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ON THE COVER

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Prime Time
BRIAN BIGG

“Did you ever think we’d see a time when an ultralight would cost the best part of a quarter of a million dollars?”

*The Blackshape Prime is about to make a big splash down under.
Photo: Blackshape Prime*



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Sincerely,
Rodney Stiff
Managing Director



Risk and reward

BY MICHAEL MONCK

I WENT flying the other day and did some aerobatics. There are procedures and checks to do when performing this type of flying which are all about mitigating risk. We aren't allowed to do aerobatics in RAAus aircraft but the topic of risk still applies to each and every one of us.

Before discussing risk, it is useful to understand what it actually is. I did a quick poll of a bunch of people in a client's office recently. I asked them what they believed risk was. I got a range of answers. Pretty much all of them boiled down to risk being something bad that happens. But it isn't.

Risk is made up of two components – the likelihood of something happening and the consequences of it happening. The two combined make up risk.

There are many different ways people use to rate risk but let's use a simple 3 x 3 matrix to explain it. On one axis we have the likelihood and we'll rank that as low, medium and high. On the other axis are the consequences, also ranked as low, medium and high. We won't touch the philosophical debate of what constitutes a high consequence or what might be low probability. Those are discussions for another day.

So if we have an event which is highly likely to happen, and the consequences of that event are severe, we have a high level of risk. If the converse is true, low likelihood and low consequence, it is a low risk. And in the middle, as always, there is medium.

So that's risk in a nutshell. A very simplistic and high level nutshell.

With flying, the consequences are almost always out of our control and, in many cases, they are high. I know I just said we'd leave out a philosophical discussion about what might be high consequence, but we can all agree dying is a pretty severe consequence. And, unfortunately when things head south for pilots, dying becomes a very real possibility. Often it is also something we can't control. Once we're in the air, if something terrible goes wrong we can very easily end up as passengers without much control over what happens next. This isn't always true. If we have an engine failure, our actions will influence the consequences. If we are prepared for an emergency landing and have a suitable field picked out within reach, the consequences change from certain death to very survivable. This doesn't change the thrust of the argument, though, in the sense that making good decisions can have a positive influence on risk.

On the other side of the equation there is likelihood. That's something we can control through our own actions. We can do maintenance, training and practice our flying skills. We can also think carefully about our decisions and do proper planning. It's all very much under our control.

Returning to my aerobatics example, there are a number of things which can go wrong. Fuel might be fed from the wrong tank, preventing the engine from running in sustained inverted flight. Something might be loose in the cockpit which could turn into a projectile during certain manoeuvres. And on top of this, I might not be ready for the flight.

I can address all these factors by being prepared. Getting a good night's sleep, checking the aircraft before each flight and doing additional checks during the flight, are all ways I can reduce the likelihood of something occurring - and thus mitigate my risk.

It's not just flying either. Risk is a consideration for everything RAAus, like any organisation, does. We have to consider how likely an adverse event will be and what would happen should that event take place. What happens if someone is sick and can't make it to work? How do we process registration renewals and Pilot Certificate applications? Who does the banking? Who answers phones? These are all office routine examples, but they are considerations nonetheless. Another interesting consideration is the way people view us.

Over the past few years we've had comments from a number of

people suggesting the direction we are heading is a positive one. These people range from politicians through to those in CASA and other notable figures. This all bodes well for us in terms of protecting our ability to fly and it also has benefits in other areas.

We have recently begun negotiating our insurance renewals. Our change to a company structure has also changed the likelihood part of our equation with respect to organisational risk. Because we need to demonstrate more rigour in complying with regulatory requirements, there is less chance we will stray back to the way we were sometimes in the past. A company limited by guarantee is governed by the Corporations Act and therefore has a better chance of avoiding some of the governance issues we've been through. And our insurers have noticed. The CEO is currently talking our insurers to get a better deal as a result of this recognition, the benefits of which will get passed on to members.

So risk is not just something we face as individuals, it's something the whole organisation needs to consider. As individuals, we each have a role to play in mitigating the risks we face as a collective. So next time you turn a spanner or turn the key, think about the likelihood of risk and consequences of an event, and think about how you can influence a change.

No doubt you'll benefit from being safer. As a group, we can all benefit from each other. ☺

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CALENDAR OF EVENTS



A. 10 SEPTEMBER WAGGA CITY AERO CLUB OPEN DAY

The Annual Open Day will feature parachuting, free flights, BBQ, Young Eagles, vintage cars, Cirrus aircraft display. For more information, waggacityaeroclub.com.



B. 10-11 SEPTEMBER YOUTH IN AVIATION

Enjoy a day out in Temora, visit the Aviation Museum and listen to live music and chat about your pilot experiences. Talk to top gun pilots to inspire you in your future endeavours. More information join our Facebook page, Temora youth in aviation.



C. 1-2 OCTOBER WINGS OVER MACLEAY

The regional air show will be held at Kempsey Airport, as a fundraising event to support local mid north coast charities. It's the first event of its kind for the area. The local council has recently spent \$2.5 million to make the airport a fully serviced aviation business park. The air show will be a family-fun day. Food, drinks and coffee onsite. For more information, www.wingsovermacleay.com.au.



D. 15 OCTOBER RAAF TOWNSVILLE AIR SHOW SPECTACULAR

The event will celebrate Townsville's 150th birthday and its long relationship with the RAAF. Fireworks and live music along the town's foreshore. RAAF Base will hold an open day the next day. The last time the city and the air force put on a show like this, 70,000 people turned up. For more information, www.airforce.gov.au/Interact/Displays/Air-Shows.

OZ-KOSH AVIATION SPECTACULAR!
6th - 9th October 2016, Narromine, NSW

Oz-Kosh is set to be the premier aviation gathering. Be it a model aircraft, hang glider, piston or turbine power, fixed or rotary wing, home built or manufactured.

If it flies or has anything to do with flying, it should be part of Oz-Kosh!

PHOTO COURTESY Royal Australian Air Force

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For more info call (07) 3188 9369 or email info@ozkosh.com www.ozkosh.com



CALENDAR OF EVENTS



G. 15-16 OCTOBER PORT LINCOLN AIR SHOW

Two days of mind blowing high speed action. From old to new with jam packed action and adrenalin pumping pyrotechnics. Aerial action by Judy Pay and Paul Bennet. For more information, <http://portlincolnairshow.com.au>.



H. 22-23 OCTOBER INDOOR FLYING EXPO

Channel 31 newcomer 'The Flying Show' will host a first-of-its-kind indoor aviation expo at the Melbourne Showgrounds. Exhibits will showcase the history of aircraft, including John Delaney's Wright Brothers Flyer replica project. Also exhibits on powered parachutes, gliders and paragliders, RAAus aircraft, model and hobby aircraft, drones, flight simulators, skydiving, hot air balloons and parachuting. More information, theflyingshow.com.au.

I. 26 NOVEMBER MT BEAUTY FLY-IN

Everyone is invited to be part of a unique fly-in/fly-out airports event at the finest mountain airstrip in the Victorian Alps. Fly-in to join a group of fellow aviators with a passion for air sports. Be prepared to share, experience, learn and have fun. There will be a unique mix of sport aircraft. Sat night unique runway dining event. For more information, 0417 084 400.

E. 8-16 OCTOBER SKYDIVE RAMBLERS EQUINOX BOOGIE

Australia's biggest international freetail and music festival. Held every two years. Including night skydiving under the full moon and concerts. New skydivers welcome. All jumps filmed and shown on the big screen. Food, cocktails, swimming. For more information, www.ramblers.com.au.



F. 15 OCTOBER ANTIQUÉ CELEBRATION

The Temora Aviation Museum will showcase some of its older models, including the Hudson, P-40, Tiger Moth, Spitfire, Ryan and Avenger. Gates open at 10am. For more information, www.aviationmuseum.com.au.

Warning: It is a requirement to check strip condition and details with owner

Bindoon (Chittering), WA

Var: 1.3°W

Right circuits Runway 27

Additional College 340(N) 1.6 NM

R134C The meridian at longitude 116° 12.4' East defines the western border of R134C (200 M from 27 Runway)

Power Line

Gravel pit

Surrounded by grass paddocks

Bindoon - Dewars Pool Road

Noise sensitive area south of the field

NOTE: TO THE TOP, DRAWING NOT TO SCALE

Elevation:	935 Feet AMSL	Time Zone:	UTC + 8
GPS Position:	31° 20.411' South 116° 11.293' East	Area Forecast:	60
WAC Charts:	Perth (3351), Albany (3462)		
Owner/Operator:	Catholic Agricultural College (08) 95761040, greeney@inet.net.au		
Strip Directions:	09-27		
Strip Length:	1400 M		
Strip Surface:	Unsealed - brown gravel		
Windsock:	Yes		
Strip Markers:	Tyres painted white		
Lighting:	Nil		
Fuel:	Nil		
Special Procedures And Remarks:	Used by the Superlight Aircraft Club of WA on weekends. This airstrip is located within Restricted Airspace. R134C is located just past late downslope runway 27, it is mandatory not enter this airspace (Refer VNC-SL Right circuits RWY 27, turn right circumscribed at 500 feet AGL. Bew performance aircraft). 700 feet AGL. High performance aircraft). Noise sensitive area exists south of the field, do not overfly farm properties south of the Bindoon - Dewars Pool Road unless emergency or operational safety requirement. Prior to operations, please consult the SLACWA Operations Manual Visitors Version, download at http://slacwa.org.au/wp/downloads/ . Latest information also: SLACWA (08) 9279 2984, (08) 94777595, Adrian Stoffels 0427 094552 (info@slacwa.com.au), Permission required prior to use.		

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J. 29 OCTOBER SUPERLIGHT FLY-IN

The Superlight Aircraft Club of WA invites pilots of all aircraft types to Bindoon Airfield to help the club celebrate its success at purchasing its airfield. On display will be club member aircraft including VH, RAAus, GFA and ASRA registered aircraft. Also a large display of vintage, veteran and classic automobiles from Perth car clubs. Food and beverages available. Pilots are welcome to stay overnight. Bring your swag and some stories to tell. RSVP no later than October 14 to club secretary, Robin Greeney robin@greeney.net.au or (08) 9279 2984



Bindoon (Chittering), WA



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LETTERS TO THE EDITOR

BUTTERCUP QUESTIONS

I enjoy reading *Sport Pilot* and have a question for one of the technical people or whoever is considered the expert on home building aircraft.

Having recently completed my Pilot's Certificate, I am quite interested in building a homebuilt LSA aircraft. I am interested in the little known Wittman Buttercup. It is a plans built aircraft with wooden wings and steel tube fuselage. Although Aircraft Spruce sell kits, I believe they are just some of the tubes cut to size.

In searching the web I have come across a couple of businesses using CNC technology to produce kits to significantly reduce build time. The first, Steen Aero Lab uses CNC to produce a steel bolt style wooden wing rib jig as well CNC mitre cut spruce sticks and plywood gussets to fit perfectly into the jig (steenaero.com/products/wingkits.cfm). I believe they are also able to produce wing construction jig as well.

The second, VR3 Engineering, uses a CNC tube profiling and bending technology to produce fuselage kits that apparently 'fit together like Lego'. This saves a lot of time bending and profiling the tube exactly. And the ability to quickly produce some practice cluster joints to perfect the welding technique before the main weld (<http://vr3.ca/aircraftlibrary.html>).

I believe this technology would shave a significant amount of time off the build and produce a more exacting construction. However Steen only produces wing kits for their Pitts aircraft while VR3 is in Canada which presents freight issues. I was wondering if there were any such similar services available in Australia? And if anyone has had any construction experience using these techniques.

GRAHAM STEVENSON

STALL POINTS

Professor Avius (*Sport Pilot* July 2016) said 'It is also fairly common most pilots believe they are most exposed to a stall when the power setting is low. It is certainly one aspect, but there are others - steep turns with the power on are also risk areas.'

I found this a little ambiguous. Yes, it's

certainly true that both power and angle-of-bank are important. Steep turns at cruising power/speeds, i.e those well above normal Vs - are not inherently risky. The risk is much higher in low power flight, e.g low level inspections, or turning from base to final on approach. Conducting a steep turn while in low speed/low power configuration is quite risky and always requires the application of power before or at the beginning of the turn in order to mitigate the effect of the lift which will be lost once banked. By increasing power, you will not require application of elevator, and so the load factor won't be increased. Makes it safer and simpler.

RALPH BURNETT

THE NOISE!

Further to the article stalls and spin (*Sport Pilot* July 2016).

My introduction to RAAus was some 18 years ago when it was AUF. I already had a PPL, however I needed an AUF licence to fly my new Sapphire which replaced an ageing 150g and a IS29 glider.

The only place I could do this back then was at Jandakot Airport, Perth. The aircraft used was a Gazelle. The instructor was an experienced GA instructor who, sad to say has now departed. The whole conversion seemed to be going well until he asked me to demonstrate a stall and an incipient spin recovery.

Now I had spent over 20 years with gliders, much of the time as an instructor where stalls and spins were a part of the GFA syllabus. So when asked to demonstrate, I went about my

usual procedure - check for placards, aerobatic check, throttle back to idle, stick back, wait for the stall, hold stick right back with rudder in the direction of the turn, then away it goes.

Then check the ASI to make sure the inside wing has stalled and the aircraft is not in a spiral dive. Three rotations then opposite rudder, stick forward and ease out of the dive.

