend camping no bookings needed. Proceeds aid the Capricorn Helicopter Rescue Service. For more information, leonie@creedgrazing.com.au, (07) 4934 6562 or aviation inquiries Ron 0408 346 536.

L. 29 MAY CASINO BEEF WEEK MUSTER

A HIGHLIGHT of the Casino Beef Week Festival. All aviation businesses welcome. A fun weekend for everyone, on and off the aerodrome. Saturday Beef Week activities include street festival and markets, main street parade, whip cracking demonstrations, car show, wood chopping competition and rodeo.

Sunday is a Family Fun Day next to the aerodrome. Amusement rides, market & food stalls, adventure flights and aviation chat all weekend. All amenities at the aerodrome. For more information, www.casinobeefweek.com.au, Russell 0427 627 477 or Debbie 0438 627 607.



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Please do not submit articles regarding events that are the subject of a current official investigation.

Submissions may be edited for clarity, length and reader focus.



A MILLION APOLOGIES

I am confused as to the reliability of light aircraft engines.

I am working from my poor memory, but a couple of months ago in *Sport Pilot*, Jabiru quoted reliability figures I re-interpreted as an average of one failure for somewhere over 3,000 hours.

It said, in my re-interpretation, that Jabiru had 1.1 failures for every +3,000 hours and Rotax 0.9 of a failure for every +3,000 hours (Less than 0.001% difference, insufficient for CASA to highlight). Fine so far, but on page 64 of this month's mag (*Sport Pilot* January 2016) it quotes 198 in 10,000 hours. This is approximately one failure for every 50 hours. A huge difference from 1:3,000. I cannot believe the 1:50, so I assume a typo and it should have said 1:500. But that still leaves a big discrepancy.

I know you can prove anything with figures, but this is ridiculous.

IAN BISHOP

FROM THE ED / It should have said 1,000,000 hours. That was corrected in the February edition.

PORT OPPORTUNITY

I am writing to you on behalf of the Port Lincoln Flying Club. Our club is located at the Port Lincoln Airport in South Australia. At present we operate a Piper Cherokee Archer 2. Our GA flying training is carried out by Aerostar Aviation who come from Adelaide two days each fortnight. We would like to be able to offer an RAAus training alternative. We have tried unsuccessfully to get this underway by inviting instructors from other centres in South Australia to bring themselves and their aircraft to Port Lincoln on a regular basis to conduct RA Aus training. Unfortunately, for any number of reasons, we are unable to have any certainty of regular training. This has become very frustrating for all concerned, to the point where we feel it is necessary to try a new perspective.

Through your readership, we are wondering if there are any suitably qualified people out there who might consider relocating to Port Lincoln, preferably with their own aircraft, to set up a flying school for RAAus training. Other options with regard to a suitable aircraft would be considered by the club. Training could be in association with the club or on a separate private basis. Our only goal is to have such a service available in Port Lincoln. The club has excellent facilities for briefing and all

other requisites for such an operation available by negotiation.

Because we can't know how much flying training might be available and cannot be guaranteed, the operation would ideally lend itself to someone in semi-retirement. The club believes there is an opportunity for someone with the 'right stuff' to establish a viable operation. We already have quite a number of RAAus aircraft and owners in the area, with a large cross section of various types.

Port Lincoln is a city of 14,000 and has further populations in nearby towns of Cummins and Tumby Bay. We have one of the mildest climates in Australia, a great lifestyle and some spectacular coastal scenery. Our airspace is uncluttered and uncontrolled, although we have in the order of eight flights a day by Rex and Qantas Link airlines, to and from Adelaide. There is a great opportunity to attract prospective trainees to come for a holiday and learn to fly at the same time. The website Visit Port Lincoln.net has all the information about our city and local areas.

Any person interested can get further details by contacting me (kev.marg@hotmail.com) on 0428 842 092 or club secretary Sue Chappell (landserv@westnet.com.au) on 0428 842 560.

KEVIN WARREN
PRESIDENT PORT LINCOLN FLYING CLUB INC.

FROM THE OPS DEPT / We would be happy to work with anyone contemplating this move to ensure this new school goes ahead as part of our commitment to more RAAus schools for existing and new members.

CASA NOT BLOATED

I would like to respond to the article (*Sport Pilot* January 2016) by Norm Sanders ('CASA and Parkinson's Law'). There are a number of claims made by Dr. Sanders which are simply untrue.

Dr. Sanders puts forward the proposition that the number of VH registered aircraft is falling, while CASA grows larger. In fact, the number of VH registered aircraft has increased gradually over recent years. This increase has not been large, but it has been a trend over the past ten years. At the same time, CASA staff numbers have fallen over the past two years from 850 to 830. Based on the idea that VH aircraft numbers are down and CASA staffing is up, Dr. Sanders claims CASA has twice as many employees per aircraft than the US Federal Aviation Administration. Clearly this is wrong. Some quick math shows the FAA has about five aircraft per employee while

CASA has almost 20 aircraft for each employee. I'm not sure how these figures justify a claim that CASA is a bloated bureaucracy.

The claim is also made that CASA's budget is assured – that taxpayer's money is simply handed out to CASA when required. This is absolutely incorrect. Right now CASA is facing a shortfall in funding of about \$12 million. If we don't address costs and find efficiencies, this shortfall will increase in future years and our reserves will be depleted. The Federal Government is requiring us to reduce costs and improve efficiency and will not be handing out money to make up the shortfall.

As many people would know, I have begun a comprehensive program to renew CASA by driving improvements right across the organisation. I have announced a new structure centred on three themes – stakeholder engagement, collaboration and sustainability. When implemented this year, CASA will look and work quite differently, there will be fewer layers of management and fewer managers. We are asking ourselves what the aviation community needs from CASA and what the best way to deliver safety support and regulatory services should be. I want as many CASA staff as possible out on the tarmac and in the aviation workplaces communicating, engaging and collaborating with aviation people and organisations to get the best safety outcomes for all sectors of Australian aviation, including sports aviation.

MARK SKIDMORE
CASA DIRECTOR AVIATION SAFETY

COME ON BACK

There has been a lot of talk, rumours and confusion lately about weight increases for aircraft, the latest being an increase to 1100kg MTOW, flying into licenced airfields and the list goes on.

I have been with the ultralight movement since 1988, was on the Board for a period of nine years and have seen a lot of changes to the rules, regulations, training and airworthiness in that time.

The 'old' ultralight aircraft over the years have gradually become heavier, faster, more sophisticated and extremely more expensive. They require higher levels of training and skill to maintain and fly. Obviously they no longer fit into the original concept of cheap, affordable, and safe flying.

I am pleased to see the Board has had the balls to bring in an amnesty to try and bring former members back into the fold, some of whom I know are flying



on their properties with no licence or rego. Asked why they were doing it, the answer is easy "why should we pay to do a BFR, not in the aircraft we fly (95.10) or (95.25). They are single seat. We don't fly Jabirus so why should we have to pay to become current on them to do the BFR?" I explained that the CFI who apparently told them that was incorrect I advised them to look for a CFI who was prepared to be on the ground, give them instructions as to what he required, while they flew and followed his directions. In another place in October I met up with a chap who flies an old Maxair Drifter in fantastic condition. Again it's a single seat 95.10. He does mustering in his machine and is in high demand, no current licence or registration and has never had either. His answer to my question was similar to the other ones. I have listened to resentment and scorn, to alarm and concern and at one time hostility. It would be interesting to know how many instructors of all ranks have actually flown a 95.10, 95.25 or 95.55. rag and tube, powered parachute or trike. Yet there are those who make strong comments about pilots who have a lot of fun flying them.

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If members wish to build and or buy and fly heavier, more expensive powerful aircraft I consider the SAAA is the place to go. They already have the technical expertise to build that type of aircraft so why duplicate what they do.

I therefore ask the Board to look at all the categories of sport aircraft up to and including 540kg be controlled under the current CNOs, be separated from recreational aircraft register, and controlled, licenced and registered (as is currently carried out by RAAus) as another branch of the organisation called Australian Ultralight Federation - the name which is currently owned by RAAus. The reason I mention this is there are quite a few members who cannot see why they, through their membership, should support or subsidise those who wish to fly you-beaut, super-duper fully imported aircraft.

In the latest news letter (E-17) it states the places that staff have travelled to, in lieu of having Natfly. It mentions the Barossa Valley. I am a member of the Barossa Birdmen Flying Club, the only recreational flying club in the area, it is also the oldest club registered with AUF/RAAus. Why were we not informed that Board members and office staff were attending somewhere in the Barossa?

The removal of the members market from the magazine is a bad move. I know it is the first thing in the magazine that members in my club look at. Now we have to look through pages of jets, twins, helicopters, etc. When I was Treasurer the members market actually made a small profit for the organisation.

My last observation is that this year (2016) we are still holding on to our safety record, one incident and one accident (both on TV News) in the first month of the year. Luckily no one has been killed or seriously hurt. One aircraft had to do an out landing near Lake Eyre and was found the next day, after a large search. I could be wrong here, but why was the aircraft not fitted with, or the pilot not carrying, an ELB? Especially flying in that area.

IAN SHAUGHNESSY

FROM THE CEO / RAAus staff and Board remain very aware of the importance of retaining freedoms for the entire spectrum of members. When seeking higher freedoms like increases in MTOW and CTA access, we remain aware our existing freedoms must not be eroded or removed. The additional freedoms being sought will have no impact on the current ability of a 95.10 aircraft owner to fly their aircraft as they do today. The Operations Manual clearly allows

for a single seat observed BFR to take place and members are encouraged to seek other CFIs if this is not offered. If members want to fly a single seat aircraft around their property, there is nothing in the proposed changes which will prevent that.

As an organisation, if we don't seek additional freedoms desired by a large number of our members, RAAus will have failed in its job of looking after all members' wishes or needs. Members are demanding RAAus expands the freedoms to include bigger and faster aircraft and fly into more possible airfields. We would be recalcitrant in our duties if we denied this innovation and progress. There is opportunity for all types of flying to occur while administered by RAAus, but members also share responsibility to operate legally and compliantly, or we all risk losing our hard won freedoms. Splitting off into another organisation simply dilutes the power an organisation like RAAus has now to make members' voices heard on important issues. Politically we are much stronger as a unified group of aviators and more able to protect our long standing freedoms.

Members may not be aware RAAus is unique in the world in being delegated to administer pilots and sub 600kg aircraft. While other countries have similar systems, only in Australia can you choose between the government and a private organisation to fly recreationally. This was a hard won reality. Our foundation members are to be applauded for their efforts decades ago in establishing RAAus and there is no reason our heritage and innovation of today cannot co-exist.

What we must remember though is the impact on our freedoms from members (or non-members) not obeying current rules or flying in stupid or unsafe ways.

The recent amnesty was an initiative to encourage members who have been operating outside the lines to come back to the fold and we are happy to report a gratifying take-up rate of members completing BFRs, re-registering aircraft and finding out the RAAus staff and board want exactly what our members want; the ability and freedom to fly, but in a safe legal way.

With regard to Members' Market - it is alive and well in the magazine. We've enhanced it, just as RAAus is evolving, we don't take things away; we simply add more functionality for the ever expanding needs and wants of our diverse membership. Check out this edition of Sport Pilot, towards the end you will find

Member's Market. If, however you would prefer to look online, check out our new partner Aviation Advertiser and support Australia's biggest online classified aviation resource.

If there are serious concerns about 95.10 freedoms being eroded, come to RAAus with specific concerns rather than generalisations like 'back in the old days'. If we only talk about the old days and reminisce on how good they were, it means our best days are behind us. Our best days are still ahead us and we should reach for the stars.

Members pay RAAus for the freedom to continue to operate outside direct CASA supervision, and shouldn't think their money is used for anything other than furthering all members' needs.

We listen and we need to know what the specific problems are. Let's keep talking and working together to resolve any problems.

VALE - CHRIS CONROY

It is with sadness we advise the passing of Chris Conroy.

Chris was one of those people involved in the beginnings of the ultralight aircraft movement. He was involved in producing and appearing in a television outdoor leisure programme, where he always managed to sneak in an aircraft - usually on floats. Chris knew and was known by almost everyone in ultralight aviation.

He constructed his own aircraft and was one of the original members of the Gold Coast Sports Flying Club, long before we were based at Heck Field.

Sadly, another one of our pioneers has flown off into the distance.

**MALCOLM ALDRED
PRESIDENT GOLD COAST SPORTS FLYING CLUB**

RULING WITH RULES

Rules and Regulations - playing with words and people's lives. Parkinson's Law and a paradox - shut down or keep idling, stay put or get out! The items discussed in Norm Sanders' and Andrew Hibbs' excellent articles (Sport Pilot January 2016).



Herewith, practical examples and questions from real life operations.

Firstly, I almost killed my partner with an idling engine in the flying club's Cessna 172 when she changed seats. This occurred while I sat in the left seat, after a gratis survey flight over a property, prior to gaining my Commercial Licence. After landing, the property owner vacated the co-pilot's seat. Then my partner left her seat behind me, as arranged, to reposition in the now vacated front seat which she had occupied during the flight out to the property. Even though well acquainted with aircraft and having handled the controls competently many times while flying with me and knowing that the engine had not been shut down, she chose to run closely around the front of the aircraft - the propeller not being visible.

Knowing that flipping the ignition switch to off would not save her from injury or possible death, as she passed my window I shouted "STOP!" which she did, centimetres from the spinning prop. Then I shut the engine down, so both of us could regain our composure before flying back to Darwin. Just milliseconds and a whisker from tragedy - it can all happen so quickly. Why didn't she move across the rear seat and use the other door? There is no logical answer to some rushed emotional decisions we make at times.

Now to the rule about never vacating the pilot's seat of a helicopter with the engine running and the rotors turning. Even in PNG (and other 3rd world countries), this rule applied during my times there. Which was idiotic, as, except when

landing at an established camp or secure area, any sensible pilot ignored this dictum because it could mean death. Others, his own, a trashed aircraft and possibly, in the best instance, a lot of paperwork and an irate boss.

So, after landing, as locals rushed toward the chopper, one quickly snapped the throttle(s) shut, frictioned the controls and rushed back to guard the tail rotor. Due to the payback system in PNG, injuring or killing a villager who might excitedly run into a tail rotor could result in a trashed chopper and pilot - probably in a very isolated area.

It is not a time to deliberate which rule takes precedence - ensuring safety of the crew and aircraft or leaving the pilots seat with turning rotors and before the engine cool-down period after the high power setting needed to land. Has the rule taking precedence ever been tested?

I have even punched a policeman who chose to ignore my pre-flight (in pidgin) safety briefing - no excuse for misunderstanding me. The cop tried to go under the tail boom to get to the cargo locker - one does whatever it takes. He sheepishly apologised.

Obviously, rules and regs point the way, but like the so-called justice system, mandated law can and has been shown to be inadequate to cover all human endeavours and that is why command decisions in aviation need to be flexible to cover different circumstances and situations, also known as Airmanship. Remember Bill Taylor? Walking out on the wing several times while in flight across the Tasman sea, to transfer oil from a dead engine to another about to seize due lack of oil, to save himself and Smithy falling into and dying in the sea.

So, remember, in a genuine emergency situation, although shrieking against one's training and instincts, the rule about not exceeding indicated red lines printed on a dial also flies out of the window, as a last resort, if needed to save lives or minimise injury.

Wrecked engines and bent metal can be replaced.

PHIL LATZ

WRITE IN: EDITOR@SPORTPILOT.NET.AU

The state of the organisation is reflected in the Letters to the Editor columns. The more letters - the healthier the organisation. So don't just sit there - get involved. Your contributions are always welcome, even if no one else agrees with your opinion.

The Editor makes every effort to run all letters, even if the queue gets long at certain times of the year. (By the way - the Editor reserves the right to edit Letters to the Editor to shorten them to fit the space available, to improve the clarity of the letter or to prevent libel. The opinions and views expressed in the Letters to the Editor are those of the individual writer and neither RA-Aus or Sport Pilot magazine endorses or supports the views expressed within them).



ASIC CHANGES

THE RAAus ASIC Application Form has changed.

To better align with national requirements, RAAus has made a number of amendments. In addition to a number of changes to the layout for better readability, changes have also been made to the requirements regarding primary

and secondary identification.

RAAus reminds members that the requirements for obtaining and holding an ASIC are imposed by the Aviation Transport Security Act 2004 and the AusCheck office of the Attorney General's Department. Any shortfalls in the in-

formation received as a part of your application will result in our inability to process your application within the desired timeframe.

Please ensure you take note of the changes to the form and supply all required information when you apply for your next ASIC.

TECNAM BOSS BUYS ONE



Tecnam's Global Sales and Marketing Director, Walter Da Costa, hands over the keys to Managing Director, Paolo Pascale Langer.

TECNAM has made its first delivery of the year – to its own boss.

The company's Managing Director, Paolo Pascale Langer, took delivery of an exclusive version of the Astore LSA in January.

The special edition version has even been named the Astore PPL (Paolo's initials). It is painted in a military grey colour scheme, it has a custom interior, a MT variable pitch propeller, 2 Garmin G3X, air conditioning, parachute and BOSE Headsets.

Tecnam says there are now more than 70 Astore LSAs in service worldwide, one of the companies' best-selling aeroplanes.

For more information, www.tecnam.com.

CARIBBEAN AIR RALLY



ORGANISERS say a number of recreational aircraft have registered to take part in the seventh running of the Governor General's Cup Caribbean Air Rally next month.