The Gazelle responded well but what was the loud noise? Oh dear! It was the instructor, trying to explain to me that I was not to do any of that in an ultralight aircraft.

On landing, he climbed out and sent me off, telling me never to do anything like that again.

Full spin training is not permitted with RAAus aircraft for obvious reasons and I would suggest, as Dave King does, that RAAus pilots not familiar with the procedure, visit a gliding club for a few flights. They fly near a stall a lot of the time while in thermals and learn how to pick the wing up if a stall approaches. It becomes instinctive.

With about 800 hours of RAAus time, I am still not a good power pilot and, approaching 80 years, I guess I never will be. I believe, however, I am a safer pilot for understanding a bit more about stalls and spins.

These days I just fly along WA's beautiful and lonely south coast, from Albany East in my 160 Jab looking for sharks, salmon and whales, making some reports and thinking how lucky I am.

To Pat Hawe I say, go for it. There is a good coffee over the hill.

TONY CUSACK

FROM THE EDITOR / Good on you, Tony.



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).



AGM NOTICE

THE Board of RAAus invites all members to the 2016 Annual General Meeting

Saturday, October 15
Address: Adelaide Biplanes
Flight School
Aldinga Airfield, Colville Road
Aldinga, SA 5173

The day will begin with an RAAus sponsored Safety Forum 2.00 – 3.30pm.

The AGM will be held from 4.00 – 5.00pm. Any member intending to submit a reso-

lution should do so in writing prior to September 23. Members may appoint proxies to represent them.

Both the Safety Forum and AGM will be broadcast live on the web.

Following the AGM, RAAus will host a BBQ dinner at 6.00pm where the 2016 Maintainer of the Year awards will be presented. This will be a ticketed event (free BBQ with a cash bar) and seating will be limited to 120 people.

Michael Linke
 RAAus CEO



RAAUS GOES BIG AT OZ-KOSH

BY MICHAEL LINKE
 CEO

RAAUS is pleased to be taking part in an old style fly-in at Narromine from October 6 to 9.

Consider Oz-Kosh a return to NatFly – a traditional fly-in for members.

In addition to being able to catch up with mates from afar and rekindling old friendships, RAAus will also offer a number of important forums for members across the three day event.

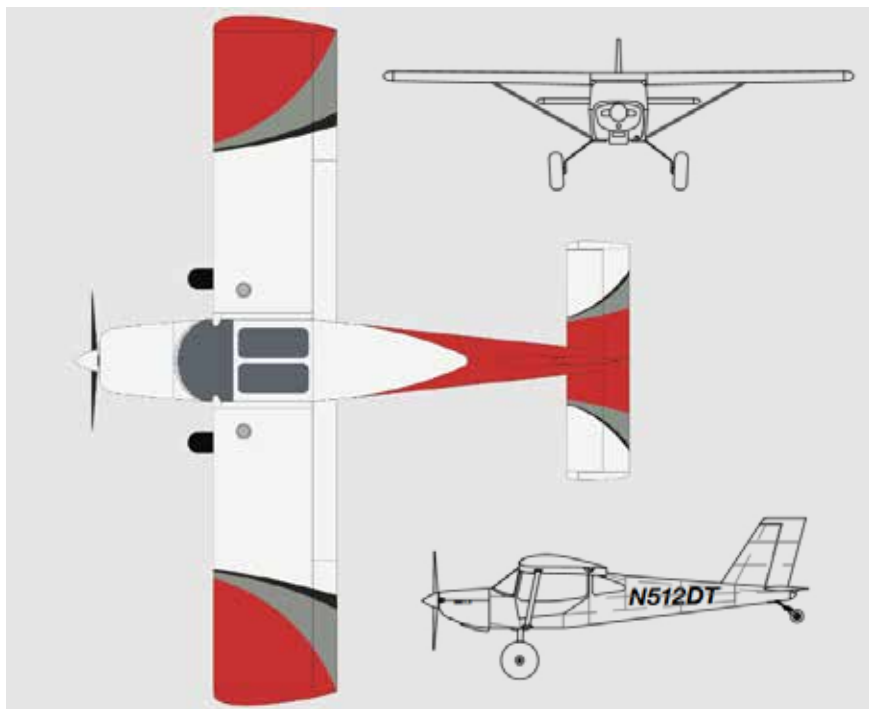
There will be news on the recently released Technical and Operations manuals, an important safety summit and updates from the CEO and chairman.

In all RAAus will offer members nine forums.

“I’d love to see hundreds of our members descend on Narromine in October. Some members want to see NatFly back. We think we’ve done better than that. We’ve partnered with the SAAA, HGFA and APF to bring an fun packed weekend of seminars and good old fashioned hospitality.

“Oz-Kosh is quite simply a weekend to get together and enjoy each-others’ company.”

RAAus is also encouraging CFIs to offer TIFs and invites manufacturers and importers to attend the event. To get involved contact RAAus directly by emailing CEO@raa.asn.au.



RANS' NEW OUTBOUND

RANS Aircraft has launched a powerful new kit STOL model.

The S-21 Outbound will have 180hp, a steel-tube crew cage monocoque fuselage, 360kgs of useful load, 800km range and all-metal design.

Rans says the new model will also assemble in record time.

“This is exciting for us,” says designer Randy Schlitter, “building a big two-seater with a lot of power and aerodynamics which allow both a high cruise and STOL credentials, and building in features which make assembly easier and more accurate than ever.”

The Outbound is an all-metal high-wing, single-strut design which can be either tail-dragger or tricycle. It mounts the 180hp

Titan engine (and can be configured for others, including a Rotax). Slotted flaps produce considerably less drag than other STOL configurations, allowing the Outbound excellent slow-flight characteristics while maintaining a respectable 130+ kts cruise.

The company says proprietary leading and trailing-edge extruded spars will make the wing cleaner and easier to build. The crew cage attaches to the main components, with an aft monocoque supporting the empennage. Making the build even quicker will be the fact that the aircraft doesn’t require paint. And finished sheet metal, powder-coating, and built-in protection mean the Outbound should stand up to years in the sun.

For more information, www.RANS.com



E LEARNING LAUNCH THE FIRST OF MANY

RAAus launched its first new online learning course in August.

The organisation has been developing a range of courses for members across a broad range of subjects.

The first course out the door is the L1 Maintainer Authority. Other courses are still in development and will soon be added to the list including weight and balance, human factors, safety management and L2 maintenance.

The purpose of the L1 Maintainer course is to provide pilots and owners with the basic knowledge required to maintain their own RAAus registered aircraft for private use.

The training package consists of a self-paced course which uses a range of resources. To be successful, you will be expected to engage in a range of activities such as reading, researching and using the RAAus online learning management system.

The L1 Maintenance Authority is a com-

pulsory requirement only if you wish to maintain your own aircraft. If you do not perform maintenance on your aircraft, you don't have to complete it.

The enrolment and assessment process has also been streamlined so your progress can be linked to your records, however you will still need to register an account with the learning system host, Canvas.

To get started, visit <http://tinyurl.com/hw3zgk9>.

DIGITAL DIRECTIONS

THERE are many ways to interact with RAAus these days.

Website: <https://www.raa.asn.au/>

Member portal: <https://members.raa.asn.au/login/>

Lodge an occurrence: <https://oms.raa.asn.au/lodge/>

Back issues of Sport Pilot: <https://www.raa.asn.au/sport-pilot-magazine/>

Subscribe to printed Sport Pilot: <https://www.raa.asn.au/sport-pilot-magazine-application/>

RAAus shop:
<https://shop.raa.asn.au/>

Sport Pilot online:

www.raa.asn.au/sport-pilot-magazine

ENewsletter:

<https://www.raa.asn.au/become-a-member/member-benefits/e-news/>



A NEW RAAUS

FOLLOWING the constitutional plebiscite in May, RAAus successfully registered with ASIC and the new company, RAAus Ltd, was officially formed on July 26.

Immediately upon registration, the existing membership privileges and rights of all financial members were transferred to the new company with equivalence to their current class of membership.

The new board held a meeting in Canberra on August 10 to put in place other administrative processes to continue the transition of RAAus Inc to RAAus Ltd.

Details of those decisions will be announced in the October edition of *Sport Pilot* and by email.

SP BACK ON THE STANDS

SPORT Pilot magazine is to go back on the newsstands for a limited time.

CEO Michael Linke approved the trial in July to gauge the response from the public to the magazine, which continues to be Australia's best aviation publication.

Sport Pilot was last sold publicly in 2014. Since then it has been available free of charge on issuu.com, to members via the web portal and the hard copy by subscription only. The hard copy continues to grow in popularity. There are now almost 2,000 subscribers nationwide. At one point in July, the office registered 100 new subscribers in just two weeks!

Because of its growing popularity, 3,000 copies of *Sport Pilot* will be distributed to newsagents across the country in September, October and November. A decision on whether or not to continue after that will be made when the results of this trial are known. Keep your eyes out for it.

In the meantime, if you want to subscribe to *Sport Pilot* at any time, email admin@raa.asn.au

VORTEX WARNING

CASA has issued a warning about the improper installation of vortex generators on wings and other surfaces.

And it has issued a new airworthiness bulletin about the potential for loss of control which can result.

A vortex generator typically offers the advantages of reduced stall speeds, reduced control speed, improved take-off and landing performance and increased maximum take-off weight. However, CASA warns that safety can be at risk from subtle wing surface defects upstream of the vortex generator array, as well as interaction between unapproved configurations or combinations of aerodynamic performance enhancements. This can include boundary layer control devices such as leading edge stall strips.

Eight recommendations are made in rela-



tion to wing asymmetries or other aerodynamic configuration problems which may only become evident during flight at low speeds and higher angles of attack.

CASA asks that all defects related to vortex generators or aircraft configuration anomalies be reported using its defect reporting system.

For more information, <http://tinyurl.com/j9ky8wq>.



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www.adelaidebiplanes.com.au | Aldinga Airfield Tel 08 8556 5404



FLIGHT TO THE SNOW

BY PETER MCLEAN

AFTER another great flight along the Murray River, the two pirate ships were put to bed for the night. Time for dinner and, more importantly, time to plan tomorrow's flight. Over dinner, the plan was hatched to fly to the snow (if the fog didn't stop us). The plan was to get ready to depart Yarrawonga at, or as close to 0700 hours, as possible. So the deal was done and the two pilots and aircrew were all ready for the flight tomorrow.

0600 hours. No fog... You little beauty! Hangar doors were opened and the aircraft moved out into the crisp morning air. Yes, it was cold. The sun cut itself on the trees at the end

"No fog...
You little
beauty!"

of the runway and bled all along the taxiway. Then it put a beautiful golden glow over the two QuikR pirate ships. Time to get going. The aircrew, made up of pilot, Ian, with crew member, Corina, in one ship, and me in the other. Aircrew, Anne, would have to stay behind today because her new hip was still not good enough for a two hour flight in the cold. The photo on the next page shows Anne's disappointment in not being able to come along.

Engines started and warming up, warming up... Gee, it must be cold! It took over twelve minutes to get them to 45 degrees. The two pirate ships taxied to the holding point. One after

the other they lined up and departed, in the cool but still air. The two aircraft climbed quickly to 2,000ft where the temperature was very nice. We made our way towards Wangaratta and kept a listening watch on Wangaratta and Melbourne Centre, but all we could hear were crickets. It seemed no one was coming out to fly today. The ground below us was very wet from the rain which had fallen over the past few months. We passed Wangaratta and started a gentle climb to 7,000ft. It was still quite warm as we made our way over the hills leading towards the town of Bright then we climbed higher and higher on our way towards Mt Buffalo. You could see the snow on both Mt Bogong and Mt Hotham. However, as we reached the top of Mt Buffalo, we could only see a small amount of snow on it. We flew over the top of the mountain and around the snow covered areas. There were a few want-to-be skiers playing around in the little bit of snow there was. After flying around the top of Mt Buffalo for a while, I decided to head down to make a low pass over Porepunkah runway. What a mistake that was. As I descended down from 7,000ft the air started to get cold. Then it dropped below freezing and I watched my oil temperature go from 100 degrees down to 50 degrees in a matter of seconds. By the way, so did my hands! Feeling quite cold I climbed back up to 5,000ft and headed back to Yarrowonga. I had told Ian not to follow me down because it was just getting too cold, and he heeded that advice so he and Corina stayed nice and warm. The flight back to Yarrowonga was just magic. The crisp clear sky meant we could almost see forever. Arriving back at the circuit we joined for runway 01 and allowed our aircraft to gently touch down. As we taxied back to the hangar and shut down, we reflected on our flight to the snow. Sitting down at the table in hangar 19 we looked at the photos we had taken. Another set of memories to keep forever.

Anne and I had done this flight a few years ago on the same date, July 17, and we agreed there was more snow back then. This was still a great flight, And soon Anne will be flying the friendly skies with me again, in her PulsR. ☺



Heading home

“As I descended from 7,000ft the air started to get cold”



Morning sun



Heading for the snow



Mount Buffelo



Anne left behind

And then I found my aeroplane

BY CRAIG AND CHRIS PAVITT

I have always enjoyed scenic views. Whether from a tall building looking over the city or a mountain looking out as far as the eye can see. I believed flying was the ultimate way of being able to enjoy such views. I got the flying bug during a flight in a Cessna as a teenager, when I was handed the controls during a flight from Mildura to Melbourne. Afterwards, though, my experience was limited to flights in airlines.