The rally leaves from Fort Lauderdale in the US on April 11 and hops along the chain of Caribbean islands to Martinique and back, a distance of 2,717nm, ending back in Fort Lauderdale on April 23.

Each day starts with a safety briefing and alternative routes are proposed depending on the weather. Planning is always based on the slowest aircraft in the fleet. The organisers take care of all airport handling.

Each night the pilots and their passengers get to stay in luxury resorts, meet with local dignitaries and visit local tourist attractions. One Australian couple who took part in the rally four years ago report that it's a relaxing and enjoyable holiday.

Team registration costs USD\$2400pp and USD\$375 per aircraft (You also have to get yourself to Fort Lauderdale).

For more information, www.airrally.com.

GOOD NEWS ON AMNESTY

BY THE OPS DEPT

BY the time you read this, the first ever RAAus amnesty period for unregistered aircraft and lapsed members will have expired. However, at the time of writing (early February) the amnesty still has almost a month to run.

The good news is that already, in the first two months, we have welcomed back a significant number of members and aircraft.

A total of 21 members, who had been cancelled for between six and 12 months, are back on the books and 61 others, who had been cancelled for more than 12 months, are also back in, giving us a total of 82 returned members.

So far, in the same time frame, we have renewed three aircraft which had been cancelled for six to 12 months and 15 others which had been cancelled for more than 12 months. That gave us a total of 18 aircraft.

A final tally will have been made when the amnesty expired on February 29.

We are working hard to maintain our level of services and hope you will continue to enjoy flying with RAAus. And we'd like to say to those old members who are new again – welcome back.



AIRSPACE BRIEFING

THE big news after the Clifton fly-in last year was not how great the flying or the food was – it was about the 20 pilots who strayed into the active airspace over nearby Amberley Air Base.

In a bid to ensure that level of incursion doesn't happen again, and discuss changes to the airspace, the Air Force has been conducting safety briefings around the region.

Toowoomba and Boonah hosted one each in February. This month another will be held in Coominya on March 19.

Presentations will be made by Flight Lieutenant Andy McWatters, Flight Lieutenant Chris Loadsman and David Wiman (AirServices).

Key topics will include information about the base and its duties, flight planning and NOTAMS, RA status, local procedures, airspace hazards, incursions, in-flight emergency response and future procedures for VFR.

For more information, www.raa.asn.au/our-organisation/events/article/?id=amberley-airspace-safety-brief-various-locations.

ST HELENS HAS SPACE

THE airfield at St Helens, on Tasmania's East Coast, has hangar space available if you are quick.

The place is a growing tourist destination, surrounded by internationally renowned attractions.

St Helens is a coastal hamlet only a short flying distance to Freycinet, Barnbougle and Lost Farm golf courses and a short drive to the Bay of Fires and Blue Derby mountain bike trails.

The local council, Break O'Day, has recognised that more and more aviators are coming to the region. It's decided to meet that demand by building hangars at the airstrip.

The council is looking for expressions of interest in order to determine just how many hangars and what sizes are needed. The hangars can be built to any size you want and will be fully lockable with power and water.

"We have spoken to local pilots who have reported people increasingly want to charter flights into the East Coast of Tasmania," Break O'Day Mayor Mick Tucker says. "With tourism statistics in our area on the up and up, offering hangar space was a logical progression."

For more information, contact Break O'Day Economic Development Officer, Tim Gowans at tim.gowans@bodc.tas.gov.au.

PLANNING FOR WIRES

ESSENTIAL Energy has issued a reminder to pilots when pre-planning their flights to identify the location of the overhead electricity network.

General Manager Safety, HR and Environment, David Nardi, says aerial spraying, fire-fighting and mustering, along with recreational pursuits such as paragliding, hot air ballooning and the use of drones, could become high-risk around powerlines.

"One incident is too many when it comes to aircraft contacting powerlines, so it pays to remain vigilant," says David.

"Essential Energy's network spans 95 per cent of NSW – and environmental factors such as storms, wind and vegetation can cause network damage, altering conditions for pilots."

Essential Energy recommends a pre-flight risk assessment before commencing any aerial work to ensure safe work practices are followed and to highlight the location and condition of overhead powerlines.



"Pilots are advised to inspect powerlines each time they take off because visibility can be reduced in overcast, smoky or rainy weather and also at dawn or dusk," says David.

Maps of Essential Energy's overhead electricity network are available by calling 13 23 91 or visiting: www.essentialenergy.com.au/overhead.

To report an incident involving an overhead powerline, contact Essential Energy on 13 20 80 or 000 if the situation is life threatening.

OPERATIONS MANUAL REVIEW

BY MICHAEL LINKE, CEO

VERSION 7 of the Ops Manual was released on November 11, 2014. Since that time the manual has served us well and it is now time to review it.

We are currently working on version 7.1. This review will be a limited one and will look at a few key areas, namely powered parachute operations, introduction of our new endorsement for utility operations and a review of our type training requirements.

Other minor corrections will also be made but these do not affect the application of the manual.

We are in the final stages of review following leadership team and board discussions on strategic and policy related matters. We will soon share the manual with the broader membership for comment after finalising a review with our CFIs.

Watch *Sport Pilot* for updates.

Hangars available in St Helens, Tasmania

The Break O'Day Council is seeking expressions of interest to rent aircraft hangars at its St Helens airstrip located on the East Coast of Tasmania.

The airstrip is 1070m long and 18m wide with no landing fees.

There are a range of hangar sizes available.

Each structure will be fully lockable with power and water utilities. Toilet facilities also available.

Pilots will also have access to an L2 mechanic and Chief Flying Instructor plus a taxi-cab service to the nearby township of St Helens which is 5 minutes away.

St Helens is the main township on Tasmania's popular East Coast. It is the gateway to the Bay of Fires and in close proximity to world class golf courses Lost Farm and Barnbougle, Freycinet National Park and the Blue Derby Mountain Bike Trails.

For more information please contact Tim Gowans on (03) 63767900 or email tim.gowans@bodc.tas.gov.au



NOTICE OF GENERAL MEETING

- 2016 -

RAAus invites all members to the next General Meeting, to be held in Canberra

When: May 14, 2016 **Start time:** 2pm

Venue: RAAus Head Office
Unit 3, 1 Pirie Street, Fyshwick. ACT. 2609

Details of special resolutions will be circulated to all members through *Sport Pilot*, electronic newsletters and be posted on the RAAus website shortly.

Michael Linke
Chief Executive

Where are the wires?

Powerline safety awareness for recreational and GA pilots



While it's basic flying to be aware of obstacles on take-off and landing, experienced pilots know extra care is needed when flying in unfamiliar areas and around bush strips or paddocks.

Essential Energy can arrange sessions for recreational and GA pilots to raise awareness about operational safety when below minimum flight level 500' in areas where there are powerlines.

These sessions are generally free of charge. If you would like to arrange an awareness session, contact the Essential Energy Public Safety team on **13 23 91**

Maps showing the general location of our overhead electricity network are available on request. Visit essentialenergy.com.au/overhead to request overhead maps for your property.

Essential Energy also recommends property owners mark powerlines to increase their visibility and help prevent incidents occurring. If you identify an area of concern, let the property owner know straight away. Essential Energy can install line markers at a reasonable cost, it might save your life.

For more information, call Essential Energy on **13 23 91** or visit essentialenergy.com.au/safety





GYFTS Scholarships now open \$50,000 available

The Giving Youth Flight Training Support (GYFTS) program supports the dreams of young aviators.

Each year RAAus awards scholarships to a number of young aviators to support them in their pursuit of a career in aviation.

The aims of the scholarship program are to:

- Introduce young people to the sport of recreational aviation;
- Develop responsible and safe flying attitudes;
- Offer a basis of aviation knowledge for advancement and careers in recreational, military or general commercial aviation;
- Assist young people to complete their flying training at minimal cost; and
- Encourage young people to become active long-term members of the recreational aviation community.

APPLICATIONS open February 1 APPLICATIONS close March 31

\$50,000 in scholarships on offer FOR more information: www.raa.asn.au

FOR many years RAAus members have supported this program by donating a small amount each year. If you would like to help the future of aviation, please contact the RAAus office to make a donation.



MAINTENANCE



JABIRU WORKSHOPS

BY SUE WOODS JABIRU BUSINESS MANAGER

SINCE the early days, Jabiru has offered owners and maintenance providers an insight into the workings of the Jabiru engine by conducting workshops at our factory in Bundaberg.

These workshops used to be run by Don Richter up until a few years ago, when Don handed over to the younger members of the team in preparation for his retirement. In those days the workshops were a five day course, providing orientation to a full overhaul and a 100 hourly airframe inspection. They were limited to a couple of times a year.

Jabiru has recognised many more owners and maintainers are keen to get their hands into an engine to learn under supervised conditions, so we increased the frequency of the workshops to one or two per month, depending on demand. Nowadays, Jason Korn runs them. He started with Jabiru back in the 1600 engine days and has experience as a trainer for a mining company as well.

The engine workshops are now conducted over three days and cover general maintenance of the engine, service bulletins and letters, how to do a cylinder head inspection, remove a cylinder head, lap a valve, reinstall a cylinder head, fault finding and engine management.

Close to 100 people have participated in the new style workshops since their introduction in 2015.

Over the years, another 120 people from all over the world have attended workshops at Jabiru and feedback has been tremendously positive.

For more information, www.jabiru.net.au.



Left rear Matt Norgrove, left front David Barwick, right rear Phillip Usher, right middle Raymond Davies, right front Jason Korn



WOAW!

MARCH 7-13



Highlights from WOAW 2015

WOMEN of Aviation Worldwide Week is on again this month. WOAW is a global initiative which takes place on the anniversary date of the world's first female pilot licence and International Women's Day.

Activities during the week are designed to raise awareness of aviation opportunities available to girls of all ages while celebrating the accomplishments of past and present women of aviation.

Activities such as flying events, factory and school open door events, museum special programs and much more have been organised to showcase today's women of aviation as well as extend a warm welcome to newcomers.

The theme this year is 'It's a jungle out there, 60 years of female bush pilots'. It's been chosen to honour Ada Rogato, the first person to fly through the Amazon jungle in 1956.

Multiple contests such as the Fly It Forward challenge, the First to Solo challenge, the Pink Paper Plane challenge add fun and rewards to the experience.

Australian women now feature prominently in the Fly It Forward Challenge Hall of Fame.

A trophy for the winner, plaques for the first and second finalists will be awarded in the following categories:

'Most Female Pilot Friendly Airport Worldwide' - awarded to the airport hosting one or more official activities which generate the most valid female first flight reports for the week.

'Most Dedicated Female Pilot Worldwide' - awarded to the registered

female pilot who conducts the most reported flights (girls reporting divided by number of passenger seats) during the week.

'Most Supportive Male Pilot Worldwide' - awarded to the registered male pilot who conducts the most reported flights (girls reporting divided by number of passenger seats) during the week.

For details on Australian events, www.womenofaviationweek.org.

WHERE ARE THE WOMEN?

While the percentage of female doctors, lawyers and police women went from nonexistent 100 years ago to around 25% today, the percentage of women involved in aviation has remained around 5-6%.

As a result, the common perception among girls of all ages is that aviation is for men only. But nothing could be further from the truth. Every day, women are enjoying flying for the fun of it or for a career. More and more women are becoming Air Traffic Controllers. Others become aircraft mechanics or aerospace engineers.

In late 2009, Mireille Goyer, an airline pilot and aviation educator, conducted a search for planned events to celebrate the 100th anniversary of the first female pilot's licence.

To her dismay, she found none. Determined to not let this important milestone for female pilots go unnoticed and uncelebrated, Goyer launched a worldwide campaign. She encouraged pilots from around the world to 'Fly It Forward' (i.e., introduce a girl or a woman to flying). As a result, more

"The common perception among girls is that aviation is for men only"

1,600 girls and women discovered the joys of flying in 36 countries on four continents throughout 2010.

Goyer then launched the annual Women Of Aviation Worldwide Week initiative in 2011 to continue the outreach effort born during the centennial celebration. The initiative is designed to foster gender balance in the air and space industry. It celebrates women's historical contributions, raises awareness of aviation's opportunities for girls and women and sparks vocations among the female population by introducing girls and women to aviation thanks to industry-wide collaboration.

As of March 2015, 96,000 have directly participated in the annual celebrations and 21,656 documented Fly It Forward flights have been granted to girls and women on five continents.

HISTORY OF WOMEN IN AVIATION

It started in 1784, when only eight months after the first manned balloon flight, Count Jean-Baptiste de Launcin got cold feet and gave his spot for a balloon flight to Marie Élisabeth Thible, a French opera singer.

She dressed as a Roman goddess and sang La Belle Arsène, a celebrated opera of the time, as the balloon ascended to 1,500m. She was the first woman ever to fly.

A few years later, riding along was not good enough for women anymore.

In 1798, Jeanne Labrosse was the first woman to fly solo in an aircraft and, in June 1903, Aida de Acosta was the first woman to fly a powered aircraft, a dirigible designed by her friend, Alberto Santos-Dumont. It is no surprise that just a few years after the airplane was invented, women were

taking on the new challenge. On March 8, 1910, Raymonde de Laroche, an experienced French balloonist, became the first woman to earn a pilot's licence.

Marie Marvingt of France designed one of the first air ambulances, dedicated her life to making air ambulance services a reality, and created the original flight nurse training program. Bessica Medlar Raiche of the United States built her own airplane, which she flew solo on September 16, 1910. She is credited for being the first woman to fly an airplane solo on the American continent. In 1913, in addition to becoming the first woman to hold a pilot's licence in Russia two years earlier, Lidia Zvereva owned and ran an airplane assembly plant with her husband. Since these early times, women have continued to contribute to the aviation industry.

RAAUS GETS INVOLVED

Great news for any Australian women or girls interested in learning to fly but who don't know where to start.

During March, any new female candidates who join RAAus as a flying member will receive flying lessons with their school to the value of their annual membership fee!

What is also exciting is that many RAAus schools are also jumping on board during the Women of Aviation Worldwide Week and have planned events (with their own special offers) to encourage more women to participate in the industry.

Spread the word. Now is the time to encourage the women in our community to get involved in aviation. Visit an event and support your local school. ✈️



Proud instructor, Martin Hughes with Tolina



A PERFECT VALENTINE'S DAY

BY TOLINA DAVIS
YEAR 11 STUDENT AT SNOWY MOUNTAINS
GRAMMAR SCHOOL, JINDABYNE, NSW

On February 14, a day for celebrating those you love, I celebrated my love of the skies and flew solo for the first time. It was an amazing experience.

I've studied aviation theory at Snowy Mountains Grammar School for the past three years and last year was thrilled to receive a \$1,500 scholarship from Jindabyne Aero Club. This generous funding gave me the opportunity to begin my flying career.

Having completed 13 hours of dual instruction and sitting the theory exams, Martin Hughes, my instructor from Alpine Aviation Australia, flew a dual check flight with me on the day before, which included several circuits and a simulated engine failure, before he informed me that he considered me to be ready to go solo.

We decided to wait until the next day so my parents could be there and on Sunday morning we rolled the Jabiru out of the hangar and completed our pre-flight checks. After three circuits, Martin was happy to let me go solo.

With a few nerves, I carried out my pre-take-off checks, lined up and completed my final checks; runway, flaps to half and wind direction - I pushed in the throttle and was away.

In Jindabyne, wind direction and turbulence off the mountains are two of the biggest considerations pilots encounter. Immediately after I became airborne, the wind changed direction through 90 degrees, resulting in some turbulence on the final approach which required me to call on additional skills Martin had taught me to control the aircraft and land safely.

I heard "congratulations Toli" over the radio and couldn't believe I'd actually completed my first solo flight and landed safely in one piece.

On clearing the runways, I made my final call and checks before cutting the engine and letting the adrenaline flood through me.

Thank you to Martin, my instructor, and Mr. Ryrie, my SMGS teacher who runs the aviation studies program, who have supported and encouraged me to realise my dream. ✨

"Martin was happy to let me go solo"



'Off I go'



Old and new for Old Station

BY LEONIE CREED

THERE is going to be even more to see and do at the 25th Old Station Fly-In and Heritage Show on the weekend of May 22-24.

If you haven't been before to the Old Station airfield near Raglan in Queensland, then you should come along. It's the favourite event of the year for many pilots.

Aircraft of all sizes and shapes fly in, park up, and become part of a large and impressive static display. We have confirmation the RAAF Roulettes and our Red Bull Air Racing champ, Matt Hall, will be coming again this year. Just one air display is planned for Saturday afternoon (3pm) which will also feature the Rolph-Smith family with their T-28 Trojan and a couple of Yak-52s. Paul Bennet put on a great show last year with his Grumman Avenger and 400HP Wolf Pitts. He will be here again this year too.

The paperwork is being done at the moment, but we always get good support from Richard MacDonald, Troy Smith and Bryan Carpenter with their great displays. There will be more time this year for a joy flight or adventure flight if you missed out last year.

Six years ago we changed the event to include a large truck show with trophies for 'Truck of the Show', 'Best Working Truck', 'Best Presented Modern Truck' and 'Best Presented Heritage Truck'. The public actually judges the 'Truck of the Show' and, after doing that, everyone gets to wander past all the

parked aircraft and spend a while watching the heritage tractors competing in their various HP categories to see if they can out pull our state-of-the-art Tractor Pulling Sled. Trophies are presented to the winners.

We get great support from all the wonderful people who bring along anything heritage, including old engines and machinery. There will be food and drink stalls and entertainment for the children. We will even have a fashion parade about lunch time Saturday. There is usually a good line up of stalls, near the tractor pulling area, selling everything from old tools to art and craft work.

Fireworks are planned for Saturday night, with a licenced bar running, then the Clyde Cameron band takes over 'til late.

Sunday morning we will have something new - a large heritage car show. All the various makes and models will be lined up with a special display of All British cars. The vintage motor bikes will also be close by. We will have a couple of trophies for the cars and bikes, so polish up your machine and come along and enjoy the weekend.

Thanks and gratitude is always extended to all of our wonderful sponsors, supporters, dozens of volunteers and, of course, the thousands who come along to make the event happen.

Again this year, proceeds will go to aid the Capricorn Helicopter Rescue Service. ✕



Pictures: Damien Freiberg, CQ Plane Spotting Blog



Above Evans Head



Peter and his ever patient ground crew

“Several times Lynette in the car was ahead of him”

Perfect ground crew

BY BRIAN BIGG

ONE of the many visitors to the Great Eastern Fly-in at Evans Head in January was Snoopy the Drifter and his owners Peter Swift and partner Lynette Frazer.

Peter and Lynette have only owned the Drifter for a year. Before then it was owned by RAAUS board member, Rod Birrell, in Victoria. Rod had owned it for 10 years but hadn't flown it much.

Peter had dreamed for years of owning a Drifter. But when he finally found Snoopy and bought it, it took him four attempts before he was able to finally fly it back to Maitland.

“First the engine played up,” says Peter. “Then the weather played tricks with us.”

“Lynette proved to be the perfect ground crew for me,” says Peter. “She went south with me each time in the car. It's a long way.”

It took three days for Peter to fly home, Lynette following along by road. Along the way they would stay in contact via handheld radio.

Not saying that the Drifter is a lazy way to

travel, but Peter reported that several times on the journey Lynette in the car was ahead of him.

The two now fly together most weekends. Peter says Lynette is plane crazy, just like he is, but she can only take an hour before she needs to get out and rest.

“On long trips I normally restrict the legs to under two hours.”

She has no plans to get a Pilot's Certificate of her own, but Peter is encouraging her to undertake a partner's course, to learn what to do to get the aircraft onto the ground safely in case he slumps at the wheel.

“In the air, she always refuses if I ask her to hang onto the control stick to allow me to look at a map or check something in a bag, so obviously she is not keen to fly it herself.”

Lynette is actually a competitive runner and travels around the state for meets. Where possible the couple tries to combine her events

with a reason to go flying there.

“It's not always possible,” says Peter. “The weather tends to play a big part, especially at the speeds we travel.”

On the way from Maitland to Evans Head, Peter stopped at Taree and again at Coffs Harbour. Lynette trailed him in the car and was there whenever he landed to help him refuel.

“I always take the fuel drums in the aircraft so she doesn't have to put up with the fumes in the car, but it's fantastic when I land to know she is there with the car to get me to the service station.”

After two great days at Evans Head and another one with friends at Casino, they went home to Maitland the same way they had travelled north, with Peter trundling along in Snoopy overhead and Lynette trailing in the car.

It's a perfect flying partnership really, made possible by a passionate pilot, an understanding partner and a Drifter named Snoopy. 🍷



Peter Swift and Snoopy

Pioneer 200 Hawk - 300 Hawk - 300 Kite - 400

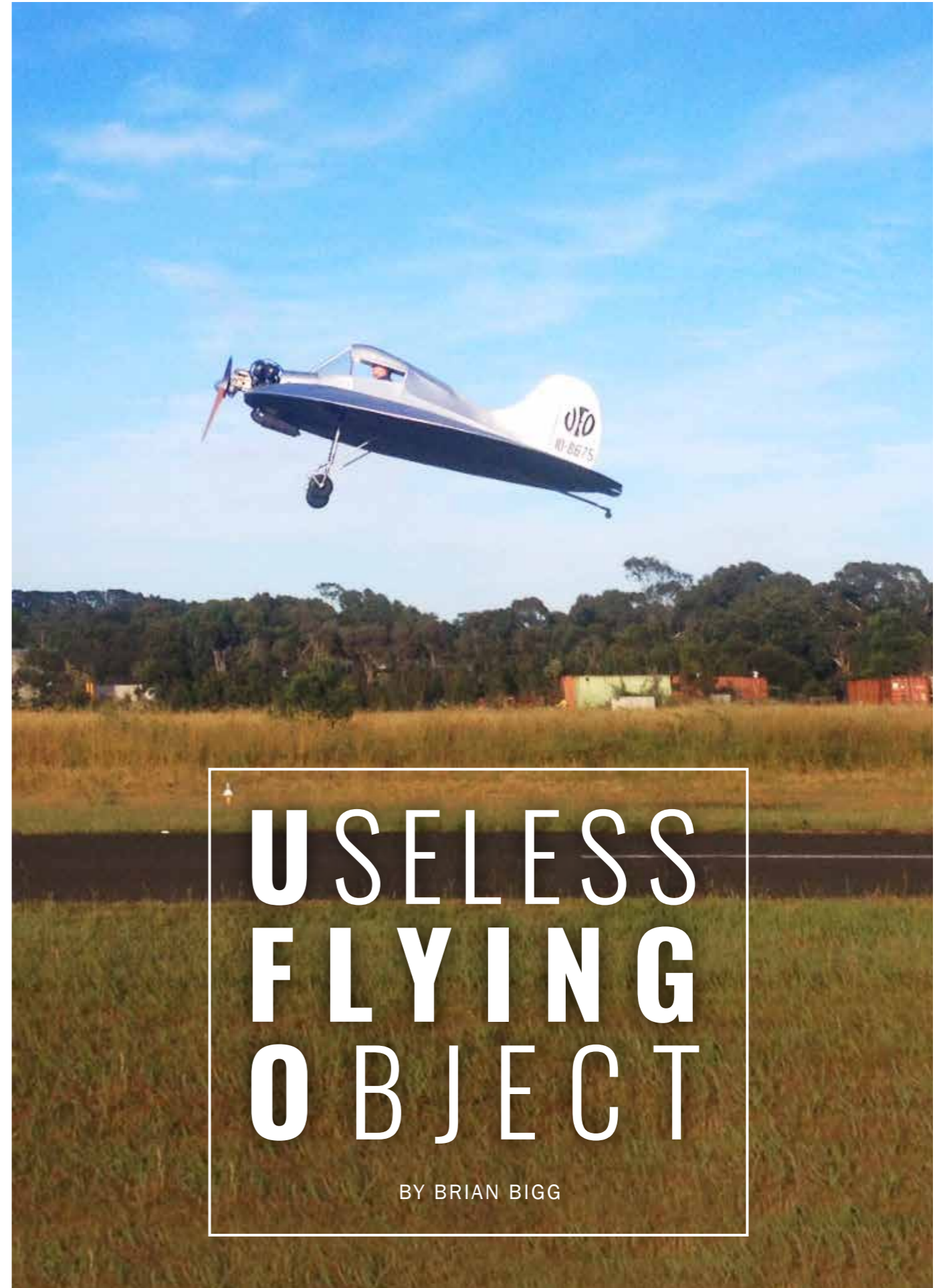
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DON'T panic Tyabb residents! That strange aircraft over your runway is not an alien making its long overdue invasion of our puny planet (although that is inevitable).

It just David Rowe in his UFO Number 5. Probably the strangest looking aircraft on the RAAus register has been flying since the start of the year.

In his day job, David is a level IV maintainer and LAME. He is normally to be found elbow deep in Mustangs, P51s and other great beasts of the air.

But in his own time, he doodles with aircraft designs using a pencil and paper. He says before he started on making a real aeroplane, he spent a long time designing model aircraft. He has a thing about flying wing designs - none of his aircraft have tails - and he likes to keep the same aerofoil on each of his designs (he has 10 to his name).

UFO Number Five has been the result of almost 20 years of flying and fiddling with the design. UFOs One, Two and Three had various degrees of success. Number Three won the 'Most Innovative Design' award at Natfly three years in succession.

"The fourth never flew," says David. "It was going to be my first two seater".

"With each of my UFOs, you get aboard by climbing in and out from underneath. It makes a great show at the airport because people always stop to watch you taxi in. It always gets them talking when they see me climb out from underneath.

"When the wife and I climbed into Number Four for the first time, it was a struggle and we decided it was too hard, so I threw it away."

David went back to a single seater for Number Five, and made it the first of his designs to have a retractable undercarriage.

"It has much the same performance as the earlier models, but having the legs tucked away makes it look much better in photographs," says David.

David has been rather well-known in RAAus circles since he started designing and building these weird looking aircraft back in the 1990s.

"One of my friends gave me an article about low aspect ratios and how the efficiency rises and falls depending on how high or low the aspect ratio is. I noticed the efficiency peaks about 1.25, so I built a model based on that aspect ratio and chucked it around the yard.

"It flew pretty well. So I knocked up UFO Number One and put a 28hp engine in it. It got off the ground and flew about powerline height. After a couple of flights though, I realised it was very underpowered, and it looked daggy, so I salvaged what I could from it and threw the rest away.

"For Number Two, I installed a Rotax 503 and made it look a lot nicer. It was tail heavy but flew quite well. If you let the stick go it would pitch up or down, which meant the weight was too far back.

"I flew Number Two for two years, but eventually threw it away as well. For Number Three, I moved everything forward. That solved the stabil-



David's day job parked beside his hobby

ity issue, and the aircraft felt more solid. It didn't leap off the ground like the second one had done but it flew very nicely.

"Number Three was also the first of the UFOs to have tricycle gear, so it was more docile on the ground."

David flew Number Three for 13 years, including several trips from Wee Waa to Narromine for Natfly, where the aircraft drew crowds of admirers.

The flight from Wee Waa to Narromine is only a couple of hours, but the UFO made the journey a nightmare.

"It was very uncomfortable over long distances," admits David. "I would often climb out from underneath the aeroplane at Narromine and swear I'd never do it again. I learned to stop at Coonamble just to give my legs a break.

"The cabin was a snug fit for me. Most pilots couldn't even fit into there, though several other



Which is the model?

"David admits it was his wife who came up with the name"

pilots did fly both Numbers Two and Three over the years."

David put pen to paper again to come up with UFO Number Four. When he relocated to Tyabb in Victoria, he put it together but, as we already know, this one didn't even get off the ground.

So now he is up to Number Five. Being a tail dragger, like Numbers One and Two, it's a bit more finicky when taxiing compared to Number Three. But after take-off, David manually winds up the two wheels, three turns on the crank for the left, three for the right.

The retractable undercarriage makes the UFO look nicer in photos, no more gangly legs ruining the image of a strange looking alien spacecraft, but tucking up the wheels has no real impact on performance.

David reports that Number Five has brisk acceleration and seems to climb quite enthusiastically. He doesn't know for sure because it has no



The aliens are coming!

VSI. Just an altimeter, airspeed indicator, tacho, fuel pressure gauge and fuel quantity gauge. That's all you need really.

The aircraft cruises at between 85 and 90kts and, like most of our aircraft which have light wing loadings, it gets bumpy in turbulence.

Number Three had a 60 L fuel tank so David could travel from Wee Waa to Narromine, but in Number Five, because he has no plans to go anywhere, he's only installed a 20 L tank.

"I think I'm going to regret that decision," he admits. "I've only done flights around the field so far, but it's going to mean stopping quite regularly if I want to go anywhere else."

There are no flaps on Number Five either. In the earlier numbers, there was an elevator on the back and a small aileron on each side. In this one there is one combined control for both elevator and aileron.

In the circuit, when he pulls the power, it drops quickly. It might look strange, but it acts like any other ultralight as it approaches and touches down.

Since these photographs were taken David has already changed the design of the rudder. The fin is lower (he salvaged the fin from Number Three).

David has never made any attempt to work out how much his aircraft have cost him or how much time he has spent working on them.

"It's a personal thing," he says. "When I finish with them, I throw them away. It's very satisfying."

"It's one of the joys of the 95.10 category. It allows you to build something unusual as long as it stays below 300kg and is a single seater.

"A lot of people come along and look at the UFO and admit it is interesting. But most won't build anything which looks weird and most don't like flying wings. Only a few weirdos like me like to do things differently."

And is Number Five, which is only just taken the air, going to be the last of the line?

"In fact I've just built a balsa wood model of what might just be a two seater Number Six. I'd need a Rotax 913 before I could think about building it, but you never know."

And David admits it was his wife who came up with the name.

"She called it a useless flying object," recalls David.

Useless? Never. It's RAAus at its most stripped down, grassroots, bottom-up, seat-of-the-pants best. Should be more of it. ☺

Just another week

BY PETER & ANNE MCLEAN



A 'chalk and talk' day



Dual instruction



Formation flying



Brekky



A great day



heading home

"There always seems to be more paperwork"

YOU know, I have this comment said to me a lot... "You are so lucky to have this job!"

I love it, but you know the harder I work, the luckier I get. Yes, I guess I am lucky. I get to fly most days of the year. If I am not training a new pilot, or helping already licenced pilots to hone their skills, I get to fly one of our three aircraft with my wife on board, and I wouldn't have it any other way. It has been my life and I have to say - I love it.

It's Monday and the sun is coming up. The Yarrawonga Aerodrome is coming to life. Hangar 19 is also open for business with the front gates opening along with the two hangar doors, one going up and the other sliding to the side. The sun streams in and the hangars are filled with a golden glow. But it is summer in Yarrawonga and the farmers are harvesting their crops, so that golden glow only reveals how much dust has settled on the aircraft overnight. So, after a moment appreciating the beauty, it becomes a matter of getting the dust off the aircraft before the students arrive.

I will pre-flight all three aircraft long before the students arrive, and yes, as a CFI, I have my own set of tricks to play on the students before they come to do their own pre-flight. Next it's time to look at the paperwork and

see who's who in the zoo today. How many students are up for circuits, or is it a day for flying navigation flights? Which aircraft is best for which student, and how much fuel will be needed in each aircraft for the days' flying? Then it's time to check the weather and NOTAMs which needs to be done to determine whether we fly in one direction or another, or if we fly at all.

Ok, time for breakfast, and if I'm lucky, I will get something to eat. If not, we work until morning tea time and then I get to eat. Sometimes the students bring a feast with them, which means he or she will advance more quickly... only kidding! We did have a student who brought hot chocolates and cakes in each morning. I had to stop her. We were beginning to get over MTOW.

It is now time for the first student to arrive. Most of them are so keen they arrive up to an hour early! Yes, this is why I am up very early. I need to beat the keen students. Next it's briefings, pre-flights and then the engines start up. The air comes alive and so does the radio. The flying day has started.

Hour after hour the aircraft go up and down and round and round. Students come in and fly, then they sit around in the hangar or head for home,

waiting for their next training session. At times I hear the students talking among themselves, and they always comment to a newer student about their experiences, and how 'this' and 'that' is done to overcome a potential problem which may arise. I like this. It's good to see students helping each other out. If the weather is not suitable for flying, we look at doing theory for the day, so it becomes a 'chalk and talk' session.

It's now the end of the day and the radios final begin to go silent. The aerodrome is starting to close down for the night. It's now time to clean the aircraft and make sure the maintenance is done for the next day of flying. The aircraft are all in the hangars and the doors are closed and the last student heads home. My job is far from over. Once the students leave it's time for the paperwork. There always seems to be more paperwork than there was the day before. Finally the lights go out and the hangar falls silent. The aircraft are now sleeping after another hard day.

Its 9pm, time for dinner, and, "Oh, no!" I have missed that TV program I was going to watch. Never mind, I'll see it another time. Tomorrow is another day. Or is it? The days become a blur, as the routine is still the same

no matter what day it is. Except for Thursdays. On Thursdays we close early and friends and anyone else who is around, head to the Sydney Hotel for dinner and to the movies. We have been doing this for the past two years. I like it, because it gets me away from the aerodrome for the night.

It's now the weekend, and, just occasionally, there are no students at YFT. I should shout "YES!!!!", but students are my livelihood, although it is nice to have a day to yourself now and then. When we get one, it's great. Past students who are now good friends, come up and we go flying for fun. We may do formation flying as Shadow Flight, or we may fly to another aerodrome for breakfast, or just go for a flight around the local area. It doesn't matter. We are all just having fun in the sky and that's why we all became pilots.

So that's why I feel I am very lucky. I have a great life, taking people on their pilot's journey. Its why I go to bed on Sunday night, happy in the knowledge that I'm going to be up before dawn again Monday morning to start another week, just as good as the last. ☺

Why a wheelbarrow is bad

BY ROB KNIGHT

SCENE 1: A fine day with a light wind blowing across the runway at about five knots. A light aircraft is on short finals, airspeed is just a few knots fast and the aircraft, tracking slightly, is astride the centre-line and a bit high. The aircraft reaches the flare point further into the runway than the pilot likes so he decides to get the wheels onto the ground where he will have some braking.

Scene 2: Inside the cockpit, the pilot hasn't allowed the aircraft to float as normal to wash the airspeed off. He flares just enough to let the aircraft touch down on the mains and nose wheel simultaneously.

Scene 3: From outside, the tyres squeak and the aircraft bounces gently. You can see the trailing edge of the elevator move down as the pilot pushes the stick forward to hold the aircraft on the ground. The nose is forced down onto the nose wheel and the nose wheel suspension flexes as the leg shortens. The aircraft has begun to drift slightly across the runway with the crosswind.