But my desire grew stronger. I considered myself to be a Youtube pilot. I watched countless videos over many years, but kept putting off the initial step of contacting someone to actually do something about it. When I did, I initially considered maybe flying a trike - until my attention was drawn to aerochutes when I saw one advertised for sale.

I watched another truckload of videos over many months, when it finally dawned on me that the flight characteristics of an aerochute would be much better suited for what I was looking for, travelling with a compact aircraft. What better way to see Australia than from an eagle's perch? I could also take an aerochute with me on holidays. Leaning on the cautious side by nature, I was also influenced by the outstanding safety record of the machine.

Eventually, I made the phone call and spoke to Stephen Conte, who spent a considerable amount of time answering my many questions and addressing the concerns I had, many of which stemmed from incorrect information I had read on the internet. Stephen sent me an information package and DVD and one week later, I booked my trial flight.

One of the major reasons I had delayed for so long was because I was worried my wife, Chris, would never be willing to give flying a try. I wanted someone to go flying with now and then so I didn't have to go on my own all the time.

I knew I was in for a real challenge. Chris does not like heights and even struggles to get

to the second step of a ladder.

Chris came along to my trial flight with no intention to go for a flight herself. She took video of my flight. On the tape you can hear her telling someone she didn't like heights and was not going up.

As I came to the end of my flight, I knew I really needed to get Chris up in the air. I knew if I got her interested, it would put her at ease with the idea of me flying and make my life much easier when it came time to tell her I was planning to buy an aerochute.

Back on the ground and with a grin from ear to ear, I pretty much ambushed Chris. She was suited up and harnessed in before she even had a chance to think about it.

I did half expect to see her unbuckling her harness and attempting to jump out mid-flight but, when she touched down, I was surprised to see her also grinning from ear to ear. She had really enjoyed her flight. I asked her "if I learn to fly, would you go up with me?"

After receiving an unexpected "most definitely" answer, the rest is history. We went straight from the trial flight to Coburg where we picked out an aerochute and signed up for lessons.

I recently went on a cross country flight as part of my training and was amazed by the views. Even more recently I went solo. This was an awesome experience and is something I will remember forever.

The aerochute has put the gift of flight finally within my reach.

My advice to the Youtube pilots out there and every other hopeful aviator - don't put it off for years as I did. If you have a desire to fly, don't wait. Book a trial flight today and start grinning like me. ✪



"I was also influenced by the outstanding safety record"



READER STORY



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FEATURE



*Maroochydore
Control Tower
photo by Karin
Middleton*

Explaining controlled airspace

BY MATT RAYSON

RAAUS WILL SOON PUT A CASE TO THE REGULATOR THAT RECREATIONAL PILOTS BE ALLOWED INTO CONTROLLED AIRSPACE.

It's a big call. It will require discipline and training to a level not normally expected of us. Bumbling around in the bush where no one can see you make mistakes is all well and good. Making the same mistakes in a busy air traffic corridor full of jets will bring the world down on your shoulders. As part of the controlled airspace submission, *Sport Pilot* will feature regular articles to assist recreational pilots understand just what it is we are asking for.



AT the mention of 'air traffic control', most of us would imagine a bunch of people sitting around a radar screen in air conditioned comfort, drinking loads of coffee, barking orders at pilots and thinking of excuses to deny pilots their requests. I guess, in some respects, that is accurate. But in defence of the guys and gals who man the VHF frequencies and deliver a world class service to us pilots, let me paint a better picture.

Just like a country is divided up into states, the world is divided up into Flight Information Regions (FIRs) that are assigned to appropriate International Civil Aviation Organisation (ICAO) compliant countries. Australia is responsible for two FIRs; the Melbourne

FIR (YMMM) and the Brisbane FIR (YBBB). Collectively they make up around 11% of the world's airspace. Airservices Australia is the authority appointed to administrate YMMM and YBBB.

Airspace within an FIR is classed as either Controlled or Non-Controlled. Controlled airspace is divided up into 'Classes' and parts of non-controlled airspace are sub-categorised as either Prohibited, Restricted, or Dangerous (PRDs). By designating parts of an FIR as controlled airspace, pilots can benefit from services delivered by an air traffic controller.

Across all FIRs, a layer from 60,000ft down to 30,000ft (the lower limit does vary) is designat-

ed as controlled airspace and to capture the major city airports, controlled airspace 'steps' down much like an upside down wedding cake. This section of controlled airspace is classified as either a Control Area (CTA) or a Control Zone (CTR). A CTR is the top section of the wedding cake (which is at the bottom in this analogy), which touches the ground and surrounds a controlled airport. A CTR is easily identified on a VTC as the area inside dashed blue lines. They're not very large portions of airspace, the horizontal boundaries rarely extend beyond 5-10nm from the airport within and usually only extend up to 1,500ft or 2,500ft from the aerodrome level. The rest of the wedding cake and the 60,000ft to 30,000ft layer is a Control Area CTA which is identified on the VTC chart as solid blue lines. The lower limit of each step identified by the blue letters begin with 'LL'. To enter controlled airspace (either CTR or CTA), a pilot must obtain a clearance from air traffic control (it is worth also mentioning that a

"Services available to pilots depend upon the rules the pilot is following"



clearance to leave controlled airspace is mandatory too, as the controller must release the pilot from the services being delivered). The services the air traffic controller provides are;

- To prevent aircraft colliding with each other in the air and on the ground;
- To prevent the collision of aircraft with the ground;
- To provide an orderly flow of traffic to expedite arrivals and departures at busy aerodromes;
- Provide information to pilots concerning matters of aeronautical safety (enroute weather and NOTAMS);
- To provide assistance to search and rescue to aircraft in need.

To prevent aircraft colliding with each other, most of us would again imagine the controllers sitting around a radar screen. But what of the parts of Australia not covered by radar? Air traffic controllers then rely on pilots communicating their po-

sitions and intentions and separation becomes more of a procedural operation rather than a visual one.

CLASSIFYING AIRSPACE

ICAO recognises seven classes of airspace; Classes A, B, C, D and E are classes of controlled airspace, and Classes F and G are non-controlled. It helps to think of the classes as rooms of a house; just as each room provides different functions, each class of airspace is classified by the services available within it. In Australia, we have all but Class B and Class F airspace; each CTR is classified as either C or D, CTA is classified as either A, C, D or E and the rest (non-controlled airspace) is classified as G.

In Class C airspace radar coverage is guaranteed; hence the reason you'll only find it at and around major capital city airports. In Class A, D and E airspace, the controller must rely on a procedural separation service. But there is more to

airspace classification than just this.

A knowledge of IFR and VFR is also required.

As we all know, VFR pilots need to maintain VMC (set horizontal and vertical distances from cloud and minimum flight visibility requirements, which vary with the class of airspace); we need to maintain VFR navigation standards i.e. navigate by reference to the ground or water, obtain a positive fix every 30 minutes; we need to remain at subsonic speeds (duh); and when in controlled airspace, observe any speed restrictions which may apply (so ATC can stack aircraft for arrivals at major aerodromes).

VFR rules are quite straightforward because the premise is that the pilot is solely responsible for seeing and avoiding traffic and terrain.

In IFR the requirement to maintain VMC no longer exists. To avoid terrain, the pilot must maintain a Lowest Safe Altitude (LSALT) and traffic separation becomes a joint responsibility between the pilot and the controller.

Explaining controlled airspace cont.

Avoiding terrain seems pretty straightforward (and it is. If you can't see, don't fly lower than your LSALT), but avoiding traffic becomes more complicated. Under IFR, air traffic control bears responsibility for traffic separation.

Because of the strict nature of IFR flight, controllers can rely on the ability of the pilot for procedural separation. They cannot expect the same from a VFR pilot because of the 'relaxed' nature of a VFR pilot (for example, a VFR pilot is not permitted in cloud, so would have to diverge from their given track manoeuvre to avoid it. An IFR pilot would maintain the track, making it much easier for the controller to direct traffic). This is why services available to pilots depend upon the flight rules the pilot is following.

A MATTER OF CLASS

In Class A airspace, ATC provides a full traffic separation service for all aircraft. The upper layer (30,000ft to 60,000ft) is all Class A but,

because of the distances from radar towers, the controller provides only a procedural separation service. The controller relies on the pilot making mandatory position reports and keeping within a strict tolerance on their flight path. None of us VFR pilots can get up that high anyway so it's of no interest to us.

In Class C airspace where radar coverage is guaranteed, ATC will separate IFR traffic from other IFR traffic and from VFR traffic. The controller will not separate VFR traffic from other VFR traffic, but will provide information on other VFR traffic and a suggested course of action. But unlike with IFR traffic, VFR pilots still hold the ultimate responsibility for seeing and avoiding potential collisions. All flights must obtain a clearance to enter Class C airspace.

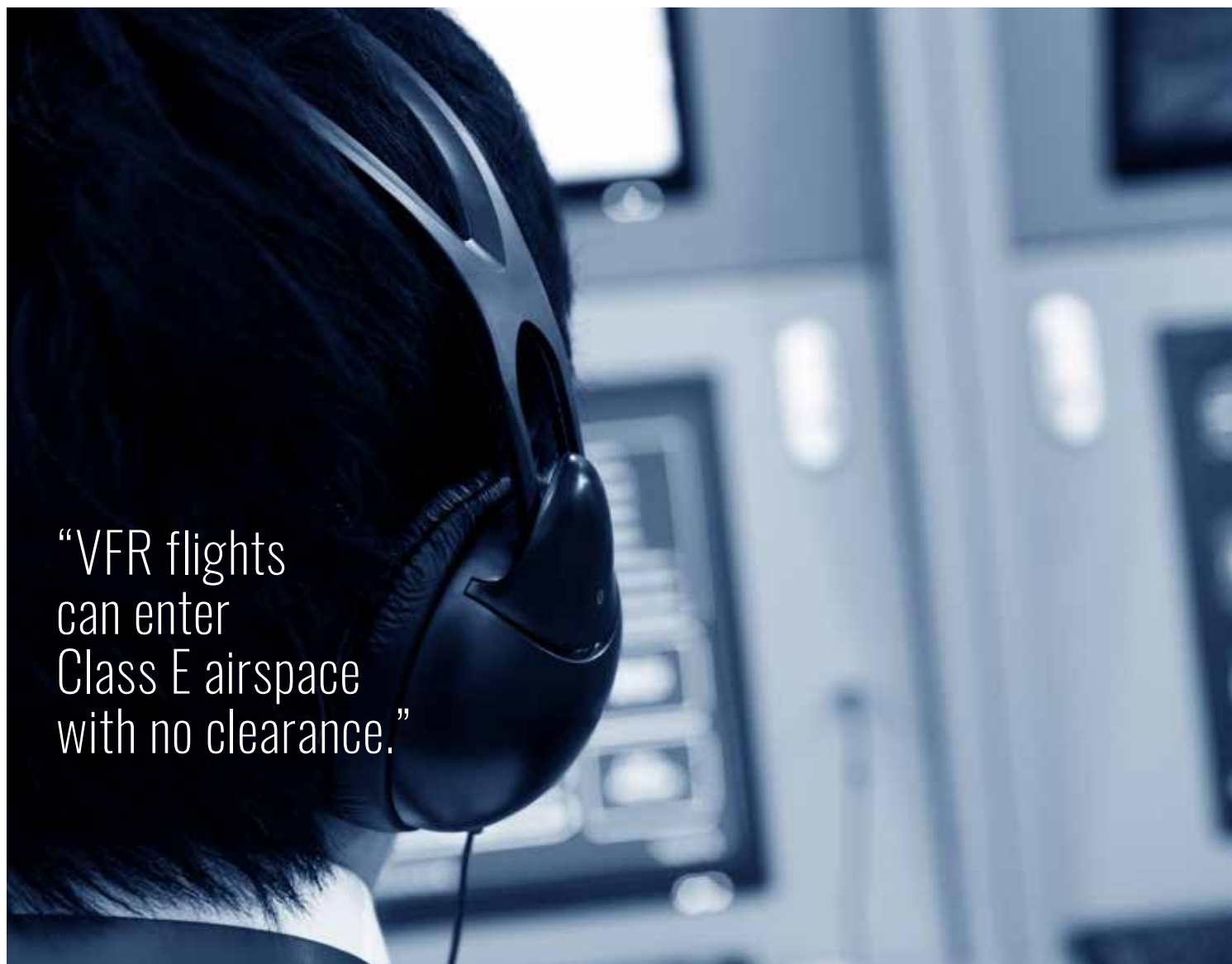
In Class D airspace, controllers provide a separation service for all IFR flights from other IFR flights, but not IFR from VFR flights (as in Class C). There is no radar service in Class D airspace, so the controller relies on pilots making radio

broadcasts of their position.

Class D airspace is only applied to major airports which require an ATC service but which do not have radar (i.e. Moorabbin, Bankstown, Jandakot and Launceston etc.). Class D regions are usually relatively small in size and the tower controllers use both radio broadcasts and binoculars to sequence and separate traffic. This is only practical in visual conditions. If the weather prevents visual means, the controller has only the radio to rely on - not enough to provide services to VFR pilots. All flights must obtain a clearance to enter Class D airspace.

Class E airspace is the same as Class A except VFR flight is permitted - and permitted without a clearance. IFR flights must obtain a clearance to fly in Class E airspace because ATC will provide them the same services as in Class A, which is full separation.