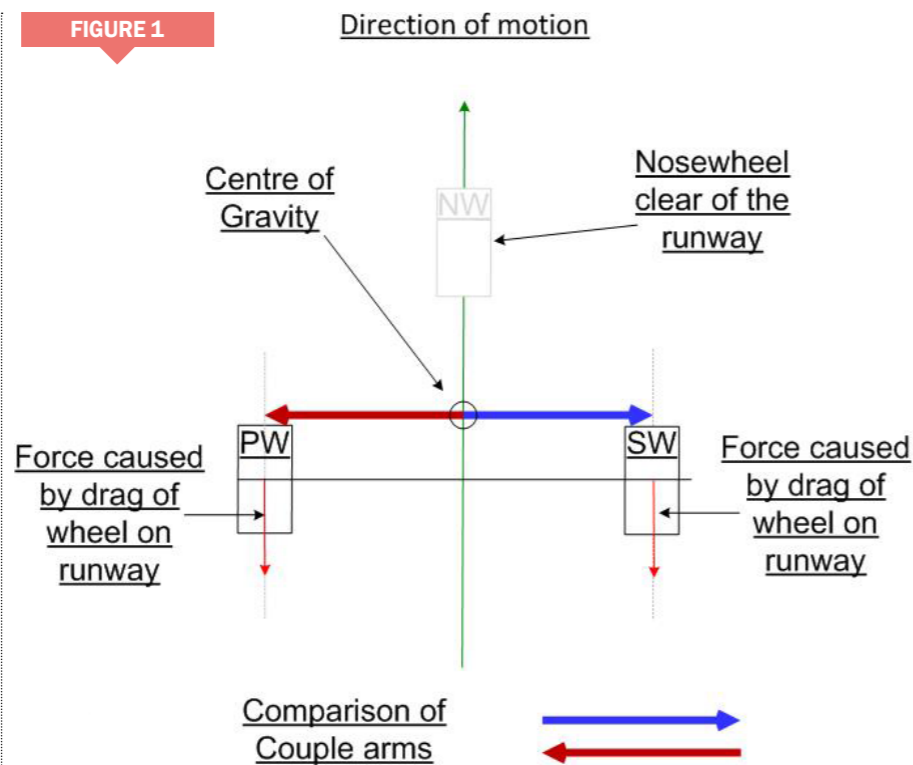
Scene 4: Inside the cockpit, the pilot reaches for the brakes and applies them firmly. Too much of the runway is behind him so he presses the stick further forward and applies even more pressure on the brakes.

Scene 5: From outside, the main wheel leg lengths extend as the tail rises and the nose pitches even further down. The main wheels stop rotating as the traction diminishes; the weight has come almost completely off the main wheels. Directional control is lost - falling airspeed has robbed the controls of their effectiveness and any chance of useful differential braking is gone- the braking wheels are virtually off the ground and, anyway, the pilot is too engaged to try to use them. The aircraft continues to drift further away from the runway centre line.

Final scene: The aircraft suddenly snaps and yaws violently into wind, pivoting around the point of contact of the nose wheel with the runway. The nose leg fractures and collapses. The prop strikes the ground and bends backwards as the cowling crumples and tears away beneath the engine. The tail and windward wing rise and the aircraft slowly topples tail over nose to lie upside down on the runway. There is silence except for the crackle of bending metal as the wreck settles. There is a strong smell of petrol in the air.

Wheelbarrowing is a dangerous condition which occurs when the weight of an aircraft becomes concentrated on the nose wheel during a take-off or landing roll.

On take-off, the common cause is the pilot holding the airplane on the ground too long, particularly when a crosswind is present. When this flawed technique is used, the forward stick which holds the airplane on the ground by pitching the nose down, unloads the main-wheels, transferring



the load to the nose wheel. This extra heavy nose wheel loading compresses the nose wheel suspension and forces the nose wheel to remain in firm contact with the runway.

In this condition, any yaw will set up a couple which will turn your airplane, and your very world, upside down. All directional control will be lost and the airplane will trip over its nose wheel.

In reality, there is no cause to keep an airplane on the ground after it has reached its VX (best angle of climb speed). Indeed, there are very good reasons to be airborne before this figure is reached. If a pilot considers that he/she should hold their airplane until attaining its VX before lift-off, then the flight should be cancelled or postponed until better conditions exist.

Wheelbarrowing is more frequently an issue during landing. Commonly, it results from approaching too fast and then touching down too flat. As the rebound from the undercarriage tries to make it fly off again, the pilot takes the stick forward to hold the aircraft on the ground. The applied forward stick will pitch the airplane nose down, unloading the main wheels and loading the nose wheel instead. With the aircraft main wheels on tip-toe, braking will be lost because the wheels will have insufficient weight on the tyres to provide traction for brakes to function. The nose wheel, still in firm contact with the runway, will suffer substantial drag, and any lateral movement will create a powerful couple which will yaw the airplane and cause it to pivot violent-

ly about its nose wheel.

To get a grip on this topic, it is necessary to be clear on what a 'couple' is in this sense.

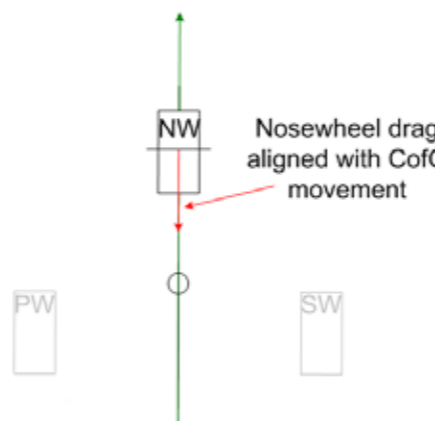
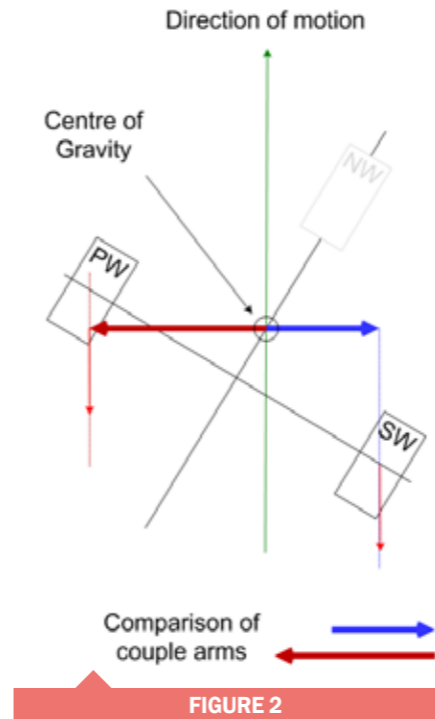
A couple is a force acting about a point. The magnitude (power) of a couple varies with either a change in the power of the force applied, or a change in the arm of the force. A couple can only be opposed by another couple.

In a normal landing, when the main wheels touch the runway with the nose wheel clear, two couples are generated by the contact the wheels have with the runway. The magnitude of each couple is determined by the drag force of the tire/wheel and the length of the couple arm - the distance between the point of application of the drag force and the aircraft centre of gravity.

Assuming the same drag applies to each wheel, when the aircraft is pointing in the same direction as it is travelling, the couples are equal (red and blue couple arms are the same length) and no yaw will be caused by the interaction. This makes a nose wheel equipped aircraft easy to control on the runway because it is directionally stable and its forces try to keep its nose aligned with its direction of movement without pilot input. See Fig. 1.

As Fig. 2 illustrates, this is a stable action because it yaws the aircraft back towards its direction of motion and, as it does so, the couple arm shortens, diminishing the force as the alignment completes. In other words - the airplane wants to move in a straight line. The weight and drag

Using the correct take-off and landing technique provides a directionally stable aircraft. Drag from the wheels in contact with the runway provide a directionally corrective force.

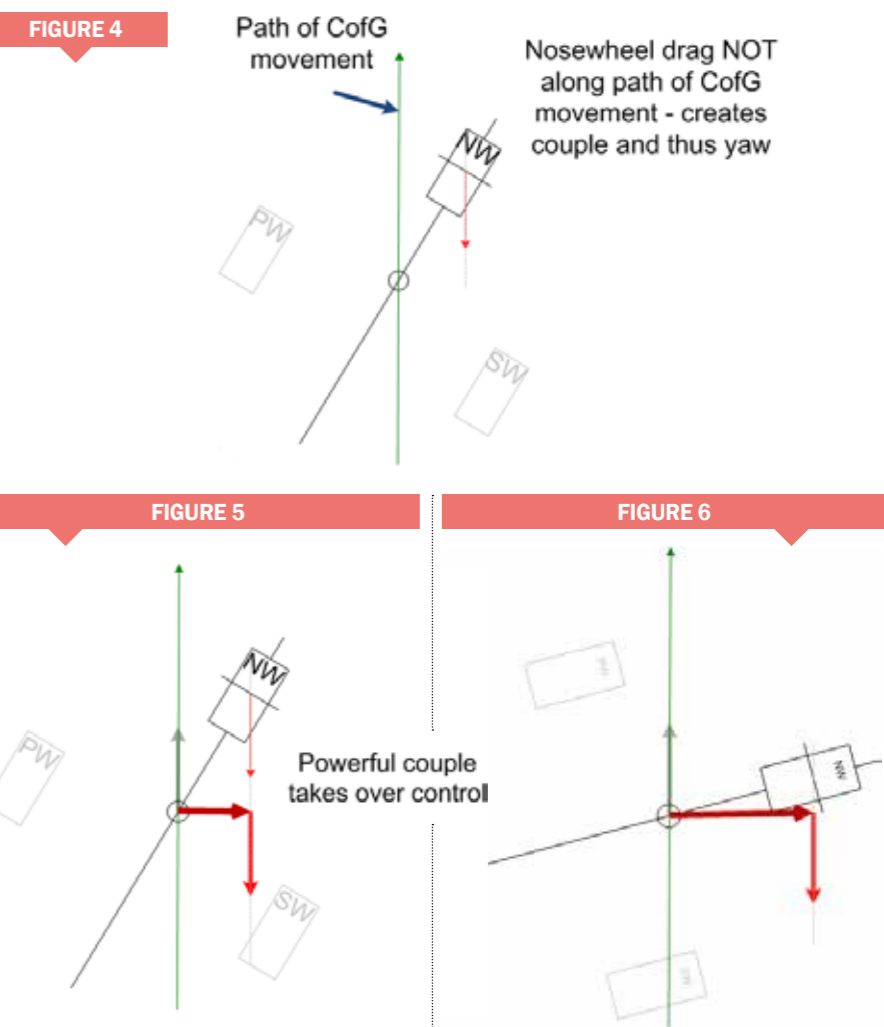


forces tend to keep the airplane moving straight.

However, this will only be the case while the main wheels are on the runway and have traction. If the main wheels are not in contact with the runway and the load is on the nose wheel, an entirely different situation exists.

If, while the aircraft has weight on the main wheels, the nose wheel is clear but the aircraft nose is not pointing in the same direction as the aircraft is moving, then the couples will not be equal - the leading main wheel will have a greater arm and therefore the more powerful couple. This, the red couple as illustrated, is more powerful than the blue couple, and the imbalance provides a force to yaw the aircraft's nose and align it with the direction of motion.

However, when the nose wheel is on the run-



way and the main wheels aren't, the situation becomes critical.

Fig. 3. If, in this state, the drag generated by the nose wheel is directly aligned with the centre of gravity and the direction of motion, no couple is formed and there is no yaw force generated.

However, immediately the nose wheel diverges from its alignment with the centre of gravity, it will instantly create a couple which generates the unstable yawing moment. For example- See Figs 4, 5, & 6.

Fig. 4. If the nose wheel has moved to the right, the drag force caused by nose wheel contact with the runway is now no longer aligned with the centre of gravity and direction of motion. A couple is formed.

Yaw creates an unstable condition which can quickly become an out of control situation.

Fig. 5. The grey force of the aircraft's mass acting through the aircraft centre of gravity is moving forward while the red drag force created by the drag on the nose-wheels contact with the runway acts rearwards. This will savagely yank the aircraft into a right yaw state and, as the yaw takes effect and the angle change increases, the arm gets longer and thus very quickly more powerful.

Fig. 6. The magnitude of the couple has increased greatly with the changing angle. Not only is the arm longer, but the front wheel has

less rolling ability and the now scuffing tyre has greater drag than it initially had.

The situation is now serious. The aircraft still has just the nose wheel on the runway and the yaw forces are now beyond correction by the rudder. Removing forward pressure on the stick and then adding full power may allow the aircraft to fly off, but as curative action it is doubtful at best. Effective control is lost and there are no remedial options available to the pilot at all.

This is, in effect, a ground loop condition and the side loads on the nose wheel assembly will quickly exceed their design limits. The nose leg will fail. The prop may strike the ground and disintegrate. Parts of the propeller may enter the cockpit with fatal consequences. This can ruin your whole day. On the bright side, the landing will be short!

While the best correction is to never get into this condition in the first place, an immediate go-around before substantial yaw is experienced can resolve the problem - but early recognition of the pending problem is paramount. The correct landing technique has the main wheels touching first and the nose wheel settling only in such a manner that a positive load is retained on the main wheels as the speed washes off.

As you can now see, there are very good reasons for this. ☺

Water takeoffs

BY VAUN MONCUR



APART FROM YOUR NORMAL WARM UPS AND PREFLIGHT CHECKS, YOUR FIRST CONSIDERATION SHOULD ALWAYS BE “HAVE I GOT SUFFICIENT FUEL?” IT’S A LESSON WELL IMBEDDED IN MY MIND FROM A FATAL SEAPLANE ACCIDENT.

I ALWAYS store my plane with full tanks. There is less chance for condensation and you are always ready to go. Remember recreational seaplane pilots take off and land on water, well away from the normal airport refueling stops.

For long cross country trips, some pilots also carry collapsible fuel bladders to top up at the servo in town by a river or across from the lake. Seaplane pilots actually have more refueling options than land pilots do. I mostly run my 100hp 912 Rotax on 98 octane. It burns 18 litres an hour and saves my oil life. Step taxiing across a lake is as much fun as flying.

I’ve tried fishing from my aircraft but I haven’t the patience - I just love flying. Recreational seaplane pilots do multiple touch and goes each day, often one after the other. It’s important you check which wing tank you have selected and swap fuel tanks every 30 minutes. Obviously that keeps your aircraft in balance, especially important when you are stationary and floating. My Garmin 550 GPS is set to remind me every 30 minutes to swap tanks (I have to be mindful that if I switch my engine off, the Garmin will start recording time again from scratch).

Record your engine hours each morning, then you can judge your fuel consumption exactly along the way. Full fuel in my Super Petrel LS is 90 litres, that’s five hours, or 4.25 hours safe. I rarely fly over 5,200 rpm. Generally I fly low and slow, looking for my next water landing opportunity, so I know I’ve got more than five hours endurance.

In choosing your take-off run across water, consider the wave height carefully, along with wind direction. You don’t have to take off directly into the wind, nor should you ever take-off directly into larger waves. Even with a steady tail wind, you can safely take-off downwind in a seaplane, as long as you have plenty of smooth water and no obstacles ahead. Seaplanes often have the luxury of very long take-off areas, across lakes, rivers and bays.

Uneven wave heights are dangerous. Do not land in open water or the ocean. Your seated position in a floating hull, while in displacement, is very low to the water, which doesn’t always allow a clear view of water conditions ahead. In Sydney Harbour’s Rose Bay for instance, you can often encounter a rogue wave from a ferry which has gone past minutes before. Striking one before you’ve achieved take-off speed can be dangerous. You must always consider the extra weight of your (chubby) passenger, because he or she will keep you thumping along in rough water for much longer than when you are alone. Rough water take-offs are difficult and should be avoided. They can cause more damage than just propeller pitting.

There is one thing both float planes and floating hulls have in common. From a stationary displacement position in the water, they must both climb out over their own bow wave to get onto the step, or to a planing configuration. With my floating hull, this means full throttle, joy stick full back. Within a few seconds, once over that first big bow wave, move the stick forward, then continually adjust it for level planing until you build



up to take-off speed. I’ve always been a fan of letting my aircraft take-off by itself, unless avoiding a wave. With float planes you need to lift one hull first to break the suction. With my Super Petrel, I like to let the aircraft lift-off when it’s ready and has coped with the load, temperature and altitude. If you need to get off the water more quickly, you should first consider another, longer, take-off direction. Step taxi to another spot and reconsider your options. Just like a runway, the amount of lake behind you is of no help. Many of your take-offs may be towards trees or mountains. Your climb rate won’t maximise before you gain maximum airspeed for the particular climb. This climb is obviously affected and compromised by high temperatures and altitude. Your take-off distance at Lake Eucumbene in the Snowy Mountains will be much greater than at sea level, by as much as an extra 50m (There are many stories of seaplanes landing at Lake Tahoe in the US Rockies and not being able to take off again). If you watch most seaplanes take off, they never climb out too steeply. My advice is, once airborne from water, build up your air speed, and only then change direction or climb out steeply.

On a tiny lake, you have the option to circle while doing your run up, to gain planing speed prior to take-off. Floating hulls are more suited for

this manoeuvre, as they can bank or roll in the water, so they can make a very tight turning circle. Unlike your runway, water take-offs can have floating hazards. These can easily be avoided with a keen eye ahead once planing. Be aware of shallow water and always look out for that speeding jet skier, who has no idea what he’s doing and who thinks its fun to speed along beside you taking off.

One great reason to buy a seaplane is that, unlike our land plane cousins, we have permission to fly Sydney’s R405. This route takes you down Sydney Harbour, over the south pylon of Sydney Harbour Bridge and out along the Parramatta River.

WHICH TYPE?

There are just four two-place floating hull seaplanes available in Australia. The Seamax, the Super Petrel, the Colyaer Freedom and the SeaRey.

If and when the Icon A5 will be imported and approved here is anyone’s guess. All models are manufactured overseas, imported from Spain, Brazil and the US. A recent fall in our dollar relative to the greenback has seen imported floating hull seaplanes skyrocket in price from all around \$130,000 three years ago, to around \$200,000 today.



Naturally this has dragged the second hand prices up as well.

The SeaRey has been the most popular but, until recently, has only been available in kit form. The much larger four seater US built Lake Buccaneers in Australia are all 30 or more years old and now out of production. As an aluminium aircraft, their owners are forever chasing corrosion problems caused by landing in salt water but most are generally well cared for and good value for money. The more modern designs are all fibre glass or carbon fibre hulls. They do not let in water like the aluminium seaplanes do.

I’m not going to suggest which one you should buy, they all have their good features. The surprise to me is that more people didn’t jump in when these seaplanes were all around \$130,000 three years ago. Admittedly an equivalent sized Jabiru was around \$75,000 at that time. That’s a sizeable difference. Where is this leading? I think there is now an opportunity for a locally made two place floating hull. Are floating hull seaplanes as safe as small recreational planes that only land on runways or into paddocks? I believe they are. 🙄

NEXT MONTH Seaplane rescue

Bobby & the eagle

BY MIKE GREENWOOD

MY dog, Bobby, and I took off in a Glasair Sportsman from the Gold Coast destined for home base at Moruya on the south coast of NSW. We were heading home for Christmas, a journey of 1,500kms.

Early in the trip we flew up high, but were forced down to 6,000ft by solid cloud cover and we stopped off at Mudgee for fuel.

We'd been flying for three hours, heading south-east directly for Moruya, cruising on autopilot at about 140kts at 5,500ft to stay below solid cloud when...BANG! An explosion, followed by a rush of loud air and the sound of the engine screaming.

I saw an image of large bird spread across the windscreen just as it smashed straight through, hitting my face. The impact left me unable to see or hear - my face and eyes were covered in blood - my headset ripped off in pieces. The plane began to fall out of the sky.

In the first moments after the collision I was blind. My first thought was to slow down - I figured slower was better for controlling the air rushing at me, but I couldn't see the airspeed indicator and I didn't want to stall. I wiped my right eye and got a brief glimpse of the tachometer which showed 2,700rpm. We continued to fall.

I worked on clearing my vision. I had come to the conclusion that my left eye had been destroyed by either the bird or the windshield and I thought to myself "stop wasting time on it". Instead I began to clear my right eye with my shirt. It was a decision which saved my life. My first glimpse through the blood showed I was about to hit the mountains.

I pushed everything forward - power, pitch and mixture, and started pulling on the stick.

This way, still barely able to see what I was doing, I managed to regain some sort of control and fought the aircraft level just above the ground. I didn't know if the wings or tail were damaged so I kept it straight - aiming towards gaps in the mountains ahead, trying to get it to climb out of there. I got the aircraft stabilised (sort of) and managed to make it climb a little.

Then I saw a possible creek landing next to a paddock over a hill I had scraped by, but I made the decision instead to continue trying to get the plane to climb and steered over a saddle.

That first few minutes while blind were the worst of it. The deafening wind rushing at me, the engine screaming and no headset, while the plane plummeted for the ground. It was like being in the middle of a continuous explosion. I really did not expect to survive.

However, it did eventually occur to me that, despite having to wrestle with the controls, I was not spinning or banking, so perhaps the wing and tail damage was not too bad, even though my vision through the blood was not good. I climbed some more and, eventually away from the ground, I knew I had a chance.

I then remembered I had my canine co-pilot, Bobby, strapped in behind me. I looked back. He was unharmed and calm. Bobby's attitude helped me focus on doing as much as possible as fast as I could.

I kept clearing the blood from right eye and started to see more of the instruments, so I could settle engine and airspeed to climb. But being able to see more didn't solve all my problems. The cockpit and screens were all covered in blood and I couldn't work out my exact position on the blood covered maps.

I thought I could see the remains of two birds jammed beside me (which later proved to be beak and pieces of one large eagle) and I was covered in



"I texted my friend in the US again to make sure he would look after Bobby if I didn't make it."

The messed up aircraft

feathers, flesh and blood. I had no idea which of these were mine (probably not the feathers), but I knew the left side of my face had been hit.

I felt for the headset plug on the roof and followed the lead with my hand, hoping to find the headset which had been blasted off my head. But at the end of the cable on the floor was no headpiece, just some wires with the boom mic still hanging on and a broken ear cup.

I pushed the transmit button on the joystick anyway and shouted a mayday call into the remains of the microphone, more in hope than in expectation the radio was still working. In any case, I could not see through the blood on my maps to give my exact position.

With no headset to communicate with, I pulled out my phone and sent texts to a friend in the US, knowing he could contact airport control and emergency authorities. While texting, I cleared the blood from the one screen which appeared undamaged - the iPad fixed to the roof. It revealed I was heading towards Moruya, still over an hour away and over mountains. I tried to steer the damaged aircraft further right towards Canberra, away from the mountains.

I could also see a yellow (indicating urban) area behind me to my right which I guessed was maybe Bathurst, Orange or possibly even Goulburn. So I texted a new plan to my friend in the US and tried another mayday call.

I had fought the auto pilot continuously. It could not hold the aircraft up against the force of the air rushing into the cockpit through the smashed

windshield. But I knew I had to disconnect it to turn around to find an airport. I was holding a high nose attitude with low airspeed and full power, pitch and mixture. This was slightly better for air rush but the noise was horrendous. I used half flaps and didn't let the speed fall below 70kts so as not to risk losing altitude or stalling while my vision was still so poor. I also didn't want to force a turn without knowing what damage I had to the wings and tail.

So I disconnected the autopilot and turned very carefully to avoid provoking any wing damage and to keep control against the changing air rush. I thought the town below me looked like Bathurst - I hoped it was Bathurst - and I turned gingerly towards the north of the town, vaguely recalling Bathurst's airport was north east of the built up area. I hoped this was Bathurst - it was.

By good luck I spotted the runway in the distance and crossed over an industrial area, still high. I flew over the airport and tried one last emergency call while checking which runway to use. I couldn't see well enough to spot the windsock, but assumed the wind would be roughly easterly. I carefully made a wide turn overhead at 3,500ft then made a gentle wide circuit and set up final approach for the runway.

I texted my friend in the US again to make sure he would look after Bobby if I didn't make it.

On short final I couldn't see very much but, with some glimpses through



What's left



Just after landing



Bobby stayed cool



The messed up pilot

the wind and my right eye focused on the airspeed, I came in with my heart pumping from the adrenalin. I used lots of runway but managed to get it down in one piece. What a relief.

I looked for a fire truck, but only saw the airport manager's truck with orange light. I retracted the flaps and checked for fuel problems, ready to turn off the fuel quickly if necessary. Then I managed to taxi in and park where directed before shutting down (I took these pictures immediately after climbing out). Bobby was as calm as ever - still with his headset on!

I was surprised when I saw how much blood was sprayed through the cockpit. People came up to the plane and one sensibly called an ambulance. I told people I would refuse to leave my dog if the ambulance wouldn't take him. But the ambos were great and were dog lovers. So we found a kennel for Bobby before going on to the hospital.

Hours later, I discovered I still had my left eye. It was an unexpected bonus. I had already written it off. And the belief it had gone had saved me from crashing into the mountains.

Eagles are beautiful birds. A shame, I guess. It must have hit the prop first, because you'd think the slope of the windscreen would have been enough to deflect it. But the collision speed was up to 400kmph, so it didn't stand a chance.

But it was my co-pilot who got me through it all without panicking. Bobby calms me. Because of him I just focused on the job as best as I could. ☺

Compact Radials

BY ARTHUR MARCEL



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COMPACT Radials is a Canadian based manufacturer of small two-stroke aero engines. The company markets several innovative designs by Italian engineer Guido Zanzottera.

Guido, in fact, was the original proprietor of Compact Radials, selling the company in 1997. Most of the components for CR motors still come from Italy, but some parts are made in their Vancouver CNC engineering facility.

Compact Radials motors have high power-to-weight ratios. This is because they use hi-tech Nikasil coated, alloy barrels. The weight savings are remarkable. For example, their MZ-202 motor is very similar in design to the Rotax 503. Both motors are two-cylinder in-line, with fan assisted cooling. They both have similar layouts with the twin Bing 54 carburetors and the exhaust manifold on similar sides of the motor. They both have CDI twin ignition, and gearboxes which appear almost identical in shape and size. They basically have the same external dimensions and would fit in roughly the same size box. Yet the MZ-202 produces ten more horsepower than the Rotax and weighs about seven kilos less. In the US many MZ-202 motors have been sold to pilots replacing their no longer made Rotax 503s. CR also sells a down-rated version (40hp MZ-

201) to pilots wanting to replace a Rotax 447. Because of its light weight, the MZ-202 is also popular for use in single-seat helicopters.

There are nine models altogether, ranging from the 18hp, single-cylinder MZ100 (100c) used in paragliding back packs, to the 85hp, three-cylinder MZ301. Two of the motors are indeed radials, the three-cylinder SC430 and the four-cylinder SD570, which are both available on special order. There are also belt-drive reduction units for US Part 103 aircraft, where weight is a critical regulatory factor. There are several designs of belt drive available which can save as much as four or five kilos from the weight of an aircraft.

Most CR motors are sold into the US market, where they have been earning a reputation for reliability. Australia is not big business for the company, although they once had a display at the 2005 Natfly at Narromine and sold about ten engines there. Not having an agent in Australia means the motors incur individual freight charges, making them a little more expensive than would otherwise be the case. An adverse exchange rate plus GST doesn't help either.

For more information, www.compactradialengines.com.

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SOME OF THE RADIALS



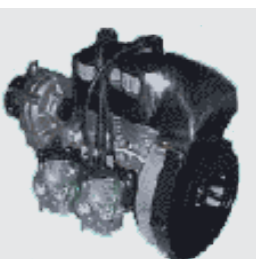
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MZ35 (313cc) Single Cylinder



MZ201 Free air cooled, optional fan (626cc)



MZ202 (626cc) 2-Cylinder Inline



SC430 3-Cylinder Radial

New life for heritage aircraft

BY DARREN BARNFIELD RA-AUS TECHNICAL MANAGER



An amendment to CAO 95.55 was released on February 24, 2015. The amendment will allow RAAus to authorise and permit modifications to RAAus registered Type Certified and amateur built aircraft. This process does not apply to LSA aircraft. These amendments are in the form of two new subparagraphs (1.2 (d) (iv) and 6.1 (f) (iv)).

Apart from this, there are no changes to the existing contents of CAO 95.55 except for updating certain provisions, including the exempting provisions mentioned in section three. The changes only involve removing outdated references no longer in force and replacing these as necessary.

In relation to the amendments of CAO 95.55 which permit RAAus to approve modifications to Type Certified and amateur built aircraft, these were agreed after CASA was satisfied with the relevant procedures set out in the RAAus Technical Manual amendments.

As the MARAP process continues to evolve, the engineering behind modifying a Type Certified aircraft is long and very involved. The RAAus MARAP process is the same as the CASA based Engineering Order Supplemental Type Certificate and is administered and managed by the Technical Manager and an external Sub Part 21M engineering company.

The first three applications made were:

- 1: Fitment of Bolly Bos 3 ground adjustable propellers to Gazelle aircraft;
- 2: Fitment of a 912A and Bolly Bos 3 propeller to a Drifter;
- 3: Modification of brake and wheel caliper to a Flight Design CTLS.

The Drifter flight test program is complete and proved to be a great success. It will soon be a bench mark for any other applications and processes. The Bolly on the 912A Gazelle reaffirmed what we already knew. The ability for RAAus to manage and modify our legacy/heritage Type Certified aircraft will save a lot of the aircraft which were modified outside of the requirements of the type certification which, up until now, made them illegal. The testing on the Flight Design CTLS wheel and brake is ongoing.

So what does this mean for the membership? It is a turning point for RAAus. We can now legally modify an aircraft which holds either an Australian Type Certificate, or European Type Certificate, to incorporate a modification under the MARAP process. This will allow all the early legacy/heritage aircraft to be upgraded with latest technology.

Does this mean you can go out and purchase the same product and do the same

modification and fitment? No. Each MARAP Certificate will be assigned to each aircraft via serial number and registration. It will be recorded as each modification is approved by RAAus.

RAAus will then be responsible for ongoing airworthiness and carry the legal obligation for the modification outside what was listed on the original Type Certificate.

More to follow on upcoming projects and outcomes in coming editions of *Sport Pilot* and our digital newsletter. Subscribe by visiting www.raa.asn.au.

GOPRO

One of the more unfortunate tasks I do as Tech Manager is help in accident investigations. One of the accidents I recently investigated involved a small bit of technology which helped greatly.

A GoPro had been installed on the passenger's helmet and delivered irrefutable evidence about what had happened in the lead up to the incident. As a result I decided to approach the Australian distributor of GoPro... with great success. The company has decided to allow RAAus members to purchase GoPro's at wholesale prices.

The technology can act as a sort of black box recorder in the event something untoward happens. What I'm hoping for is that members will also be able to enjoy a quality product to record their memorable flying achievements and the places they visit.

The ordering process and prices are available on request from RAAus Headquarters.

For more information, www.gopro.com.



TECH MANUAL

I'm pleased to announce we are approaching the final stages of the Technical Manual re-write. This has been one of the hardest items I have been tasked with as Tech Manager.

The current version has served us well, but is long overdue for a re-write. The new Tech Manual should offer everyone a clear path forward regarding the technical operation of an aircraft and maintainer's responsibilities. It has been completely re-written, from start to finish. We urge everyone to read it when it be-



Drifter 25-0790 during one of its test flights. As a CASA Authorised Person I'm able to issue an experimental C of A under research and development via the MARAP process



Stuart McColl's pride and joy Gazelle 'Flappy Bird' (24-3538). This aircraft is fitted with a Bolly Bos 3 ground adjustable prop. Testing continues with great results.

we need you to work with us to make it happen.

By informing everyone about issues found during inspections, audits and with the new online Occurrence Management System, we will build a more informed group of L2 maintainers. This will lead to an overall improvement in maintenance practices and, in turn, safety across the fleet.

If you use to receive emails from us but have not since last year, contact the office and verify your email address. Remember your L2 Privileges must be renewed every two years. LAME/L2s are not required to renew as long as the LAME Part 66 licence requirements are met. Auditing of all L2s will begin around mid-year.

MAINTAINER OF THE YEAR

Nominations will open soon for the inaugural RAAus Maintainer of the Year award.

The initiative will shine a light on our maintainers as we look for an outstanding individual who epitomises the RAAus ethos.

Our L2 maintainers aren't an easily recognised sector within the aviation community and RAAus feels the award offers a great opportunity for these unsung heroes and extraordinary talented engineers to receive the recognition they deserve.

Do you have one of those maintainers who seems to live at the local airfield? Are they the person who is always around to lend a hand, help with those little things such as the correct tool, bit of lock wire or provide you with the direction and guidance with all things technical? Then get ready to nominate them.

The nomination period will run from May 15 to September 30. The winner and runner ups will be announced in November.

The awards will be judged by an independent panel of members from the recreational and GA community.

CESSNA SIDS

A note to all RAAus 24 registered Cessna operators.

Below is a link to the CASA website for the compliance details for your Cessna 100 series aircraft. This is a mandatory requirement for all Cessna model aircraft on the RAAus register. Compliance to the SIDs program will need to be supplied to the technical team to upload to the aircraft's file. Any aircraft identified after the expiry period will temporarily grounded until compliant.

www.casa.gov.au/sites/g/files/net351/f/02-048%284%29.pdf

comes available. There will be a phase-in period and the technical department will actively work with each and every person to assure compliance.

We will soon begin a program to communicate and educate L2s to provide them with advice and comfort about the changes.

It is important to note that nothing in the revised manual removes any privileges for the RAAus fleet and maintainers. Because it is a complete re-write, we need to understand how it operates in the hands of the people who use it. After six months we will undertake a review of the document based on the feedback and advice we get from members.

LEVEL 2S

If you are an L2 privilege holder and have not already done so, please let the office know your email address and contact details. I want to send out email and text updates to the Level 2s as often as possible to keep everyone updated on what is happening. RAAus is embracing technology to make communication easier and

BAT HAWK

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AIRCRAFT FEATURE

BAT HAWK FLIES IN

BY BRIAN BIGG

A NEW South African made cheap recreational aircraft is about to land in Australia – the Bat Hawk.

More than 500 Bat Hawks are already in service around the world. According to the Australian distributor, Errol van Rensburg, when the aircraft arrives here next month, it will go on sale for between AUD\$55 to \$60,000 (ex GST).

The Bat Hawk will only come as factory built. It's been designed and built by Micro Aviation in South Africa for African conditions, which are similar to ours.

It features a strut-braced high-wing, a two-seats-in-side-by-side configuration open cockpit, fixed tricycle landing gear and a single engine in tractor configuration.

There's a choice of engines - 120hp CAMit or 100hp 912 ULS Rotax.

As a conventional 3-axis light sport aircraft, the Bat Hawk does not rely

on pilot weight shift to affect control. Twin seats are positioned side by side for full dual control and both crew members are protected from the weather by an aerodynamic fibreglass pod and large wrap-around windshield.