But VFR flights can enter Class E airspace with no clearance. That may sound dangerous, because it seems IFR flights must maintain vigi-



“VFR flights
can enter
Class E airspace
with no clearance.”



FEATURE

lance, but any VFR flight can wander around with no clearance.

But a VFR flight will only ever be in Class E if the pilot can maintain VMC, so it is reasonable to assume IFR pilots are also able to visually look for traffic. So in Class E airspace IFR pilots must be aware that, if conditions are visual, VFR flights may be sharing the airspace. VFR flights are required to have a transponder and, as such, ATC may be able to identify them and will certainly pass on their presence to an IFR pilot.

CLEARED FOR

The good news for pilots from a practical standpoint is that, when it comes to obtaining clearances, the VFR pilot can consider C and D together as 'requiring clearance' and E and G airspace as 'not requiring clearance'.

Only one clearance to enter controlled airspace is required. It's not necessary to ask permission each time you change steps, change



classes or change areas. ATC is like your bloodstream – it's interconnected and communicates with itself.

Prior to giving you clearance, the controller must identify you from all other traffic via your transponder. It receives the radar signal and, rather than just bounce that signal back, it transmits a response to the radar with a four digit squawk code and a pressure altitude reading. The controller will give you the squawk code to dial in. They will use it to identify you on their screens.

AIR TRAFFIC CONTROLLERS

Air Traffic Controllers come in three flavours Aerodrome Controllers, Approach Controllers and Area Controllers.

Aerodrome Controllers provide services to all flights (in the air and on the ground) within CTRs (regions of controlled airspace which touch the ground and surround a controlled airport).

Approach Controllers provide services to all flights within CTA for the part of the flight associated with the arrival to, or departure from, a controlled aerodrome. In some instances, flights transitioning over the top of major controlled aerodromes may also have services provided to them by an Approach Controller.

Area Controllers provide services to all flights within CTA for the part of flight not associated

with the arrival or departure, or within a CTR.

The Aerodrome Controllers are posted in the control towers. Approach and Area Controllers are stationed in one of two major air traffic control centres - Brisbane or Melbourne. The Brisbane centre administers the Brisbane FIR (if a line is drawn across Australia from Sydney to Broome, it's the area to the north east of that line) and the Melbourne centre administers the Melbourne FIR (the south west of that line). So a flight arriving at Perth is controlled from Melbourne, until such time that it enters the Perth CTR and is handed to the Perth Aerodrome Controller.

Areas within a FIR are divided up into Flight Information Areas (FIAs), and an Area Controller is assigned to each. FIAs are easily identified on the VTC map as solid green lines, and the VHF frequencies of the Area Controller assigned to that FIA is printed in green. When transitioning from one FIA to the next in CTA, the Area Controllers (who are most likely sitting next to each other), will hand you over and discuss your intentions well before you get the instruction to change VHF frequencies. When you do change VHF frequencies, there is no need to identify your position and intentions, because the next Area Controller has already been briefed. You'll just need to confirm your altitude because that's the only piece of information which cannot be determined looking at a plan view screen. ✕



BLACKSHAPE PRIME TIME

BY BRIAN BIGG



YOU HAVE TO
HAND IT TO
THE ITALIANS.



THEY never do anything mechanically half arsed. Think Ferrari, Lamborghini, Alfa Romeo. Outrageous, ostentatious, desirable, beautiful machines.

I have owned two Alfas. The second one, a 156, is the only car I have ever truly loved. If I had to go across a 10m wide road to return a video, I'd drive there in the 156 rather than walk it. It's almost as if the Italians have a cultural imperative to only make sexy machines.

When RAAus National Tech Manager, Darren Barnfield, told me recently he'd approved the Italian Blackshape Prime for membership into the RAAus community, my first thought was of my beloved Alfa. It was almost as fast as the stodgy BMW3 (206kmph on the German Autobahn was flat out) and too expensive compared to other similar machines. But strap it into the hilly and winding roads around the highlands of Scotland (which I did several times) and my 156 came alive in my hands, like a thoroughbred horse. Ah, the joy.

Don't get me started on my beloved Alfa.

So while most aircraft manufacturers, from sensible logical countries like Germany and the Czech Republic, proudly declared their machines are perfect for beginners (schools are a big market after all), not the makers of the Prime.

I sat down with Blackshape Managing Director, Angelo Petrosillo, in Sydney recently and almost the first thing out his mouth was that the Prime was not for beginners.

It's a high performance two seater made of carbon fibre and aluminium. It only weighs a bit over 300kgs wringing wet, but it has a VNE of 165kts, retractable undercarriage and is stressed to +4/-2, so if RAAus aircraft were allowed to do aerobatics (which they are not), this would be a performer favourite at every fly-in.

It's a damned sexy looking aircraft. Everyone's first comment is that it looks just like a fighter. And just like a fighter (or a Lambo or Ferrari for that matter), the Prime is expensive enough to make your eyes water.



AIRCRAFT



BLACKSHAPE prime

SPECIFICATIONS

Engine: Rotax	Rotax 914 ULS3
Wing area	9.51sqm
Wing span	7.94mt
Height overall	2.41mt
Length overall	7.178
Fuel Tank Capacity	2 x 50 lt
MTOW	472.5 (up to 620)
Max baggage weight	20kgs
Cruising Speed VC	280km/h
Stall Speed @Flap LDG	65km/h
Range @75% MCP	1100km
Endurance @75% MCP	4.5h
Max rate of climb	1450ft/min
Max Load Factors	+ 4 / -2 g

Did you ever think we'd see a time when an ultralight would cost the best part of a quarter of a million dollars? What is the world coming to? Our pioneers begrudged spending more than a \$1,000 on their flying machines. \$240,000 for a two seater? Really? As Angelo told me, it's not for beginners.

The Prime started life as the Millennium Master, a 2007 design, which itself was a development on an earlier wooden kit called Asso X. Blackshape bought the rights to the Master in 2011, got to work in southern Italy to develop the design further and make it comply with Fédération Aéronautique Internationale microlight rules. Eight months later, at Aero 2012 the company formally launched the Prime. It was an instant hit. They have been selling 11 or 12 a year since.

Angelo and his partner, aeronautical engineer, Luciano Belviso, have so far sold 50 aircraft, primarily in The Netherlands, South Africa and Canada.

Angelo says Australia is to be the fourth leg of

a worldwide co-ordinated structure of sales and support. Surprisingly, or perhaps not considering the sophistication of the aircraft, the main customers have been national air forces.

Did you ever think there'd be a day when an air force would fly patrols in an ultralight? I ask again, what is the world coming to?

Angelo quite proudly told me the Prime had the honour of being the first ultralight to ever take-off and land on an aircraft carrier. The Italian navy bought them for low cost patrolling and Angelo and the company's test pilot were asked to do a circuit to show the navy it was practical. Because of the 20kt headwind, they only used 30m of the carrier's 130m deck runway. Take that Boeing.

As well as looking drop dead sexy, the Prime has some serious cred under the skin.

Angelo likes to boast it uses the same high tech as the Boeing 787. Each Prime, he says, leaves the factory exceeding their expectations.

The aircraft uses quality prepreg fibre, steel



“You won’t want to venture into this machine until you have a few hours of fast and furious under your belt”

151kts cruise

BLACKSHAPE PRIME TIME

4.5 hour endurance



AIRCRAFT



rate of climb 1,150 fpm



Tricycle retractable landing gear electrically actuated

and aluminium. The low wing configuration and the low fuselage cross-section shouts high performance and agility.

It's available with either of two engines: the Rotax 912 or the Rotax 914. The performance of each is well known to most of us. A Dynon Skyview takes care of the avionics, also well known to most of us. The Skyview integrates a transponder module and is available with additional autopilot panels and backseat display.

High performance means the Prime has to take special care with safety. Military certified wiring is standard, there is an advanced circuit breaker system, plus temperature and fuel capacity sensors. In addition, the aircraft comes with four point certified safety belts, ballistic parachute and anti-blast fuel tanks.

You and your best friend in the back will blast around the country at 148kts, burning 15-20 litres an hour. Angelo says the Prime has a range of 1,100kms.

According to reports from Europe, the trade-off for the streamlined shape is a sudden and strong stall.

Another reason why the Prime is not a good choice for a beginner. You won't want to venture into this machine until you have a few hours of fast and furious under your belt. An aerobatic endorsement wouldn't go astray either. Being able to recover from unusual attitudes is probably something you will need at some point.

Flying the Prime in Australia will have to

wait until Angelo chooses a local distributor, which is why he was here in July. There are several hopefuls with their hands up, but a final decision will be a difficult one.

Angelo quite correctly says the Prime is not positioned to be a market leader. It's actually the only aircraft in an entirely new niche.

He says his potential customers will come from one of four potential pools – high net worth individuals who already fly recreationally, GA pilots looking for a simpler life in RAAus, schools which specialise in high performance training and the government.

It going to take a new and specific approach to its sales and marketing if it is going to achieve the potential it reached in other places. So choosing a distributor will be a complex decision.

The first Prime will land here in September. I've already begged Angelo for a flight when it arrives.

Just a month later the company will officially launch a bigger, meatier sibling for the Prime called the BK160. That will be a GA aircraft powered by a chunky 160hp Lycoming.

It will retail for a lazy Eur300,000 (AUD\$430,000). Another gorgeous model from a country which specialises in gorgeous models.

The Prime is going to cause fights in some households when it arrives. You know you will want one because you know that at the next fly-in, you will be swamped with pilots who want to be your new best friend. But, just like a Lambo or Ferrari, you will have to sell your children to afford one. Start packing kids. ☹️

“Expensive enough to make your eyes water”

Getting ditched part 3

BY RICK FRITH

PART 3 OF A MULTI PART FEATURE ARTICLE ON THE DANGERS OF FLYING OVER WATER AND THE EQUIPMENT AND TECHNIQUES YOU NEED TO CONSIDER WHEN THE NOISE UP FRONT STOPS AND YOU FACE THE PROSPECT OF GETTING WET. IN PART ONE (*SPORT PILOT* JULY 2016), RICK DISCUSSED THE DANGERS INVOLVED IN DITCHING AND THE FOUR CRITICAL STAGES TO AVOID IF YOU WANT TO SURVIVE THE EVENT (COLD SHOCK, SWIMMING FAILURE, HYPOTHERMIA AND POST-RESCUE COLLAPSE). IN PART TWO (*SPORT PILOT* AUGUST 2016) HE LISTED THE EQUIPMENT HE TAKES ON EVERY OVERWATER FLIGHT. IN THIS INSTALMENT, HE TAKES ALL THAT PREPARATION AND EQUIPMENT AND GETS INTO THE AIR.

I ALWAYS submit a flight plan for an over water leg and upload my proposed itinerary and list of emergency equipment to the AMSA website. Items like the life raft design can significantly effect the mathematical drift models used to predict the likely position of survivors. Also, if rescue aircraft know you are carrying a red laser, or fluorescein dye, they are more likely to recognise you during a search. If hypothermia is a concern, the search may not be abandoned so soon if authorities know you have a life raft and thermal blankets. All information helps your chances of rescue.

My overwater pre-flight checklist includes donning the emergency gear (wetsuit, life jacket, PLB, hook knife), securing the helmet and ditching bag in an accessible location, checking my sharp knife is in the door pocket and paying particular attention to securing all other loose items in the cabin. The deceleration forces when stopping in water can be massive, as noted by two of the survivors I spoke with, so loose items can be a serious hazard on impact.

OVERWATER

A flight plan will facilitate over water, scheduled position reports, or 'skeds'. These are radio calls made to centre every 10 or 15 minutes (as the pilot nominates) confirming "ops normal", current position and time of next call. See ERSA Gen SP 1.2. I set up skeds crossing the coast and fly at the highest practical altitude given cloud base, controlled airspace and hemispherical cruising levels. This ensures the furthest radio range and maximum time before hitting the water if the engine fails. Skeds are cancelled on safe arrival after the crossing.

My second action on crossing the coast is to carefully note the direction and strength of the prevailing wind at sea level (normally the direction of the waves) and the direction of the major swell, which may be in a very different direction to the wind. The swell direction is difficult to pick below 2,000ft, but the wind direction and strength is easier to read down low. Forecast swells and waves are available here: <http://www.bom.gov.au/australia/meteye/underwaves/forecasts>. The map shows total wave heights

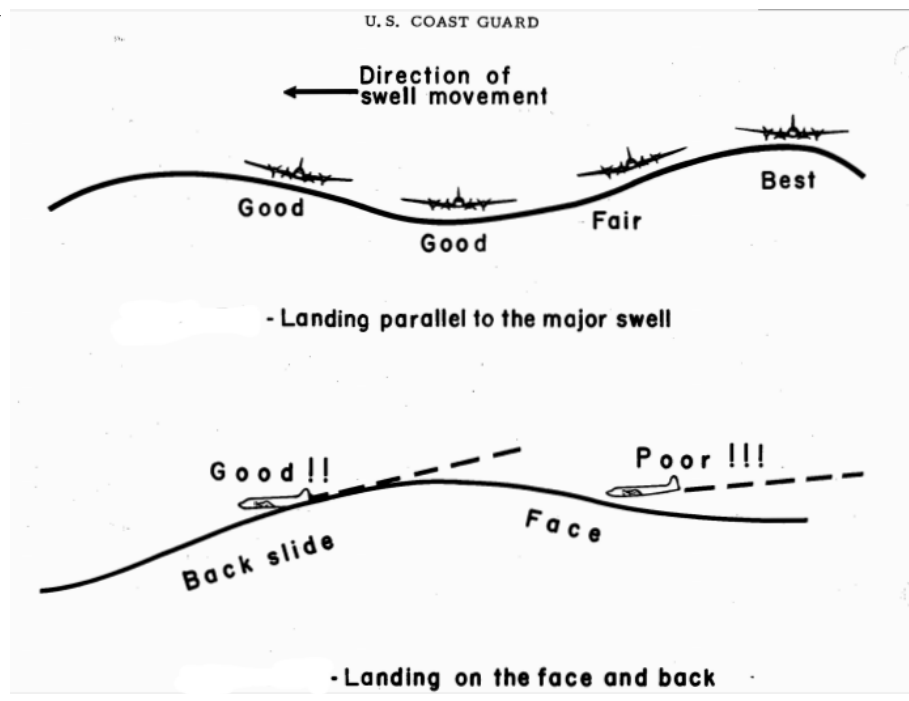


Figure 1 - Swell Ditching Angles

and the direction of both the two largest swells. Wind and swells determine the best direction to fly when hitting the water.

At first glance, it may seem best to ditch into the wind and land at the slowest possible speed. However, if the swells run in the same direction as the wind, the aircraft may hit the face of a swell and be severely damaged. Note there can be swells running in different directions. The largest or primary swell is the one which will normally determine your ditching direction. Ditching along the axis of the major swell is therefore the recommended direction, unless the wind is very strong (say 20kts+) in which case the landing should be into the wind - on the back of the swell. This is shown in Fig 1. The POH may also specify the preferred wind speed to swap direction.

Having established these factors, I then record my proposed ditching heading and review it after every sked call, because conditions do change. A westerly swell, for example, can dif-

fract around King Island and change direction by 45 degrees in quite a short distance. Rounding Cape Howe and Tasman Island will also show large changes in swell direction.

I always keep track of my position in transit, because precious seconds can be lost if I cannot immediately give my aircraft position in a Mayday. I have heard skeds which reference headlands and bays not shown on the charts, but I use mapped features or GPS miles to run.

I am now set up to just fly along and enjoy the view ... until the engine stops.

DESCENT AND IMPACT

I have printed a ditching checklist and I always attach it to the panel on overwater flights. It reads (without the explanatory notes):

- **FCMOST** - Standard engine failure procedure. If unsuccessful, then;
- **Mayday** - Call sign, Engine Failure, Ditching, Position, POB;

- **Squawk 7700**
- **Trigger PLB**
- **Slow to minimum descent speed** - This is usually a bit slower than best glide speed and will maximise time in the air. If I think I can reach land, best glide speed is preferred, but the temptation is always to stretch the glide too far. It is better to ditch than stall/spin into water trying to reach a beach;
- **Turn onto ditching heading**
- **At 2,000ft** - (Four minutes to impact in my aircraft);
- **Confirm swell direction** - Last chance before height too low to judge;
- **Remove and stow headsets** - Unplug and stow the leads to prevent tangling in them;
- **Don crash helmet**
- **Jam doors open** - The airframe can distort on impact and prevent the doors opening. Check POH if flying an aircraft with gull wing doors or a bubble canopy, as opening them may not be permitted in flight. If so, carry an escape hammer to smash the Perspex if jammed. High wing aircraft often have doors which can be locked open, with the lock bolt outside the fuselage preventing the door from closing. Ensure all doors are opened not just the nearest one;
- **Tighten seat belts** - These should be as tight as possible, even painful, since the forces will be extreme on touchdown;
- **At 1,000ft** - (Two minutes to impact in my aircraft);
- **Full flaps** - or as stated in the POH. Low wing aircraft may specify partial or nil flaps to avoid premature contact with a wave crest;
- **Thumbs clear of control column** - If the elevator is forced upwards by impacting the water with the nose held high, the control column can be forced backward, breaking your thumb if it is around the stick. Lay the thumb along the index finger;
- **Confirm wind direction** - It may be different to that judged at height. I have an EFIS which displays winds aloft;
- **Steer for swell or wind**
- **Remove glasses** - assuming you can still see well enough to fly the aircraft;
- **Brace** - With spare hand not holding the control column;
- **Hold minimum safe airspeed** - Some sources suggest maintaining sufficient airspeed to allow a flare at touchdown to wash off forward speed. Having done several parachute jumps into water, I do not believe I could safely judge the flare height and not risk stalling, especially along a rolling swell. I prefer to impact at a minimum airspeed;
- **Deep breath** - Just before impact.

GOLDEN RULE AT IMPACT

Do not move from the brace position until the aircraft has come to a full stop. The impact will be violent, the windscreen may collapse as the nose digs into the water, the aircraft may cartwheel if a wing catches a wave and you may be submerged, inverted and tossed around before the aircraft becomes to rest. Disorientation can be

life threatening. Maintaining the brace position throughout the impact will maintain your frame of reference within the aircraft. If the door was on your left in the air, it is still on your left even if upside when coming to a rest.

ESCAPE

If the aircraft is filling with water, take a new deep breath and wait until the pressure against the door equalises. Grasp the door frame with one hand as a reference point before using the other hand to unbuckle the seat belt and ditching bag. Exit the aircraft, keeping the firm grip on the door frame for reference. The ditching bag may be buoyant and pop up against the fuselage if it is under water. Use the light to judge which way is up. Do not follow bubbles; they may lead into the tail of the fuselage.

All this assumes the occupants are conscious when the aircraft comes to rest... it is why a crash helmet is so important.

If you have a passenger, it may be necessary to re-enter the aircraft and/or assist the passenger to exit. It is this escape phase, with the shock of impact and possibly cold shock gasping or hyperventilation, where the EBS system may save your lives.

Practical training is available for the egress phase of ditching. It is called HUET training or Aviation Escape Training. A one day course costs around \$700 to \$1,000+ and is available in most capital cities and many regional locations. The training involves the theory of survival and practical experience in escaping from a dunker' cage or mock up helicopter fuselage, under various circumstances, including inverted underwater. Although never as stressful as the real thing, such training can be quite realistic in showing you the difficulties you might face. When I first did such a course, I always chose the most difficult escape position (such as behind the pilot with a small exit window) to add to the stress.

SURVIVING IN THE WATER

It is only after exiting the aircraft, and possibly re-entering or diving down to assist passengers, that you should inflate your life jackets. If you do it within the aircraft, escape may be impossible. In this case, you may need the knife you have for deflating the life raft.

After exit, I would have my ditching bag tethered to my belt on the lanyard and so would inflate the life raft and get out of the cold water as soon as possible. Even though it may feel colder out of the water than in it, heat loss is always far greater when submerged in water than when in the air.

Entering a life raft can be difficult, particularly if you are injured or in rough seas. One survivor told me he spent almost 30 minutes trying to board a life raft in strong winds and rough seas. The raft was capsized by the wind every time he pulled himself up the side. It was only with a determined effort to remain calm did he finally work out a solution and climb on board.

The cheaper floatation solutions can be trained in the surf or a swimming pool to master entry techniques. A fancy TSO raft might only be

used in practice when its expensive repack date comes due.

ON THE RAFT

One of the first things to do is take sea sickness pills to reduce the chance of vomiting and dehydration. Also application of sunblock may be advisable.

If the only comms you carry is the GPS beacon, survival now becomes a waiting game for rescue. In general, it is not safe to swim to shore, unless it is very close and the water is warm. If VHF, mobile or sat phone is available, it would be best to let centre or AMSA know your situation, if only to confirm the beacon activation is genuine. If using VHF, it will probably be necessary to relay your message via overlying aircraft.

As mentioned above, if the beacon is not GPS capable, searchers will only know your position to a few kilometres. The signalling equipment carried in the ditching bag would probably be needed to help zero in on your position. ERSA EMERG 4.6 also has some useful tips on sea survival, especially if you have no life raft. Laminate a copy and add it to your kit.

SPECIAL CASES

As in life, there are exceptions to the rules. I often fly Victor #1, the offshore coastal VFR route in Sydney, where the altitude is limited to 500ft due to overlying controlled airspace. This means that less than 60 seconds are available between engine failure and impact. Allowing 15 seconds for a Mayday, there is barely time to complete many other steps in the checklist. The essential things to do are to turn onto ditching heading, lower the flaps, tighten the belts, open the doors and don your helmet. My priority here is to remain conscious during the impact and exit the aircraft. Triggering PLBs and initiating searches are of secondary importance to me until I am safely out of the aircraft, especially given the number of boats in the area which may well pick me up. If you have a passenger, they should be briefed to trigger a beacon, after tightening their belt and opening their door.

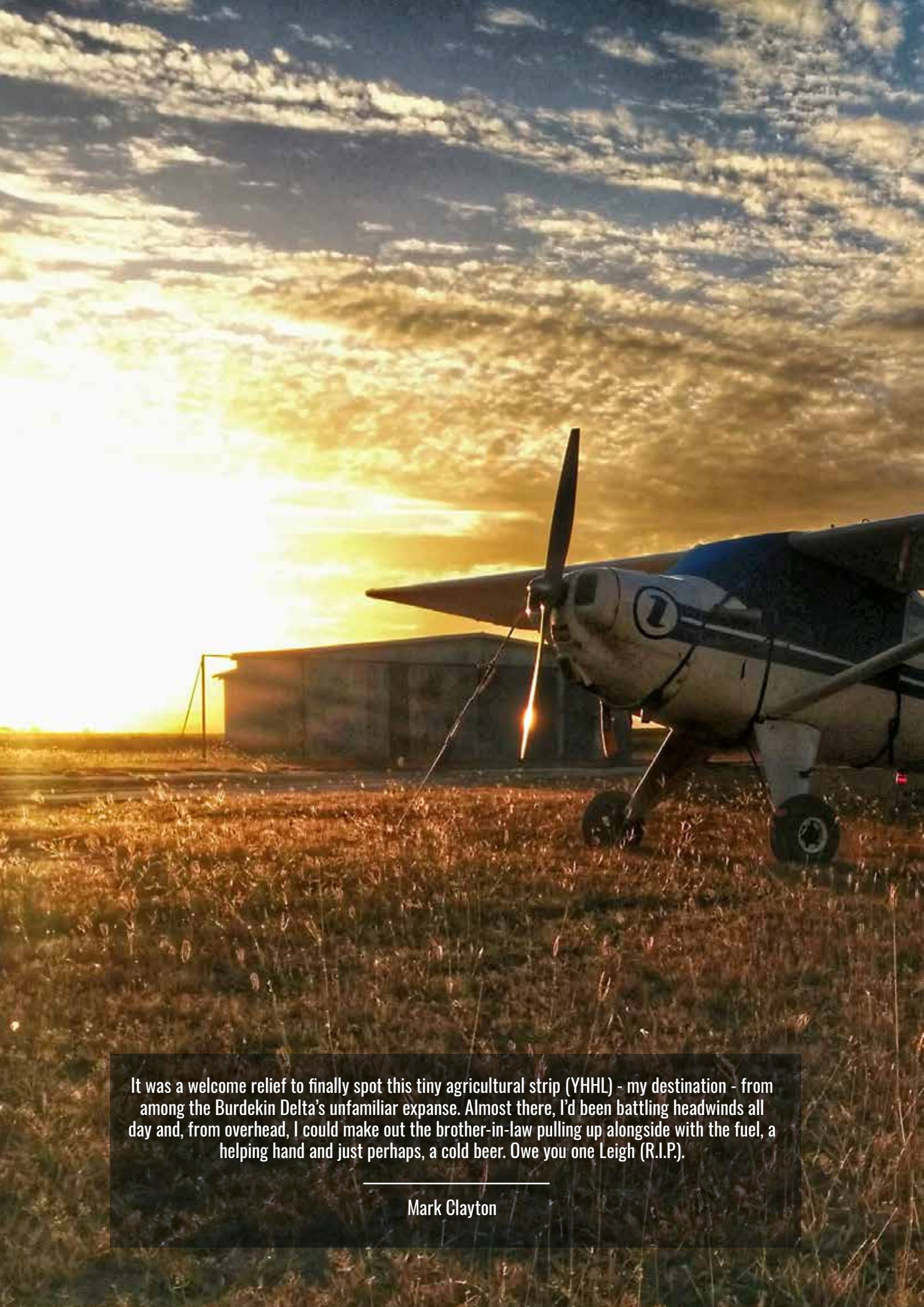
A second danger is the temptation to attempt a beach landing, which risks stretching the glide and stalling. It is safer to pre-commit to ditch if properly prepared than it is to stall and hit the water out of control.

Circumstances change and some forethought and planning for a particular trip may save your life.

It is particularly important when planning an overwater flight.

The saying goes for single engine aircraft is that you should never fly further over water than you are prepared to swim back. But, with the proper preparations, you should have every confidence that your survival chances will be pretty good if the noise up front suddenly stops and you face the prospect of getting wet. ☹

For a timely look at what happens when your fixed gear aeroplane touches the water, see <http://tinyurl.com/hddfhbl>



It was a welcome relief to finally spot this tiny agricultural strip (YHHL) - my destination - from among the Burdekin Delta's unfamiliar expanse. Almost there, I'd been battling headwinds all day and, from overhead, I could make out the brother-in-law pulling up alongside with the fuel, a helping hand and just perhaps, a cold beer. Owe you one Leigh (R.I.P.).