With an empty weight of 260kg and a MAUW of 540kg, it will take two grown men easily.

It has strong main gear, large bush tyres, hydraulic disc brakes, 80 litre fuel tank capacity, zip open/close luggage area, and engine monitoring system, strong wing spars and wing struts, a streamlined nose pod and a large windscreen for good visibility.

Errol says the people who have bought one already include surveillance and conservation industries and farmers wanting a true bush plane.

Sport Pilot has asked for the chance to doing a flight review on the Bat Hawk when it becomes available and will present that in a future edition.

For more information, www.bathawk.co.za.

“It will take two grown men easily”



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Photo shows some options

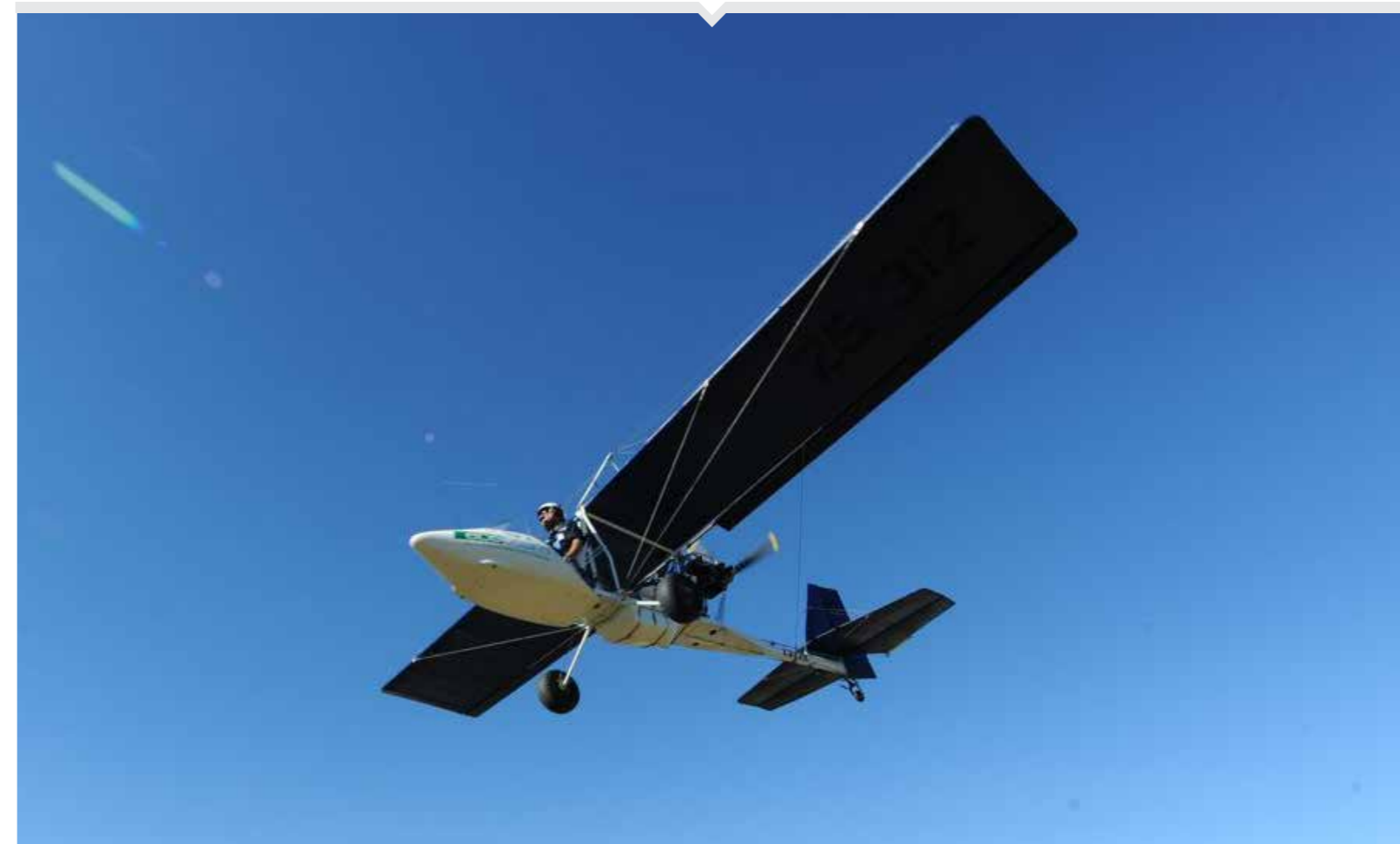
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FLYING TAUGHT ME THIS TODAY



Mind the hump



It had been raining for a few days and a break in the weather gave rise to the opportunity for me to get airborne and visit a friend at a nearby airfield. The airfield was a typical country grass strip with a slope, no taxiways, and the hangars all at the uphill end. No problem, because I'd been there a number of times before.

I made a ten mile inbound call. My friend on the ground replied that there were a couple of wet patches on the runway and so the preferred direction was 22. Overflying revealed there was a rather large wet patch about midway along the runway and also that there was a crosswind. Runway 22 was uphill, so I estimated it would be easy to land and be at a very slow speed when I needed to navigate past the wet patch. All went according to plan and the subsequent coffee and hangar talk were well worth the trip.

Then came the bit where I should have known better. The crosswind was still hanging around. The way it was blowing meant there was no real headwind advantage in taking off in either direction. Since 04 was downhill – not to mention it meant not taxiing far from the hangar to threshold – I decided 04 it would be. Remembering the wet patch, I decided to get back as far as I could on the runway and try to be airborne before I ran into anything soggy. The wet bit, I reasoned, was only on one side of the runway anyway. Checks done,

nothing in the circuit, radio quiet, full power and stick into wind. Did I forget to mention there was a slight hump in the runway before the downhill slope 50m ahead? I forgot it too!

By the time I had full view of the runway I was still a fair way from flying speed. Beyond the hump I could see the wet patch and the ride on mower. RIDE ON MOWER? The mower had actually been left on the edge of the runway, level with the wet bit. However, it gave rise to numerous thoughts, both at the time and for hours afterwards. Stop or go came to mind, very briefly.

“There was a slight hump in the runway”

I was airborne well before the mower - but well after my lapse in Airmanship. Suppose it had been in the middle of the runway? Suppose I had burst a tyre, slowed down and veered to the left? Suppose, suppose, suppose.

Anyway, the take home message is (as always), 'Don't assume. Check.' Don't be reassured by the lack of radio chat and visual check of the approach. Make sure you can see the entire runway before starting a take-off run. Kangaroos don't have radios. Nor do all our fellow aviators. It would have been a simple matter to taxi to the hump and back. Sure it would have taken a little longer, but I'm reminded of the saying that it's better to be a little late than dead on time.

It's always embarrassing to confess a lapse in Airmanship, because the finger pointers will give you heaps. It's tragic, however, not to notice it. ☹

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EDITOR'S CHOICE

A quick trip to the airport

BY BRIAN BIGG



TOLD the missus I'd be back in a few minutes. "I'm just going to whip out to the airport and check the brand of my tyres which are going to need replacing soon," I said.

Two hours later, she rang me to find out where I was. I explained I was still at the airport.

When I had opened the hangar door, I'd noticed the canopy of my aeroplane was grubby, so decided then and there to give it a polish. And while I was at it, I reckoned it would only take me 10 or 15 minutes to give it a quick wash as well.

I had just about finished the wash, when the bloke from the hangar next to me came over to say hello and tell me about his recent flight to the out-back. Midway through his story, the young bloke from the helicopter company wandered by and joined our discussion, because he been to visit the same area a year before.

Anyway, before you know it, the phone had rung and I had to hurry home. I hadn't even looked at my tyres.

A few days later, I told the missus I was whipping out to the airport again. "Still need to check the brand of my tyres," I said. "Shouldn't take more than a minute or two." Two hours later, she rang to find out where I was. I explained I was still at the airport.

I hadn't even got out of the car at the hangar when the president of the aero club pulled up next to me and started telling me about how the council was going to muck us around yet again with security access.

We were discussing strategies about how to get the council to pull its head in, when the bloke who runs the local air charter business wandered by to say hello and tell us about his new aeroplane. He insisted we just had to have a sticky beak at it. A beautiful aeroplane it was too.

Anyway, we were sitting in the plane discussing the pros and cons of the new avionics he'd installed when the phone rang and I had to hurry home. I still hadn't even looked at my tyres.

Saturday afternoon, we had guests coming. The house had been polished until it shone and even the barbeque had been cleaned. Sent into town to get some last-minute supplies, I thought I'd sneak out to the airport to finally examine my tyres. Should only take a minute or two, and I would be home with the supplies long before the guests arrived.

But the LAME, who'd been on holidays for weeks, and was often harder to find than a polite Telstra receptionist, was there at the hangar door. If I didn't talk to him about my dodgy altimeter then and there, it could have been weeks before I found him again.

He and I were elbow deep in the engine compartment, when the couple who run the fly-in for the club every year wandered in, armed with a list of jobs and looking for volunteers. I was talked into putting my name down for setting up tents and cooking snags.

Then the bloke who runs the parachute school strolled in with his kids in tow. They squealed with delight. "What a beautiful aeroplane!" and "Can we sit in it please?" I can't help myself when someone says they think my aeroplane is beautiful. I think so too.

So the kids were perched in the front seat with headsets on and pretending to dogfight, when two young blokes came over from where they had been refuelling a Warrior at the bowser.

They wanted to know if one of us knew the best way to get through the nearby control zone. "Sure", I said. "Show me your map".

Anyway...

That's when the phone rang.


It's now two weeks later. I've done nothing but chores and been polite and the chill seems finally to be thawing.

I still don't know the brand of my tyres. With the annual inspection looming, I need to know it in case it takes a long time for them to be delivered. So I've told the missus it's important I whip out to the airport to look at them.

I've promised...it should only take a few minutes. ☹

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The steps to CTA

BY THE OPS TEAM



It may occasionally appear the Ops Team is not so visible and, when we are seen, we appear to be like ducks - smooth, calm and serene on the surface. But, just as with ducks, under the water there is significant activity. Here's just a couple of the things we are working on.

CONTROLLED AIRSPACE

The CTA endorsement will be a major focus of work by Ops, as outlined in our strategic plan for 2016. For all manner of reasons not required to be spelt out here, a CTA endorsement would improve safety, improve members' ability to operate in airspace currently not available and reflect the evolving and increasingly professional face of RAAus operations.

So, how are we moving to get CTA access for RAAus members and how long will it take?

Firstly, in order for an RAAus aircraft to operate in CTA, as provided in CAO 95.55 paragraph 7.3, it must:

- Be certified or meet LSA certification requirements;
- Complete two yearly instrument calibration requirement (CAO 100.5) for pressure testing to ensure the altimeter, transponder and air speed indicator are accurate;
- Be fitted with a radio (required) and transponder (if required for the airspace);
- Be maintained to manufacturer and regulatory maintenance requirements;
- Be factory built and have an approved engine.

L2 maintainers therefore need to be aware of ensuring these instrument checks are carried out as part of the aircraft maintenance schedule. Tech Manager, Darren is working hard with maintainers on this and other areas. Sadly, Ops inspections of school aircraft has revealed a significant number of them have not had the appropriate maintenance done, which means they would not legally be allowed to enter CTA. An assessment of members' aircraft maintenance is also being undertaken by the Tech department, to provide more information for this process.

FOR THE PILOT

- The pilot must be trained to minimum standards, assessed as competent and issued with a CTA endorsement;
- There must be a syllabus of flight training requirements;
- Instructors must be competent and current to teach CTA procedures;
- CTA must be available for training.

So Ops is developing a process to get information from instructors about their abili-

ties to train CTA and their currency. We will require them to provide the assurances to RAAus, making it easier for us to give the assurances to CASA. While we did undertake a similar exercise in 2007, with Ops Manual Issue 6, much has changed both internally and externally, and we will have to repeat the process. Fortunately, since 2007, we have had 11 schools successfully and safely operating under exemption in Class D, forming a significant safety case on these sort of operations.

Behind all of that are the administrative systems RAAus requires to record and administer the CTA endorsement for members. That will also require us to change our brand new database and member management system PULSE.

At the end of all this development work will be oversight by the regulator and engagement with other stakeholders such as AirServices, the Defence Department and Regular Public Transport. They will expect minimum standards, correct operations and systems to adequately manage a potential influx of an extra 3,000 aircraft in already congested airspace.

Finally, Ops, Tech and Safety departments will collaborate on a safety case for CASA to assess. If members have ever completed a Risk Assessment for an activity, whether aviation related or not, they will be familiar with the level of detail we will have to provide. A Safety Case is like a Risk Assessment on steroids, detailing significant risk factors, assessing the risk and applying a treatment plan to ensure the risk is adequately managed.

So how long will that take? We have some specific targets to meet and a plan to achieve them. We have committed to providing CASA with the CTA Safety Case by June. Other aspects are beyond our direct control, but initial discussions with the Director of CASA and team members within the regulator have been extremely positive. We are committed

to planning, creating and administering in anticipation of approval.

Ops, Tech and Safety departments are committed to extending flying freedoms for RAAus members and are looking forward to the CTA endorsement being implemented. However, as you can see, it is not a simple matter of asking CASA and getting an answer. Processes must be robust, provide assurance and take time to develop.

While this is going on, Ops is also embarking on a nationwide and ongoing Professional Development program for our CFIs, Pilot Examiners, Regional Operations Coordinators and Instructor Trainers. Mem-

bers with these approvals are key gatekeepers of our pilot training standards and assessments. A nationwide standardisation program like this has never been attempted before. It is ambitious and occasionally provoking, but the response from approval holders has been encouraging.

"A Safety Case is like a Risk Assessment on steroids"

CFI PORTAL

Part of this includes the development of a CFI Portal. How many times have members arrived at a school to complete a BFR, or other training, and realised they have left their membership card or logbook behind? As this usually takes place on a weekend, Ops receives a phone call from the CFI to confirm the member has membership or that the aircraft they want to use is registered.

The CFI Portal will permit CFIs appropriate access to the RAAus membership information so they can confirm membership and BFR expiry dates, endorsements and ratings held and aircraft basic model, type and registration detail. No personal information or contact details will be accessible.

So if you see us at a fly-in looking serene and calm like ducks on a lake, remember we are probably thinking about all the tasks we have to achieve for you. Below the surface, we are paddling furiously. ☹

Biscuits, jelly, nylon and steel

DESIGNING YOUR OWN AIRCRAFT BY DAVE DANIEL

I HAD planned this month to dive headlong into the mysteries of load paths.

But after some consideration it dawned on me that there are more fundamental concepts which have to be understood first. And, given the endless trouble which the misunderstanding of these basic concepts causes, I'm going to devote this article to them instead. So let me introduce the four pillars of engineering: Stress, Strain, Strength and Stiffness. None of which is particularly complicated or difficult to understand, but all of which seem to cause endless problems, mostly stemming from the fact that in engineering they each have very specific meanings, whereas in general usage they are loosely defined and all too often abused.

STRESS AND STRAIN

These two are intimately connected - you simply cannot have one without the other - but this does not mean that they are the same thing. A fact easier to grasp if we imagine how a material behaves at a microscopic level.

Solid materials are made up of billions of atoms, and/or molecules, all held together by chemical bonds. These bonds are extremely stiff, but nonetheless if a force is applied to them they will stretch or compress ever so slightly under the load. The stretch in each individual bond is miniscule but combined over the entire length of a structure will produce a measurable deflection. This is the fundamental basis of strain and it occurs wherever there is loading. It may be too small to measure - such as a fly landing on a block of concrete - but it will always exist. As can be seen in Fig. 1, strain is a measure of how much an object deforms under load and is given as a ratio of the amount an object has stretched (its extension) divided by its original undeformed length. As strain is a ratio it doesn't have any units, but strains are usually numerically very small so they are typically converted into a percentage or even multiplied by a million to give units of 'micro strain', thus avoiding numbers with lots of leading zeros which can be easily misread.

Because chemical bonds really don't like being stretched, they respond much like a spring and generate considerable forces in an attempt to return to their original length. It is this behaviour which embodies stress. Stress represents how hard the bonds within a material are having to pull or push in order to hold the material together and maintain its shape. As can be seen in Fig. 2, stress is calculated by taking an imaginary slice through a structure and dividing the load acting at right angles to the slice over its surface area. The result gives you the stress and is given in units of force per unit area.

Both the location and direction in which stress and strain are measured is important because, unlike pressure, stress and strain are directional. This is easy to visualise if you imagine a weight hanging on the end of a steel rod, the strain will obviously be much higher along the direction the rod is being loaded and the stresses highest over a surface at right angles to the load.