Mark Clayton



POSTER OPPORTUNITY

Want to see yourself or your aircraft larger than life on your clubhouse or bedroom wall? *Sport Pilot* is offering subscribers the chance to show off their favourite aviation photo in this double page centre spread of the magazine each month. Each edition one photo will be chosen (We will try and make sure every photo sent in gets a run). If you are an aircraft seller, it's a great chance to show off your product. If you have a fancy paint job, now is the time to show it off. And if you have a great photograph of you and your mates at a fly-in, it will make a good memento. Send your photos (As separate jpeg attachments please) to editor@sportpilot.net.au.

It obviously has to be in landscape, not portrait, mode and be as big a file as possible please.



BOLTS AND TORQUE

The rule of thumb for determining bolt length is that the bolt must be long enough to pass through the parts or material being fastened together so that: The threaded part of the bolt is never in shear (no threads are allowed inside hole); no more than three and no less than one thread must be showing when the nut is attached and tightened to the correct torque value; at least one flat washer must be used under the nut and no more than three are allowed; if you need more than three washers use a smaller bolt.

More precise determinations of grip length are found in a number of books, including the Standard Aircraft Maintenance Handbook. These are a must for all RAAus L1, L2 maintainers.

BOLTING PRACTICES



The bolts used in aircraft are about .001 to .003 inch smaller than their nominal diameter. This permits them to be installed in a properly drilled hole. The bolt should lie solidly against the surface of the material. Burrs must be removed before it is inserted and the shank (grip) should extend entirely through the hole, no threads should be in contact with the bearing surfaces.

Most applications with bolts require the use of a washer, use the specified type and torque to the specifications of the manufacturer.

BOLT TORQUEING

The following information is provided for reference when using AN grade hardware. Occasionally bolts, other than a standard bolt, will be required. Ensure these special bolts are used where needed.

The aircraft designer selected them because they provide the strength for the connection in a place where a standard bolt cannot.

STANDARD TORQUE TABLE (IN INCH/LBS)

Bolt Size	Fine thread series		Coarse thread series		
	Standard Nuts	Shear Nuts	Bolt Size	Standard Nuts	Shear Nuts
10-32	20 - 25	12 - 15	8-32	12 - 15	7 - 9
1/4-28	50 - 70	30 - 40	10-24	20 - 25	12 - 15
5/16-24	100 - 140	60 - 85	1/4-20	40 - 50	25 - 30
3/8-24	160 - 190	95 - 110	5/16-18	80 - 90	48 - 55
7/16-20	450 - 500	270 - 300	3/18-16	160 - 185	95 - 110
1/2-20	480 - 690	290 - 410	7/16-14	235 - 255	144 - 155
9/16-18	800 - 1000	480 - 600	1/2-13	400 - 480	240 - 290
5/8-18	1100 - 1300	660 - 740	9/16-12	500 - 700	300 - 420
-	-	-	5/8-11	700 - 900	420 - 540

Reference: Standard Aircraft Maintenance Handbook

BOLT INSTALLATION RECOMMENDATIONS

Certain standards are to be followed when installing bolts in aircraft, some of these recommendations are:

- **Keep bolt and nuts free from grease and oil when installing and torqueing;**
- **Always use a calibrated torque wrench and correct torque values for the bolt and part;**
- **Torque with smooth even pulls;**
- **To determine the bolt length, a minimum of one thread must be visible outside the nut and no more than one thread can be inside the bolt hole;**
- **Typically you would use a bolt and a nut with a washer under the nut as bearing;**
- **When the bolt is too long you may use no more than three washers, but this increases weight;**
- **Nyloc self-lock nuts should be used with undrilled bolts; when using a drilled bolt, make sure no burrs exist;**

A good rule of thumb is to install bolts pointing aft and to the centre of an aircraft. Remember with all these applications, always follow the manufacturer's Maintenance Schedule where applicable. ✖

MAINTAINER OF THE YEAR

TIME RUNNING OUT!

THE time is running out for you to call out your choice for RAAus Maintainer of the Year.

This is a long overdue recognition of the people who keep our aircraft in the air. Nominations close on September 30.

The award will be the first time RAAus showcases the knowledge, experience and integrity of our L2s. Look around your airfield. If you think your L2 has the special traits and qualities to become the organisation's first Maintainer of the Year award recipient, get the form and nominate them.

Each state will have its own finalist. The awards will be judged by an independent panel of members from the recreational and GA community.

MAINTAINER PRIZES

First prize will be a return airfare for one person to the EAA Oshkosh Fly-In 2017. The prize will include meals and accommodation.

There are other prizes too, thanks to the generosity of our sponsors.

- Jabiru Australia will supply a Jabiru engine course;
- Bert Flood imports will supply a Rotax engine course;
- The Industrial Shed will supply a Bahco tool set;
- Peter Harlow from Foxbat Australia will supply a flyaway toolkit;
- Bolly Propellers will donate a 3 Blade BOS 3 Ground adjustable propeller.

For more information, www.raa.asn.au. ✖





The changing face of trikes

WHEN I first saw a trike, it didn't impress me much. It was no more than a hang glider wing with a lightweight frame and a chainsaw engine strapped to the back. As I said, I was not impressed. But this was the era of the ultralight, and that was the way it was. By the way, I never flew in one of those bad boys. At the time I was flying much larger aircraft for the military.

It is important to remember this history. Three axis aircraft have more than 100 years of development, whereas trikes (or, more correctly, weight shift aircraft) have only a little over 35 years of development.

However, in that short time, the development has raced ahead. We have gone from the chainsaw engine to the Rotax 912. The speed of the trike has gone from 30kts to over 100kts. The comfort level has changed as well. Around the world, designers of trikes have gone from back yard hopefuls to aeronautical engineers with Ph.Ds in aeronautical engineering and carbon fibre composites.

I have met one of these amazing people.

BY PETER MCLEAN

His name is Robin Kraike, from P&M Aviation in England. Robin and Bill Brooks are the driving force in trikes in the UK. Bill Brooks is the designer of the new PulsR. Robin is an engineer and test pilot, and has been a designer of the new wings. P&M said to Robin, "Design what you like, but just remember, you will be test flying your designs". I would have to say that the new wing designs Robin has incorporated into the Quik range of trikes is amazing and safe. Robin developed the STARS system, which stands for Stability Trim And Roll System. Then Robin developed the Roll Trimmer. I was amazed when I flew the first STARS QuikR aircraft. I was able to fly at a very high angle of bank at very low speed, while still having full control of the aircraft. I had the same control at very high speeds. So what speeds am I talking about? The slowest speed at very high angle of bank was 40kts. The fastest speed at the same angle of bank was 108kts. I am not suggest-

ing that anyone habitually fly these aircraft like this, but with most high performance wings they normally become very unstable at low speeds and high angle of bank. I felt very safe flying this aircraft. Mind you, when I was in the back seat with test pilot Robin, I saw the aircraft fly like I have never seen a trike fly before! It was amazing and I have to say that flight was right on the edge of my comfort zone. I always comment to my students that I will let them get to the edge of their comfort zone, but they will never get anywhere near mine. Well, Robin had me at the edge of mine, and I was nowhere near his!

Then there was the Roll Trimmer. This was just great. It just works and the aircraft flies straight or in a controlled turn if you want it to, with no effort at all. All of the P&M's roll trims are attached within the wing, with no need for fins attached to the wheel spats, or dampeners attached to the main mast, which don't work anyway. They may look good, but really don't do much except make the workload in the cockpit much higher when you are flying.

I have flown most of the trikes available in



FEATURE STORY



QuikR



QuikR



PulsR



GT Lite



Cockpit QuikR

Australia and I would like to say I don't see much of a difference between them in price. However flying capability and comfort are another matter. The first big change for me was the Air Creation Tanarg - big and roomy and very comfortable. The flying speed was 10 to 20 knots faster than the other trikes around at the time. I still have two Tanargs I use for training. I then purchased a P&M Aviation QuikR - not quite as roomy or as comfortable as the Tanarg, but it was fast and the response on the controls is something to be seen. I love flying the QuikR. At present it is my favourite aircraft to fly.

P&M Aviation asked me if I like to become their dealer in Australia. I like their aircraft and flying it so much that I said to P&M, "Does a one legged duck swim in circles?" I took on the dealership. Anne and I decided to buy another QuikR, a GT Lite and one of the new PulsRs. The

PulsR is not for sale,... it's mine (Well, ours... or maybe just Anne's, and she gives me permission to fly it).

I was very surprised to find most of our students want to fly the QuikRs when they are given the chance. I suspect they may have felt it would be too fast for a low time pilot.

The more I fly the P&M aircraft, the more I can see the passion that the workers and designers at the factory have put into their products. Even the accessories have been designed to work in with each of the various new models of aircraft.

To me the PulsR is the best weight shift aircraft I have ever flown. There is no wind in the cockpit. I don't even wear a helmet or a jacket in this aircraft now. The cockpit is quit warm and you feel very protected. The PulsR flies at a cruise speed of 75kts, however you can sit on 85kts if you want to. Will I be bringing more PulsRs into Australia? Probably not, due to the build time. At the moment it takes about eight months to build a PulsR. They are all carbon fibre construction and incredibly strong. I would



QuikR

need to order at least four PulsRs to make it worthwhile.

The GT Lite is the same shape and looks just like a QuikR, but it is powered by a Rotax 582 oil injected engine. One of the nice features is the de-icer on the carburetors. This aircraft has a 65 litre fuel tank and a cruise speed of 70kts, so you can really go places without fear of running out of fuel. The best part about the GT Lite is the price. It's half the price of its 912 brother. So if you are flying fewer than 80 hours a year, this could be the trike you want.

The QuikR is a great aircraft to fly. I love flying my two QuikRs because they are so light on the controls and the speed is just awesome. Most of the time I fly along at a speed of 85kts, however if I need to slow down for another aircraft, I just use the electric trim and I can match their speed. If I need to go faster, I can quite safely.

The next generation of P&M Aviation aircraft has just been released. It's called the Hyper (which you read about in the last *Sport Pilot* magazine). The prototype flew in early May in the UK. It was a great success, but some of the people didn't like the chisel nose, which

was designed to house the landing lights. I think P&M is listening to people who will probably never buy the aircraft anyway. The factory is going to redesign the nose.

I love flying trikes. The open cockpit and the visibility is just something else. I know some people say it is too cold in a trike, but I disagree. The new designs mean very little cold air gets into the cockpit. Remember, I fly trikes all year round. I can fly an enclosed cockpit any day I like.

So why did I get into trikes in the first place? It came from a decision by Anne and I to get into recreational aviation. This meant a rethink about the aircraft we would fly. No more Cessna 210s or Piper Aztecs. We would be down to a two seat aircraft. We first looked at the Skyfox, because it was the only two seat three-axis aircraft at the time and it was designed to be put on a trailer. The only other option was a trike and, after flying them both, we decided on a trike. We still love flying the trikes and have seen so many changes over the years. Safety is one of the biggest changes I have seen, but training to fly trikes has also changed. Gone are the days of training a student to fly a slow aircraft and then being able to jump from one

type of trike to any other. I was never able to go from a Cessna 150 to a Cessna 172 without having to do conversion training, but it seems that some people think you can in recreational flying. Not at my school! I have always pushed my students to do as much conversion training as they can, or need.

If you have only been flying a slow trike, you should have conversion training with an instructor who flies both types regularly. Otherwise you put yourself at risk. When I buy a new aircraft I test fly it myself in all conditions, for up to 20 hours before I think of putting a student in the front seat. Quite simply, I don't want to be learning at the same time and rate as the student. I want the knowledge on how the aircraft handles in all sorts of situations and I want to be able to fly out of any unusual attitudes safely. I don't want to be with a student and discover I am in an unfamiliar situation. The student counts on me to keep them safe.

Here is a thought for every three axis pilot (and if you have read this far, I presume you are still interested). Next time you see a trike flying around, just think before you enter the circuit. That trike might actually be faster than the aircraft you are flying. ☺

Guide to buying second-hand trikes

BY JOHN CRESSWELL

OWNING (and more importantly flying) your own trike can be a hugely rewarding experience. But it is not a purchase to be taken lightly. If you can afford a new aircraft, it is a relatively straight forward process of choosing the model, engine, extras and colour scheme you want, placing the order and paying for it.

Most people however will buy a second-hand trike and will probably have to compromise some of their choices to meet the price they are prepared to pay. Clearly, nobody would buy a trike for \$80,000 if you could get something just as capable for \$10,000. But that doesn't mean a \$10,000 machine is necessarily a bad purchase.

FINDING YOUR TRIKE

Buying a second-hand trike isn't so different from buying a second hand car, except there are far fewer listed for sale and proportionally far more dodgy examples. Unfortunately there isn't any one good place to look for trikes for sale. Obviously the RAAus magazine classified adverts are a good start – these are now listed on www.aviationadvertiser.com.au. Some cheaper models can also be found on Gumtree and eBay. Many microlight flying schools (including Caboolture Microlights) also advertise trikes they know are for sale on the school's website.

Australia is a huge place and it is more likely than not the trike in which you are interested isn't conveniently located within easy driving distance. So the first step is contact the vendor by phone or email to make your initial enquiries. General questions such as “how long have you had it?” and “why are you selling it?” will help you form an impression of the vendor.

Questions to ask should also include “has the aircraft been involved in any accidents, damage or heavy landings?” and “what is the overall condition?” (e.g. scratches on pod, stone damage on spats or damage to the sail). You should particularly ask about the condition of the prop leading edges (stone damage is very common) and the flying/landing wires (corrosion is common especially in coastal areas). Bear in mind that what the vendor considers acceptable or normal might not be within the manufacturer's serviceable limits.

“Where is it stored?” (fully enclosed air-conditioned hangar, barn with open

sides or pig sty) and “how often has it been transported by trailer?” (almost inevitably transporting leads to minor chafing and wear. It sounds nasty but is usually only cosmetic).

The aircraft logbook/maintenance records of many (if not most) trikes in Australia are shocking.

Ideally in the aircraft you are considering, there should be an accurate record of the hours the aircraft has done, the number of landings and all the maintenance performed on it. More likely there will be, at best, a 50c notebook with a few gibberish scribbles and maybe a few receipts. Ask the owner if they can scan and email a few pages from the records to possibly save you a wasted trip.

Ask who does the maintenance – is it the owner, an RAAus Level 2, a LAME, or some bloke from the pub who used to be a truck mechanic? Have any parts been replaced, any modifications made or extras fitted? As almost all 95.32 trikes are factory built aircraft, all modifications must be approved and recorded in the logbook (most of them won't be). Ask when the last maintenance was performed and what was done? This should also be recorded in the maintenance logbook and a vague answer will suggest to you that the vendor is more interested in flying it than looking after it. Likewise, if he doesn't know what airframe and engine Service Bulletins are/were applicable.

Sail condition is obviously critical on weight-shift aircraft – your life depends on it! The usual test of quality is to use a device called a bettsometer to apply a specified load to the fabric and the stitching. Ask when this was last done (this should generally be every 200 flying hours or annually). I strongly recommend you don't buy a trike without doing this yourself, although you can get a good sense of whether it is likely to pass by looking at the extent of fading on coloured areas of upper wing fabric. Check if the vendor will allow you to do the test – if not, does he suspect that it won't pass? French manufacturers like to be different and use a test panel of spare material sewn into the wing fabric. Sections of this are cut away and returned to the factory to determine the condition. Damage to the sail can be serious and must always be repaired in accordance with the manufacturer's guidelines.

If the trike is 4-stroke powered, ask what the compressions were at the last leakdown test (this should be done every 200 hours on a Ro-



Tanarg



Air Creation SKYPPER



Tanarg



PulsR

tax 912). The Rotax 912 doesn't often have problems in this area, so it's quite common for this not to be done as part of the service (which tells you something and possibly gives you another negotiation point).

Some 2-stroke trikes may be advertised with 'overhauled' engines – check who did the work and what was replaced. For the Rotax range, an overhaul replaces, among other things, the crankshaft, con-rods and pistons. Simply removing a few parts and cleaning inside does not constitute an overhaul.

VALUING A TRIKE

The main criteria affecting the price of any particular model are of course the age and the number of hours it has flown. A lot of hours on a relatively new aircraft could indicate it has been used for training.

Ex-school planes aren't necessarily bad, but more landings are bound to equate to more wear sooner or later. Try to find out which school was using it and their reputation.

Low hours on an aircraft isn't unusual. A lot of people don't fly very often (the RAAus average is apparently less than 50 hours per year). However 'lost logbook syndrome' is by no means unheard of – I once saw a trike for sale which I had flown many years previously when it had more hours on it than was stated in the ad. This is less likely on trikes which record the engine hours on a digital panel although it's not impossible to circumvent these, so be cautious of any trikes which have had replacement instrument panels.

Very few hours might also suggest the plane has not been run for long periods, which isn't necessarily good if it hasn't been stored properly (especially on a 2-stroke) and some components have a calendar life (ie replace or overhaul after a certain time period), as well as a limit to the number of flying hours.

Two stroke powered trikes depreciate much faster because Rotax recommends overhaul at 300 hours – many come on the market with around 200 hours on the clock for this reason. Strangely, 300 hours also seems to be a turning point in pricing of 912 trikes, although the TBO is much longer so higher hours isn't such an issue.

Many trikes are advertised with extras. Some of these are may be genuinely useful items such as a radio, intercom, headsets or antenna which you would probably have to budget for if they aren't included.

Others may be less desirable and vendors typically want to recoup the full purchase price of things such as trailers, helmets, flying suits and BRS. Only pay what these are worth to you, not what they cost him. This is especially true of technology, such as GPS where the functionality improves and the price decreases very quickly over time. There's no point paying nearly the price of a current model for a five year old, less capable device. Ask what the price would be for the trike without any extras to get a true idea of the value the vendor puts on them. You might be able to sell on any unwanted extras – your local flying school might be interested in flying suits, helmets or headsets.

GOING TO SEE THE PLANE

It's a bit beyond scope of this article to go into a lot of detail about inspecting the plane but getting hold of a copy of the Pilot Operating Handbook and reviewing the pre-flight inspection is certainly a good start.

Approach it as an exceptionally thorough pre-flight inspection, but with even more emphasis on finding the faults which make the plane not airworthy. By far the best plan is to take an independent and unemotional pair of eyes with you. Ideally they should be very familiar with the model in question, but even another trike pilot will be able to provide you a more dispassionate view.

If you have agreed with the vendor to do a bettsometer test, expect him to be rather irate if the sail tears. It is probably best to agree liability on this first and take consolation from the fact you have saved yourself a lot of money (and possibly someone's life).

If you have doubts about how genuine are the hours on the aircraft, you could ask to see the pilot's logbook and check if every flight recorded in that matches up with the plane's logbook (assuming it has one).

For various reasons, such as insurance or weather, it's not always possible to test fly the machine but if you can, it's a good idea to have

“Flying the plane for the first time is a big step”



HypeR

it flown by somebody who knows the type. It should also be clear who is the PIC of any test flight in the event of a mishap (note that an RAAus Pilot Certificate holder cannot fly as PIC of an HGFA registered trike (and vice versa). Obviously if you are still flying on a student Pilot Certificate you can only fly as a passenger (even if the owner is daft enough to let you out on your own). A current registration card should be displayed on the aircraft (if registered with RAAus). Otherwise nobody can legally fly it. But even if it isn't possible to fly the plane, there is no reason not to give the engine a good run.

NOW YOU'VE BOUGHT IT

Congratulations – you are nearly there. But you still have to get the plane home and registered in your name. Vendors will sometimes offer to deliver the plane to an airfield of your choice. While it is probably a genuine offer, things can get complicated if the plane is damaged enroute. If you do transport it this way, check the aircraft thoroughly after arrival and be very clear beforehand about who has responsibility for any extra wear & tear (or worse). Personally I would recommend doing the transportation yourself either by flying (a great experience) or by trailering (borrow one if necessary).

Transferring the aircraft ownership should be reasonably straightforward, provided the aircraft is legitimate. If the aircraft has a current RAAus registration certificate (which should be visible on the trike), you simply need to complete a Change of Ownership form and send it off to the RAAus office accompanied by the fee, a completed Aircraft Condition Report (ACR) and a photo of the aircraft with the rego numbers clearly visible. If the previous registration is still current, there is no need to wait until the forms have been sent before flying the plane. The change of ownership form requires the signature of the previous owner, so to avoid delays it is best to get them to sign this when you agree to the purchase.

If the aircraft had an RAAus registration which has elapsed, the process will be the same but you will also have to pay a fee to renew the registration for 12 months and you will not be able to fly the plane until you have received the certificate and attached it to the aircraft. If the aircraft is non-standard in any way, remember there is also a risk the previous owner was actually unable to register the aircraft for some reason and is

trying to cut his losses.

If the aircraft is registered with HGFA and you intend to keep it with them, the process is similar but there are differences if the aircraft is registered with one organisation and you wish to transfer to the other. You will first need to contact RAAus to be allocated a new registration number. Once you have this, buy suitable numeric stickers to put on the wing in place of the previous rego numbers. You will need to send RAAus a photo of the aircraft displaying the numbers, along with a completed Transfer of Registration from HGFA form, the appropriate fee and the same ACR as for an RAAus change of ownership. Also remember that just because HGFA accepted the registration, does not mean RAAus necessarily will.

An RAAus Aircraft Condition Report can only be completed by an Level 2 Maintenance Authority holder (with either unlimited approvals or full approval for weight shift aircraft) or another person with the specific permission of the RAAus Technical Manager. Note that LAME qualifications in themselves do not automatically allow the holder to complete an ACR and that the L2 person must also have no financial interest in the sale of the aircraft. Some vendors arrange for the completion of the ACR before selling the aircraft. Provided the person completing the form meets the requirements, this is acceptable for the purposes transferring the ownership. While doing this might be a gesture to reassure prospective buyers of the integrity of the aircraft, the reliability of such a report cannot be guaranteed and it is highly recommended you arrange an independent report to be done. Finally, note that an ACR is not an airworthiness report – it is entirely legal to transfer ownership of an unflyable wreck.

AND FINALLY

Flying the plane for the first time is a big step. If it is a model you are unfamiliar with, and especially if it is a significant change in performance, it would be wise to arrange a check flight with an instructor who can show you the differences safely. A significant number of aviation accidents have been pilots flying aircraft types they were not familiar with. Such a check flight would be mandatory if an additional endorsement is required to fly it e.g. 2-stroke.

Then remember. Your new plane is not an ornament – fly it safely and fly it often. ☺



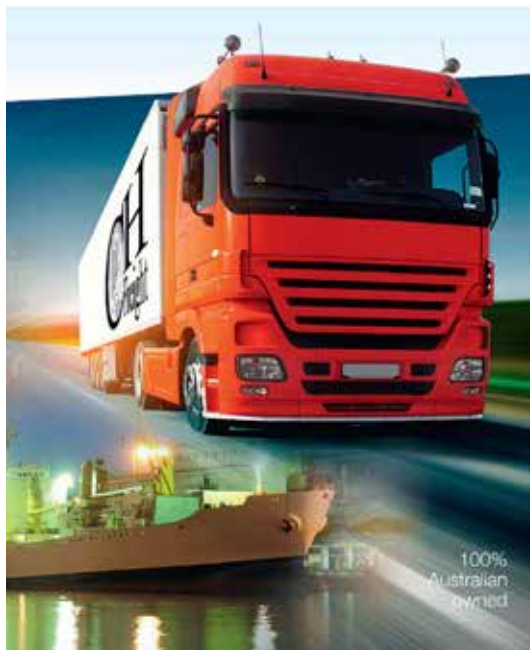
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A busted finger journey

BY PETER SWIFT

It is not the destination, but the journey which is important. At least that's what's touted in self-help groups and leadership courses I've attended. I am unsure if this philosophy applies 100 percent of the time in the real world, but the saying does ring true when it comes to long distance flying.

For me it is the planning, organising, communication and eventually (if the weather holds) the flying which holds the appeal.





THE destination is just an excuse; a reason to ask “Hey honey, what would you say to a trip to xyz?” With the normal response being “where is that?”

Then, as always, the familiar aviation dance begins - where, when, how long etc. Sometimes the dance ends with a whirl, a dip to the crowd and I walk from the floor, sure of step with head held high. At other times, I slither from the light to sulk, lick my wounds, determined to try again another time.

Such are the games we play.

And so it went with the ‘Back to Holbrook Fly-In’ trip at Easter.

FUEL AND TIME

The planning started months out. That’s how I do it. We were to start in Maitland so there were routes to consider, where the stops would be - fuel and time. Time is very important. My chosen transport is a Drifter (Snoopy). Don’t get me wrong, I like flying open cockpit aircraft. But I don’t like to do it all day. I plan the legs for about two hours each (nil wind) and I like to have the day’s flying all wrapped up by 11:30am. After which the air can get lumpy and uncomfortable for all I care.

If I am at the end of a long leg, light on fuel and flying solo, Snoopy can be quite a handful on an unstable day, so I try to leave and arrive early.

Another important consideration is the ground route. Snoopy is a two stroke. I don’t want to get into the pros and cons, for and against, of power plants. However, I consider it good Airmanship and plain good sense that I should not fly over country upon which I cannot safely land. So above most other considerations, this dictates my route. I use Google Earth to avoid tiger country. I then transpose this into AvPlan to get the turn points and destination airfields. After much enjoyable study, an acceptable plan is formulated within those boundaries.

So with everything considered and planned, came the morning of Thursday March 24, I found myself driving in the dark towards Rus-



The team

sell Field to embark on my adventure. Planned departure time was 07:15. As is mostly the case in the Hunter Valley, there was a sneaky little 5kts of westerly on the ground, but at 1,500ft there was nothing. Floating along on my magic carpet, with the morning sun bathing me in its warmth and watching the world wake up beneath me, I was struck by the thought of how fortunate are we aviators. In sight of, yet disconnected from, the mayhem about to unfold in the daily struggle of life below. The panorama continued to roll beneath my ride. Warkworth, then Denman. A slight left turn and a quick descent to fly past Pete's place at Yarrowa, but no sign of life there. Back to 3,000ft, west along the Goulburn River Valley, then to 4,500ft to get over the Murrumbo Station tiger country, then to 5,500ft to exit the valley onto the plateau beyond.