It is important to note that stress and strain describe the conditions at a specific point within a material, they are not a global property of a structure as a whole. Fig. 2 shows a wire supporting a load of 100N (or roughly 10kg). Dividing the load by the cross sectional area gives the average tensile stress over the cross section. But what happens if the wire is not of uniform thickness? Fig. 2 shows how halving the area doubles the stress and also illustrates how stresses can vary enormously within a single structure, purely as a result of its shape. Under load, one part of a structure may be close to breaking while another part is

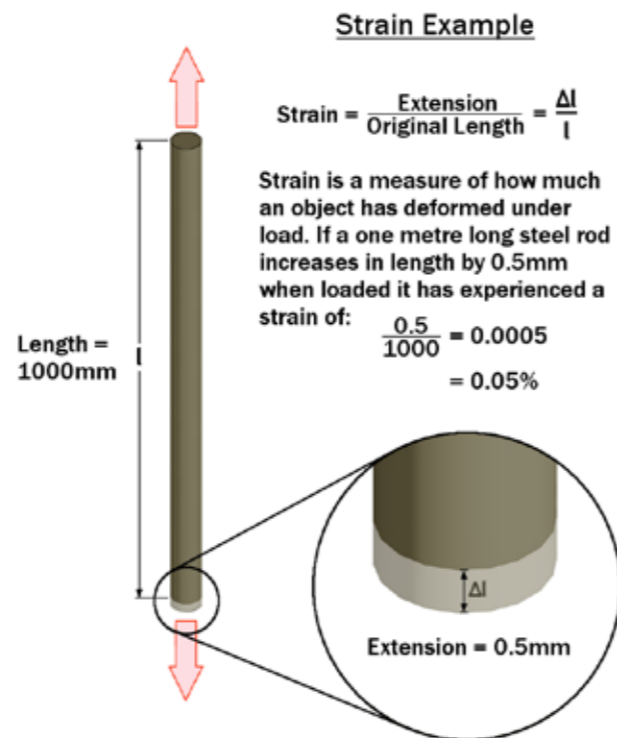


Fig. 1 - Strain

hardly stressed at all. This variation in stress explains why lightening holes in the web of a beam do not significantly weaken the structure, as removing lightly stressed material where it is not required saves weight without reducing strength.

THE AGONY OF UNITS

As mentioned before, stress is measured in units of force per unit area which should be simple enough i.e. pounds per square inch (lbf/in² or psi) in imperial or Newtons per square metre N/m² (i.e. Pascals) in SI units. Unfortunately for practical design purposes, stress values are usually large in magnitude so the units get scaled up to avoid long numbers with lots of zeros. So we get imperial units of kilopounds per square inch (ksi) and SI units of megapascals (MPa) or the equivalent N/mm² which is sometimes preferred if you are working in millimetres. Plus, if you're really unlucky, you may even find some older references to kilograms force per square centimetre (kgf/cm²)... whoever said metric was easier?

PUTTING UP RESISTANCE

Now let's move on to the other two 'Esses', stiffness and strength, and let's be very clear about this, they are not the same thing. Stiff objects are not necessarily strong and strong objects are not necessarily stiff. Anyone who disagrees with this should be forced to bungee jump using a steel cable from a bridge made of rice crackers - the bridge will be plenty stiff enough and the cable will have more than enough strength.

Stiffness is a measure of how much something will deflect under

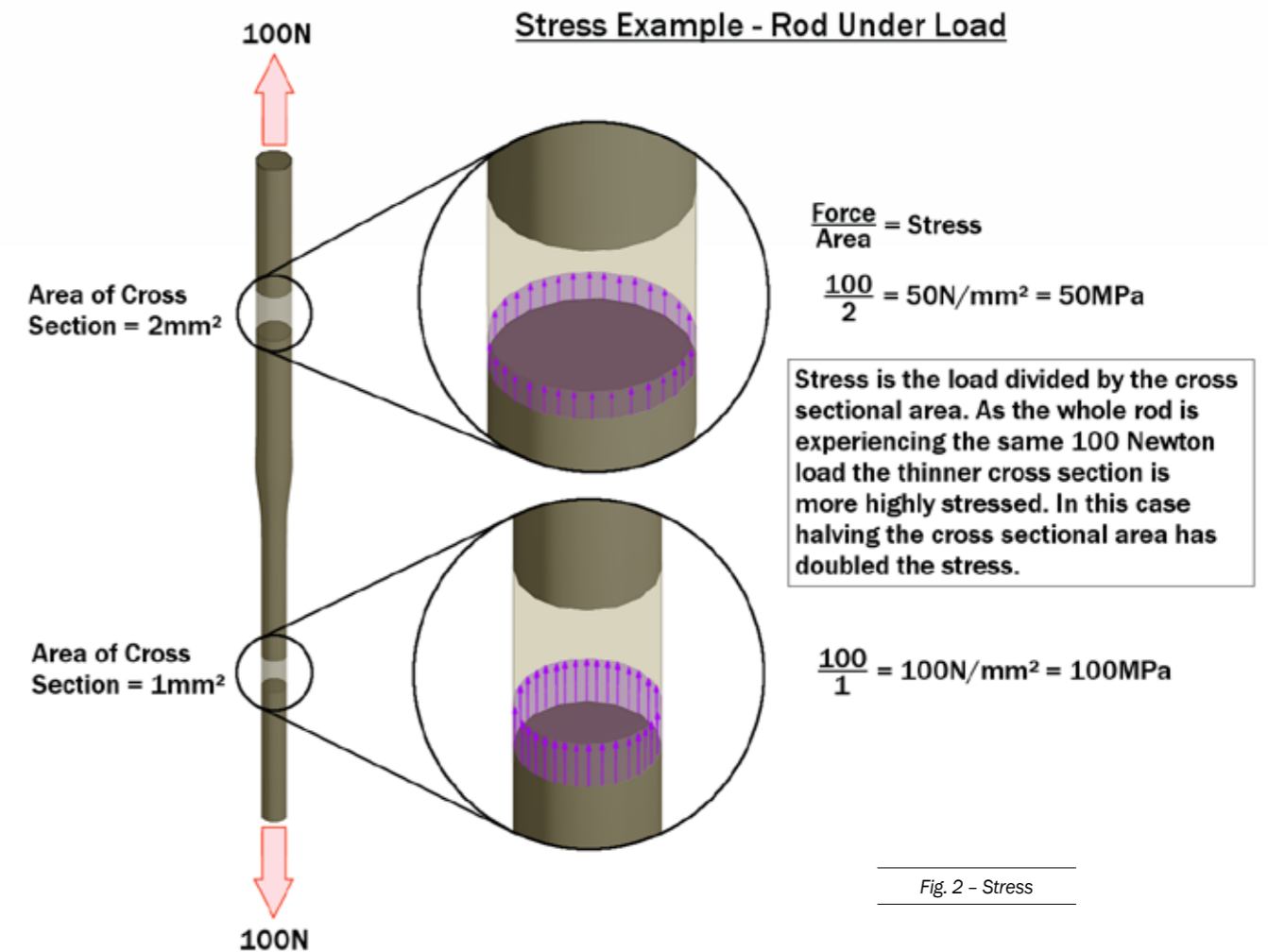


Fig. 2 - Stress

a given load, but there is potential for confusion because it comes in two flavours. On the one hand stiffness is a material property: Apply a certain stress and you will get a certain strain (see Fig. 3). On the other hand, stiffness is also used as a description of a structure's resistance to deflection under load. Puritans will tell you that the material property 'stiffness' should be properly referred to as the Elastic Modulus, but if professional engineers aren't inclined to make this distinction, I doubt anyone else will be.

Material stiffness is determined by taking a test specimen of uniform dimensions and gradually applying an increasing load while measuring the extension. For a ductile metal like steel, a plot of the results will give a graph much like Fig. 3. The gradient of the straight portion of this graph is known as Young's Modulus and is a measure of the material's stiffness. Young's Modulus is a very large number for most materials, it theoretically represents the stress level required to make the material double in length (i.e. achieve 100% strain), which of course ignores the fact that virtually all engineering materials will break at well below 3% strain.

Stiffness of a structure tells you how much it will deflect if you apply a given load and is a result of both the material and its geometry. If your structure is too flexible (i.e. lacking stiffness) you can either change the geometry, usually making it thicker, or change to a stiffer material.

To illustrate the difference between the two types of stiffness, imagine bending a steel rule. If you grasp it flat and attempt to bend it you will quickly discover it is fairly flexible. However, rotate the rule 90° along its long axis and hold it by its edges and it becomes very stiff and will hardly bend across its width at all, in fact it will probably try and twist or bend away sideways - but that is a subject for a whole different article. Clearly the stiffness of the material is the same whichever way you try and bend it, after all the rule is made of steel, but the stiffness of the structure is heavily dependent on its geometry and how it is loaded.

COMING ON STRONG

Last, but not least, we come to strength. Much like stiffness, an important distinction needs to be made between strength as a material property and the strength of a structure. The strength of a material is independent of geometry and represents the stress level at which a given material will fail... or at least that's the idea. In reality material strength is inextricably linked to geometry, loading conditions, operating environment and many other factors. So conservative strength data is instead statistically determined based on the results of a collection of standardised tests. This allows us to conveniently design stuff without having to worry too much about the properties of the exact batch of material used, with the extra protection of an appropriate factor-of-safety. The primary published strengths - tensile, compressive and shear - represent the stress at which a material will yield or fail when being stretched, squashed or sheared respectively. For ductile materials, such as aluminium and steel, both yield strengths and ultimate strengths are available. The yield strength is the stress beyond which permanent deformation will occur. Below the yield strength the material is said to behave elastically and will return to its original shape if the load is removed. Above the yield strength the material will deform permanently, retaining a 'set' even if the load is removed. The ultimate strength is the maximum stress the material can support, and any attempt to increase the stress beyond this point simply leads to the material stretching to reduce the load finally leading to fracture. A typical stress-strain graph for steel is given in Fig. 3 with the significant points highlighted.

The strength of a structure is the load at which the structure will no longer be able to perform its designed purpose - i.e. it has either broken, because some portion of the structure has exceeded its ultimate strength, or it has deflected to the point of permanent deformation and so can no longer do its job. The strength of a structure depends on both its geometry and the materials from which it is constructed. It is ex-

Biscuits, jelly, nylon and steel

DESIGNING YOUR OWN AIRCRAFT BY DAVE DANIEL

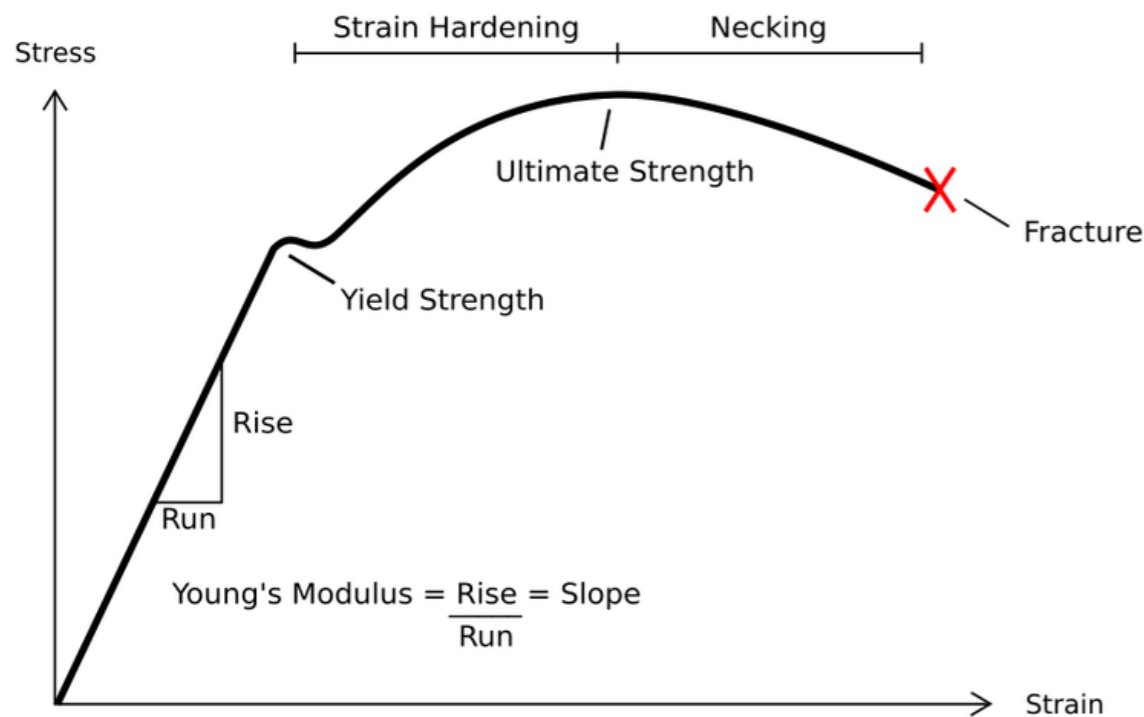


Fig. 3 - A typical stress-strain curve for steel

tremely difficult to build a strong structure from weak materials but entirely possible to build a weak structure from strong materials as many engineers have learnt to their cost.

BISCUITS, JELLY, NYLON AND STEEL

It is fairly easy to see how strength and stiffness get confused or even lumped together as meaning essentially the same thing. Very often it is stiffness and not strength which is critical for a design, so many objects end up being vastly stronger than they need to be in order to achieve adequate stiffness. In turn this leads to people equating stiffness to strength, both because stiff structures are frequently also strong and because increasing a weak structure's strength by adding more material also increases its stiffness. Unfortunately these generalisations are misleading and, in some circumstances, reducing stiffness can actually increase a structure's overall strength by allowing the loads within the structure to redistribute themselves, resulting in reduced stress.

Hopefully by now we are clear that strength and stiffness are not the same thing, but you are probably still wondering about the title of this article, so I'll leave you with a quote about stiffness and strength from J.E Gordon, arguably the father of materials science: "A biscuit is stiff but weak, steel is stiff and strong, nylon is flexible and strong, raspberry jelly is flexible and weak. The two properties together describe a solid about as well as you can reasonably expect two figures to do."

Aircraft design is an exercise in optimisation, providing the right amount of stiffness at the minimum possible weight and providing just enough strength to meet the design requirements, but no more than necessary. Unfortunately this also makes aircraft structures unforgiving and beefing up one part can prove disastrous for another, a problem we will examine next month when we look at load paths.

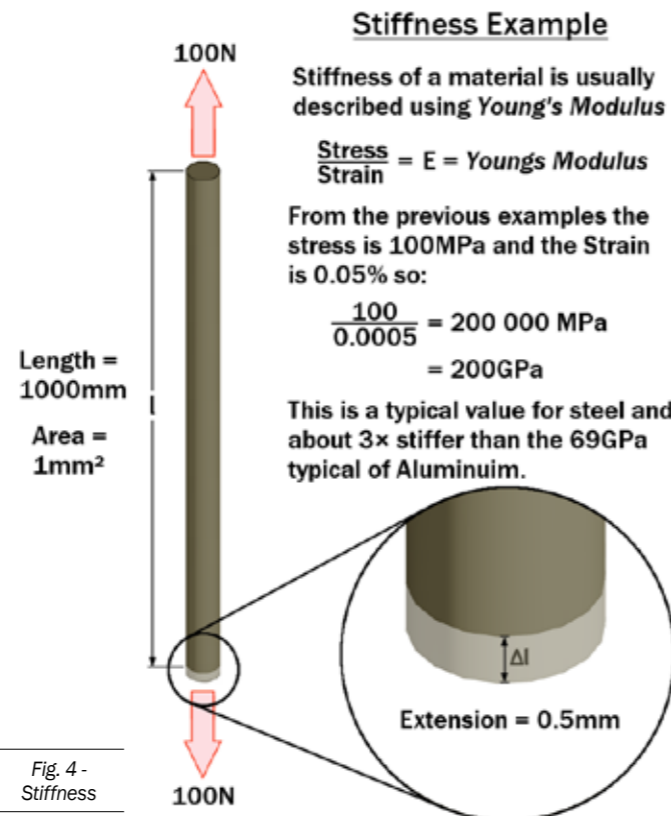


Fig. 4 - Stiffness

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'I've got this'

BY RIC ATTARD

IT was in 2015, that my instructor, John Cresswell, asked me the question we all fear and, at the same time, yearn for.

Up to this point, I felt I'd managed to fly a trike with enough skill to keep my instructor from suffering a cardiac arrest whenever I had control of his aircraft. However, John was always in the back seat and I knew he wanted to live, so if I ever froze, panicked, or lost control, I knew he'd get us home safely despite the scalding I might receive later.

Weather conditions were good at Caboolture Aerodrome that morning, the skies were clear and I'd already completed a few smooth circuits with little, if any, input from John. After a well-executed landing, John instructed me to steer off to the right of the runway - then came the question - "Right, do you want to fly solo then?" Without hesitation I boldly responded, "Yes!"

Now at this point, you might think I had already carefully planned for this day, that I had often thought this moment through, role played it in my mind, perhaps even meditated over it - like I'm sure most of you did before you responded to that question. But no, not me. Without pause I just said 'Yes,' didn't I? John got out of his awesome Airborne XT-912, gave me a few instructions, and began walking towards the hangar as I restarted the engine. That's when 'it' happened, and the best way for me to describe what I'm talking about is this:

It was as though an emergency board meeting had been called. The old, sole founder and chairman of the board had made the decision without consulting the other board members. It was havoc! Here I was slowly and steadily taxiing along, and my mind was filled with shouts from the other board members in the room (my head as it were).

The Vice Chairman opened with - "He said WHAT!? He didn't really say yes, he wouldn't, not without checking with us, would he?"

Mr Safety followed - "Did he complete all the checks again...please tell me he did! I can't find any paperwork...there's nothing here!"

Mr Weather jumped up - "Hang on, hang on - what about wind shear, turbulence, sudden gusts, hail and tsunamis. What about all that! He has to check for weather warnings...someone stop him!"

Mr Health arced up - "Hey, Hey! Have any of you seen what's happening in the chest cavity right now? How am I supposed to slow that heart down! Someone shut off the adrenalin valve - Hurry!"

Mr Worry (with an unblemished record of attendance) spoke up, "Um Mr Chairman... are you aware of how many light aircraft crashes occur each year, sir? Perhaps we should have a look at the statistics and ponder them together for a while."

Mr Conservative mumbled "We really should be looking into taking up a less extreme activity like say, gardening, playing cards or lawn bowls, What do you say, Big Fella?"

Oh, they were all there demanding to be heard. Meanwhile there was the Chairman, leaning back, the top button of the shirt undone, his loosened, crooked tie draped over his belly and a cocky smirk on his face. The petty ramblings behind him began to fade. The Chairman knew he was prepared. He had been well trained, he'd listened, he'd practiced, and yes although he was a novice, he drew confidence from recalling moments of success from the past. Of course, the rest of the board was still bickering and carrying on, but as he looked ahead, the anxious cries of those members of the board who often caused him to fail (or worst of all, quit), reduced to a dull murmur.

So here I was. My heart was pumping and my hands were sweaty. The question, "What am I doing?" surfaced a few times, but I kept going. As I approached the threshold, I gave my first ever solo radio call and, though it might sound a little corny, just before I applied full throttle a grin emerged on my face as I recalled the words Ridley said to Chuck Yeager just before



"Why was it all going so well?"

The Chairman of the board

he rocketed away in the X-1 - "Put the spurs to her, Chuck!" KAPOW! Far out! I was pushed back in my seat, the air whooshed past me as the 85 horses galloped for the sky. Without the weight of my instructor in the back seat, the climb angle of this baby felt almost vertical. What a rush! I was away and almost instantly at 1,000ft. Ok, time to rein the horses in a little - pull back to cruise speed. It was beautiful - the wing taut and trimmed, the engine purring silently, and here I was suspended alone in the miracle of flight. Was it worth it? I don't have the words to articulate the gratitude I felt (and still feel) when flying. We don't do 'this' ...we humans ... we don't fly. We walk, we swim, but we don't fly - and yet here I was! 'Magnificent men in their flying machines.'

"Look at me", I thought, "I'm flying this thing on my own!" Then almost immediately "concentrate, Ric! Look right, centre, left. Now a medium-bank, cross-wind turn - good. Maintain 1,000ft, medium

left turn onto downwind - good. Primary reference, the horizon, not the instruments - yep. Straight & level flight. Get your runway reference, parallel - good. Ok, I'm set up - now landing checks. F.A.W.N.T.S. Fuel -sufficient. Area clear - nothing seen, nothing heard. Wind direction & strength - I can see the windsock, five knot south-easterly. Nose wheel straight - Grrr still using my feet to steer in the air. Ok, straight now. Hand throttle off, trim set for landing. Security - Helmet & Harness secured.

For some reason this wasn't at all difficult, everything seemed to be going too well. I transmitted a radio call, completed my base, then final turn, pulled on some speed, approached then flared for a beautiful landing before taking off again. But I was puzzled. Why did this seem relatively easy? Why was it all going so well? Why was I having so much fun? The answer is, of course, hours and hours of submission to excellent instruction. I was having fun because I was doing what I had been taught to do

and it was all working!

The Chairman, for those of you who have their solo ahead of them, wasn't smiling because he could fly the plane alone. He couldn't - well not safely at any rate. He smiled because he knew his board members had been trained so well that when they were presented with challenges, they'd remember their purpose and they'd sort things out. The most exciting part of the flight was, (well actually the take-off was the most exciting part - far out that was awesome) but the second most exciting part was how everything just seemed to be smooth and automatic. Everything John had taught me had arranged itself into a rhythm. All the words, phrases and instructions I would normally recall in his voice, were now beginning to be in my own voice. Although there's still much to learn, it's very nice to be taxiing now and replacing the thought of, "What am I doing?" with that all-encouraging thought, "I've got this". ☺

Jabiru's tribal allegiances

THE BEST BITS ABOUT BUILDING YOUR OWN BY DAVE EDMUNDS



COMPARISON OF AIRCRAFT MANUFACTURER VS NUMBER OF FATALITIES OVER 12 YEARS

Total ATSB Website Database which starts at 2003 (as at 31 December 2015)

Manufacturer/ Model	Fatalities	Fatal incidents	Currently registered aircraft	Fatalities per 100 currently registered aircraft
Jabiru Aircraft (70 VH-reg)	3	3	1,070	0.3
Tecnam	3	2	187	1.6
Cessna 172	20	12	1092	1.8
VANS RV	11	7	504	2.2
Skyfox	4	3	118	3.3
Howard Hughes Engineering	5	5	104	4.8
RAAus aircraft not incl Jabiru	83	76	2280	3.6
Airborne trikes	17	13	285	5.9
Paragliders (various)	7	7	211	3.3

Limitations of the data (disclaimer from ATSB website). The data quality and consistency is largely dependent on the details reported to the ATSB. The information in the majority of non-investigated occurrence reports is not subject to verification.

I MUST be an unusual pilot, because my number one criterion for safety is that I won't die in my aircraft. This is not a view shared by CASA. The above table shows data collated by Jabiru from ATSB data.

In December 2014, CASA implemented restrictions on the operation of Jabiru aircraft. These restrictions required passengers to sign a waiver indicating that they were aware of potential aircraft problems. There are restrictions on flying schools and restrictions on some areas of operations. Even the most cursory examination of these restrictions indicates they have no impact on safety, do not address any structural or mechanical problem, but have a huge effect on the reputation of Jabiru.

I lodged a Freedom Of Information (FOI) request with CASA to find out what had happened and was told the information I re-

quested was not in the public interest and would cost \$236 to obtain. I strongly objected to this, pointing out that the likelihood of reputational damage to an iconic Australian company resulting from the CASA action surely constituted public interest. But to no effect. So, a friend and I paid up.

The FOI enquiry produced only two documents related to the decision by CASA to restrict operations involving Jabiru aircraft. The first document was a technical summary of engine failure rates written in early 2014. The only data in the report was two years of Inflight Shut Downs (IFSDs). These shutdowns were not filtered to include only those related to mechanical failures. The data showed that the worst performing en-

gines were Rotax two-strokes, but no restrictions were applied to aircraft with those engines. The report also referenced a US policy for aircraft IFSD rates. While Jabiru engines exceeded an IFSD rate of 1 per 10,000 hours of flight, the average for the entire RAAus fleet was 1.98 and the GA fleet was 1.27. That is, by the standard set in this document, the entire light aircraft fleet in Australia should have been restricted.

Further, the US document referenced by CASA had a number of alternative metrics, one of which was fatality rates, but this was not mentioned in the CASA analysis. As the above table shows, Jabiru aircraft are statistically much safer than the rest of the RAAus fleet.

The document made no reference to the fact Jabiru had addressed the known modes of failure in three separate service bulletins. Aircraft which have had the issues addressed in the service bulletins have a dramatically lower rate of engine failure.

There was no mention of the evolution of the Jabiru engine design as operational data accumulated. There is a large difference in reliability between earlier engines which have not had service issues addressed and the latest engines to leave the factory.

The figures used by CASA for IFSDs are raw figures, and include running out of fuel. CASA calculated a Jabiru IFSD rate of 4 per 10,000 hours of flight over 2012 and 2013. ATSB found a rate of 2.63 per 10,000 hours of flight over 2009 to 2013, the difference partly due to the exclusion of a number of failures such as fuel starvation. It does seem a bit rough to include events where the pilot forgot to put fuel in the tank. Similarly, in 2014, the CASA website reported 46 Jabiru 'problems and

events', whereas Jabiru believes there were only 12 shutdowns due to mechanical failure in that period. It is not clear why CASA has used the vague and all-encompassing term 'problems and events'.

It is part of the human condition that someone living in, say, Wagga can be obsessed with the fortunes of a football team in, say, Barcelona. Usually this is just amusing, but it can transform into more than that, and so it is with the problems with Jabiru. There are people with a blind, tribal allegiance to Jabiru or Rotax and they have confused the issue. It is already confused enough, and such intervention verges on dangerous.

CASA says it is aware blind tribal allegiances may affect objectivity and has taken it into account in its considerations. It just doesn't look like that.

At the time of writing CASA has not been able to find any document which connects the report on engine failure rates to the operational restrictions. A normal bureaucratic process would require an analysis of the various options available to CASA to address the perceived problem, and perhaps a recommendation before action was taken, but this did not appear to happen. I am assured by CASA that there was a logical process and documents which support the decision-making may be forthcoming.

CASA is rightly concerned about its responsibility for safety. While acknowledging the actions Jabiru has taken to address various problems, CASA wants to see a root-cause analysis. The CASA view is that Jabiru has responded serially to problems as they have been identified, but this is not sufficient. As the incidence of engine problems has dropped due to the interventions Jabiru has made, it is not at all clear that such an analysis should be required before the restrictions are lifted.

It is worth noting the US FAA has issued 12 Airworthiness Directives (ADs) on the venerable Lycoming IO360 in just the past decade and 46 in total, but has not required a root-cause analysis. CASA rejected the option of applying an AD to reinforce Jabiru's service bulletins, instead preferring the operational restrictions.

A further concern is that if CASA is prepared to operate on data as thin as this, then perhaps there is a great deal it is missing in the aviation environment more widely.

Sometime around 1970, I was invited to dinner by my then girlfriend's parents, where I was introduced to a man from the Department of Aviation. I had no particular interest in aviation at the time, but ructions over the Victa Airtourer were then in the news, so, politely making conversation, I asked this chap about the problems. He explained that the Department of Aviation had found that Victa was using a number of non-certified washers in the construction of the aircraft.

I politely suggested that the problem could be resolved simply if Victa was required to use the proper washers. The man from the Department of Aviation became angry so, given my circumstances, I backed off.

Victa went on to manufacture the aircraft in New Zealand and sold a version back to the RAAF as the CT4, an aircraft in some demand today. Victa has long since stopped manufacturing aircraft.

Echoes of this attitude are obvious in the story of Jabiru engines. More on this next month. ☒

DISCLOSURE I have owned a Jabiru for the past seven years. I have never experienced an inflight shutdown, although I have experienced some mechanical issues. FROM THE ED Dave's views do not necessarily reflect those of RAAus.

"Power is better, water temps are fixed."
Lucas Bignon of France, flying with his liquid cooled Jabiru 2200.

83 Jabiru owners switch to liquid cooling. Problem solved.

When your Jabiru is liquid cooled, you don't worry about CHTs. You feel relaxed knowing you're operating at safe temperatures, all year round.

Inspection of Terry Ryan's cylinder heads:



Air cooled: 25 hour inspection, dangerous detonation & leaks from overheating.

"At cruise, CHTs barely go beyond 100°C," explains Kai Lyche of Norway. "They just work!" In fact, liquid cooling is working so well for Kai, it's allowing him to turbocharge his Jabiru 2200.

"It's nice being able to fly home in the summer," says pilot Terry Ryan of rural Victoria, Australia (upgraded Jabiru 3300 engine featured below). "Before liquid cooling, the Jabiru engine had all sorts of heat related problems."



Liquid Cooled: 120 hour inspection, all heat related issues are resolved. Detonation is eliminated.

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4144 AIRBORNE XT 912 - SOLD



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4221 CHEETAH AIRCRAFT



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4349 JABIRU J160C SHARE



Syndicate share in a 2007 Jabiru J160 for sale as owner has purchased his own aircraft. \$5,000 - heavily discounted (each share valued at \$8,000). Fully maintained by LAME 2, hangared at Aldinga. Well located for fantastic scenic flying. Recent engine overhaul, Garmin 296 GPS, transponder, headsets. Contact Murray 0411 722 953.

4395 AUSTRALIAN LIGHTWING GR912T SPORT 2000



Rotax 912ULS 100hp, TBO 1500hrs. Includes - Carbon fibre prop, original wooden prop, Heliview panel, standard instruments, Microair radio, transponder. All ANs completed. Updates - fuel pump, regulator, heavy duty starter motor, new main tyres. Wheel

spats included (never installed). Always hangared in Ballina. Tidy, reliable aeroplane. Will provide 5/6 years of average usage before engine replacement/overhaul. \$20,000. Geoff 02 6676 0325.

4399 JABIRU 170-C FACTORY BUILT



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4411 JABIRU J160D FACTORY-BUILT



2010 aircraft, 24-7382, L2 maintained, always hangared, good all round condition, based in Narrogin WA. Can arrange delivery Australia-wide. 588 hours total time. Next annual due October 2016. \$48,000. Contact Tony 0400 610 076.

4420 KITFOX MK4 1200 SPEEDSTER



Selling due to health. Has not been flown for three years. Just completed overhaul, all ADs up to date. Vortex generators fitted in 2006 for a more low

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MEMBERS' MARKET

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4428 FLIGHTSTAR SL11



Built 2009. 19-5544. 1059 hours TT. HKS 700E 4-stroke engine, 412 hours, in good condition. 3-blade Powerfin prop. Uses 10L/hr, cruises at 70kts. Standard instruments with ICOM radio. Weight 205kg, MTOW 450kg. Skins in excellent

condition. Always hangared. Located at South Grafton. \$15,000 ONO. Contact Warren 02 6642 3517 or wandprant@bigpond.com.

4431 SAVANNAH CLASSIC



2005 build. 19-4295. Rotax 100HP ULS. 1025 hours on airframe and engine. Blue and white paint scheme. Leading edge slats removed by builder. VG's fitted. Brauniger LCD panel. Large tyres. 3 fuel tanks. Excellent condition inside and out. Always hangared - Caboolture Airfield QLD.

\$39,900. Contact Roger 0418 188 015.

4433 JABIRU 170D FACTORY-BUILT



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BY THE NUMBERS

RAAus at a glance

ALL ABOUT YOUR ORGANISATION

4

Estimation of the number of lives directly saved each year by the timely use of ELTs

Source: ATSB

139

The number of Thruster aircraft on the RAAus register

\$50,000

The record amount awarded in RAAus GYFTS scholarships in 2015

24

The record number of young people who received GYFTS scholarships in 2015

10.3

Amateur-built aircraft as a percentage of all aircraft in the Australian GA and regional airline fleet in 2013

Source: bitre.gov.au

27.9

Average age of the GA fleet in 2013

Source: bitre.gov.au

670,600

Hours flown in GA aircraft over 30 years old in 2013

Source: bitre.gov.au

14,571

Bird strikes reported to the ATSB between 2004 and 2013

Source: ATSB

4

The most commonly struck birds - kites, bats/flying foxes, lapwings/plovers and galahs

Source: ATSB

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WHERE IS CAGIT?

CAGIT REMAINS IN THE NORTH

The Come and Get It Trophy remains in the north of the country. John Gotts and Rene Smit took the trophy from David Carroll of Central West flying at Bathurst in September after an epic journey from the Northern Territory in their Jabirus.

The trophy now resides at MKT, Noonamah. By the look at the maps it's a hard slog from anywhere in the south, if you are thinking of making a go for it.

You can talk to them (Rene on 0437 272 645 or John on 0414 486 580 (john@candrconstructions.com.au) if you think you have what it takes to grab the trophy for yourself and take it home.

For a full list of the rules about capturing the CAGIT, visit raa.asn.au/events/cagit-trophy.

Also Dexter Burkill's great Facebook page is a valuable resource. www.facebook.com/cagithunters?ref=hl



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There is also provision for entering a departure alternate and second destination alternate, settings which allow you to switch off enroute airport NOTAMS, settings which allow you to change the search radius, plus full use of the iPad screen size and interface features.

- PRICE USD\$12.99
- AVAILABLE Appstore



TABLET KNEEBOARD

THE MyClip iPad kneeboard/thighboard is designed for pilots who want a safe and secure way to use the iPad but have their hands free to tend to the business of aviation. With clips which attach in either portrait or landscape mode, a comfortable faux suede leg strap conveniently positions the iPad on the thigh for easy one-handed use.

Secured to the leg, users do not have the worry about their expensive iPad, Galaxy Note or other tablet slipping to the floor or getting in the way of controls. When the flight is over, the kneeboard is good looking enough to bring to the coffee shop to debrief the flight.

- PRICE Various
- WEB www.myclipforipad.com

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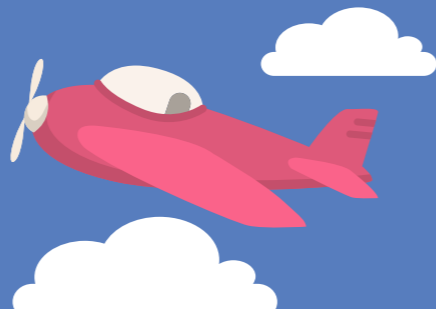
The sun visor assemblies are mounted to a patented multi-axis clamping system which allows flexible sun visor travel along the monorail. The vertical axis swivel allows the lens to turn 360 degrees. Each monorail is constructed of durable brass or aluminum rails with chrome or black anodised finish.

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- PRICE n/a
- WEB www.rosensor.com



History on display



Mustang

HOLBROOK is quickly becoming the place to go at Easter, now that Natfly is on a break.

The colourful little NSW town was actually the venue for the first three ultralight national fly-ins – before Narromine and then Temora became the preferred venues - and is becoming a must see place for recreational pilots to visit all over again, because that's where a lot of our history is being gathered.

The Australian Ultralight Aircraft Museum aircraft collection includes examples of historically significant aircraft from the late 1960s to the early 1980s. These aircraft all made important contributions in charting the course which led to the aircraft and flying freedoms we enjoy today.

The museum is a non-profit organisation and is officially supported by RAAus. Even if you can't make the Easter fly-in, a visit to the museum is well worth the journey.

For more information, www.http.holbrookultralightclub.asn.au



Cab Wasp



Steve Cohen Mustang

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912 A/F/UL | 80hp

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