I made a 10nm inbound call to Rylstone. Circuit height there is 3,000ft. In the back of my mind was the thought that I had to remain aware of the height. I was used to operating at sea level, so landing at 1,990ft might look different. (That was a theme for the whole trip. Most of the airfields I landed were above 1,000ft). The only one I stuffed up was at Young, where I elected to land on the bitumen, rather than the grass verge and, of course, it was the only one where I had an audience.

Rylstone Airpark is a beacon in the wilderness. It is a well thought out aviation oasis. Space is the word which describes it best - space on the runways, space on the available plots and space in the air.

TWO MISTAKES

After Rylstone, I tracked south west to Sofala then direct to Bathurst. The visibility was so good I could see Bathurst airport before I made the turn point at 24nm. So I cut the corner and made a beeline from where I was. That was a mistake. I picked a point too far out. I was in a Drifter at 5,500ft and could see forever. It took me 35 minutes to get there. I got bored. Silly I know, but true. I had nothing do but wait until I got 10nm out and made an inbound call. Seemed to take a lifetime. Eventually I made the circuit and landed on runway 17. Where I made another mistake. Runway 17 at Bathurst is 1.7kms long and the taxiway and hardstands are at the other end.

I was only ever going to use about 175m of it, so why do I always aim at the piano keys and land right at this end?

For the first time ever, I added more than enough power and taxied tail-up the remaining 1,500m.

Many pilots with tail wheel endorsements reading this will have a hernia about now, "You did what?" Relax. It's a Drifter. Once the tail is up and the gyroscopic precession is cancelled out with rudder, the aircraft is very easy to keep straight, it just rolled up the runway on two wheels.

Lynette, as always, was my ground crew driver and had battled hard through the Sydney Easter traffic. She was frazzled by the time she got to Bathurst, so I cut my stories short and we went to find our motel.

Long distance trips means successive pre-dawn starts. The early starts mean the fuel and my flying gear has to be sorted out the afternoon before. Normally I do an after-flight check of the aircraft when I arrive so the following morning I only have to do a cursory walk around before engine start. Snoopy has a Grey Head 582 without post-mix oil. So I have to carry jerry cans to mix the fuel and oil prior to decanting into the tanks. This is not something I want to do in the dark.

ZIPPED UP

Despite my best efforts, Friday dawned grey and cold and I faced a 10kt headwind - not significant for some but 10kts is 20% of my ground speed. I left Bathurst and climbed to 5,500ft. The country surrounding Bathurst is at altitude (for Australia anyway) so I had to keep some distance between Snoopy and the surface, in case I had an engine out. Then it started to rain. Not hard but consistently. I zipped up everything that was zippable, sank down as low as I could get to try and avoid the drops (they sting when they hit bare skin) and forged ahead.



A well deserved rest

A busted finger journey cont.

It got heavier. I was wet, cold and fought a constant urge to put down in a field next to the road and call my ground support. Then I remembered I could get the weather radar overlay on AvPlan. So I turned it on and drove around the heavier patches. What a wonderful function! I never thought this would be of use to a VFR Drifter, but it saved my bacon. I was back on track. After Cootamundra I headed out onto the western plains. The ground level was lower and the rain abated. There were even patches of sunshine as I approached Holbrook. I entered the circuit and landed on runway 32. I shut down 4.5 flight hours after leaving Bathurst. The longest day was done. It is interesting to note here that, after my long and uncomfortable flight, I landed on 32 but called runway 4 on the radio. I read the airfield diagram I had incorrectly drawn on my kneepad, despite what my compass was telling me. There was no traffic, so it wasn't an issue,

but it is part of the 1% things I strive to get right. The weekend passed in a whirl of talking, meetings, dinners and drooling over aircraft.

Snoopy won the trophy for the 'Best single seat rag and tube aircraft'. Snoopy actually has two seats but, because there were no 95:10 aircraft at the fly-in (something which surprised me greatly) the judges ruled that, because I had flown solo from Maitland, Snoopy qualified for the award. I humbly accepted but noted that, although it was a solo flight, I was not alone because Lynette played a big part in the success of my trip.

Sunday's task was a reversal of my southbound plan and a late departure meant my arrival time in Bathurst would be after my optimal time. So a quick "hoo-roo" and I was off. Lynette had left earlier and met me at Young with a cheery "Happy Easter", hot cross buns and a coffee. I had completely forgotten it was Easter Sunday.

"Worth it?
Yeah. I'd do it all
again tomorrow"



BANG EXPLETIVE

Tracking for Bathurst at 5,500ft had me battling the now familiar 10kts headwind and increasing turbulence. Nothing to do but bounce around and put up with it. It was a long 1.5 hours until I was on the ground there. I was hot, dry and flies were bugging me. I was tying Snoopy down, driving the pegs into the very hard ground with the custom slide hammer when 'bang!' my finger got in the road.

Expletive! My first thought was "Gee I did some damage". Lynette arrived to find me lying in the shade under a tree. She scooped me up and took me to Bathurst Hospital.

They X-rayed the finger and discovered it was broken. They wanted to operate on it there and then, but I convinced them to clean it out, patch it up and I would get it looked at when I got home. In the end I got a bandage, some tape, pain killers, alcohol and sleep.

The following morning it dawned foggy, just what I needed. Have you ever been at an airport waiting for the fog to lift? It takes forever. Lynette, now travelling ahead of me, sent me pictures of conditions along my proposed track.



Happy Easter

Two hours later than planned, I was confident enough to get airborne. The fog had burnt off enough, but a bank of cloud being pushed up against the mountain range by the prevailing wind caused my blood pressure to stay elevated.

The clouds began within 500m of my track and were a constant along the leg. I lost contact with Lynette and could not tell if my planned stop at Rylstone was under the cloud base or not. I forged on into a significant headwind, now 18kts - it was a long section. Rylstone came into view just as the cloud bank dissipated and I had a quick stop for coffee and biscuits.

Then it was a final sprint towards home. The thickening cloud looked solid but, when I approached it, there were significant gaps which allowed me to climb up and go VFR on top, where I could take advantage of a 15kt tailwind.

Once over the Hunter Valley, the cloud disappeared and the rest of the flight was uneventful. Lynette beat me home by an hour. I was down and done and made an appointment to see the doctor the next day.

Worth it? Yeah. I'd do it all again tomorrow (well, maybe after the stitches come out). Where to? Doesn't really matter. It's always the journey which makes the memories, not the destination. ☹️



Flight Time - 14.9 hours
Fuel - 199 Litres
Distance Snoopy - 648 nm
Distance Lynette - 1,700 Kms
Days - 5
Motels - 4
Fingers - ½ (It has since been operated on and might yet survive)

A lucky escape

VIEWPOINT



IRECKON security is a vague, unachievable, emotional construct. There is, of course, no such thing as total security and most of the time you only miss it when you've lost it. But a recent trip to an outback airfield got me thinking.

Having landed and taxied to the tie-down area, I noticed the terminal building (more terminal than building) just outside the security fence. Good fence though. The solitary person on the field was leaning up against the gate, so I asked him if he could give me the security code to get back onto the airfield the following morning.

Country folk can be a taciturn lot sometimes. They tend to talk very slowly and out of one side of their mouth – presumably it keeps the flies out. Anyway, the fellow nodded and said “Yeah, I can show you, but I can only show you once. So you'd hafta watch very carefully”. Okay, says I, and we wandered 10 meters or so along the fence to another gate. “Are you watching?” drawled my learned instructor. Yep, says I again, aware there would be only one opportunity to learn the secret procedure. “You're sure?” he asked. I nodded and the helpful friend popped his hand through a hole in the fence and opened the gate from the inside. Got it, says I.

“Just as well”, said my new helpful friend, “Otherwise you'd have to know the local frequency -126.7”. He wandered off to a muddy 4WD ute shaking his head.

Most airfield are the same aren't they? If you don't have a friendly local, just try the local frequency. Apart from some notable exceptions (Merimbula comes to mind) it's a ubiquitous trend. So I did some more thinking – this time about ASIC tags, since I'd just paid \$200 to renew mine. Has ANYONE ever actually taken a look at it? In fact, on my airfield (Class D), I'm told it's not actually necessary

to wear it. And yes, the gate code is the local FIR frequency. So why did I pay \$200, not to mention cop various threats about being hung, drawn and quartered if I broke the hallowed rules of purchase, like not sending it back or wearing it below the belt. And why are there locks on the fences when everyone knows how to get in? And what are the fences for? Other than maybe keeping the kangaroos off the airfield (I doubt they're up to using the keypad - although even they may be able to stick a paw through a hole in the fence).

So I discussed this with a friend of mine who tells me that he pasted a photo of a gorilla over his ASIC picture but no-one ever picked it up. Mind you, he is sort of short and hairy, but even so you'd think you might get better value for \$200. Anyway, full of confidence I wore my ASIC tag while picking up a friend at an international airport recently. You still have to take all the metal objects out of your pockets to go through the scanner. The ASIC card was no help there, although it did catch the eye of the lady doing the explosives check who immediately picked me out as suspicious. I tried to point out that I had been through a most rigorous, \$200 check of my security status. Didn't help.

So what's the point? Surely a sign on the fence declaring it was private property would keep out the trespassers who might want to walk their dogs on the nice open space the airfield provides. It might save us \$200 each and prevent a minefield of bureaucracy. Wouldn't stop terrorists though who, even if they couldn't work out the code, would either torture an unsuspecting pilot – or cut their own hole in the fence.

That made me wonder about the fellow I met at the outback airfield. Perhaps I'd just had a lucky escape. ☒

“Perhaps I'd just had a lucky escape”





Sorry mum

BY BRIAN BIGG

HERE'S A TIP I LEARNED RECENTLY WHICH MIGHT HELP YOU WHEN PLANNING A FLIGHT. NEVER MAKE YOUR MOTHER YOUR NOMINATED SAFETY PERSON.

MY normal procedure is to follow the sensible advice given to me by RAAus. Before I set off, I ring and tell someone where I am going and when I expect to be there.

It's much better (and a damn sight less work) than in the old days, when I had to file a comprehensive flight plan for every journey and, along the way, contact the controller any time I thought I might be more than two minutes outside my previously estimated reporting time. That system worked well because it meant I had to stay on top of my navigation every step of the way. After all, if I didn't know where I was, I couldn't really tell the controller for certain when I was going to be at my next waypoint. So the discipline of contacting the controller had a secondary impact of making sure my navigating was precise. But it was a lot of work for everyone involved, without much to show for it.

These days with the GPS shouldering most of the load, my exact position and estimate for my next waypoint is a glance at a screen, rather than a complicated set of mathematics. I still like to follow my map and do the sums like I was taught, but it is a lot less stressful. Not filing a flight plan felt strange at first, but now seems like an unnecessary administrative burden. The controller is not interested in me or where I am going, and staying away from him or her means I can be a lot more flexible in getting to my destination. But it all hinges on having a safety net.

So I always write down my intended route and my estimated time of arrival and make sure a fellow pilot or friend knows the number of the Rescue Co-Ordination Centre (1800 815 257) to call if, for some reason, I don't report in on schedule. But I can tell you now, you do not want to ask your mum to do it.

On a recent flight to visit my parents, I made the rather rash decision as it turned out, to get my mum to be my safety person for my return trip. She and my dad had followed by trip to them with calmness. When I arrived, they seemed quite chuffed to be able to tell their friends in their apartment complex that "our eldest flew his own plane to visit us, don't you know?"

But it was a different story when it came time to leave. I planned to get away very early, too early to call a friend to act as safety person. When all the flight plan details had been settled, the winds and track finalised, I wrote out a list of places on my route and told my mom that I expected to arrive at my first stopover by 10am. I told her if she hadn't heard from me by then she was to contact the Rescue Co-Ordination Centre. I wrote the number down for her.

I set off and, I have to say, it was a lovely morning's flying. But up high, there was an unexpected 20kt headwind. Halfway there I realised I wasn't going to make my landing on time so I grabbed my phone and sent mum a text to advise her.

I thought that would cover it, but I found out otherwise when I finally landed about 40 minutes later. Getting no answer on mum's mobile, I rang their house phone. My father answered and let out an 'Oh thank God, you are okay. Your mother has been crying for an hour.' They had not got the text.

Mum's mobile is an ancient Nokia and she can't work out how to read messages on it. I later found that every text I've sent her for the past three years was still there unread. Mum also admitted she usually leaves her phone turned off to save the battery.

When dad handed mum the phone, she was sobbing. She had convinced herself that I had crashed and died. She and my father had taken their jobs as my safety people very seriously indeed. They had

paced around their apartment non-stop from the time I departed, worrying I was not going to make it. When the time I had written down approached, they turned frantic. What should they do? 15 minutes before my scheduled time, they began the debate about when it was time to phone the Rescue Co-ordination Centre. They agreed that if I was bleeding on the ground somewhere, sooner was better than later.

They dialed the number several times but worried they were doing the wrong thing and hung up. By the time I called,

they were well panicked. Dad admitted I had been just seconds away from being the subject of a nationwide search and rescue effort. They were just glad I was still alive. Their son had returned from the valley of death.

A beautiful morning's flight for me had been a several hour journey of pain, drama and tears for them. After spending a lot of time assuring them I was okay and that I'd had a beautiful morning's flying, I told them I was about to set off for the second half of my journey. I didn't make the same mistake. I gave them an arrival time fully an hour and a half later than I really expected to be there. I knew I was facing headwinds again and didn't want the same dramas.

Again it was a beautiful flight to my destination. The headwinds were just as bad but I got there well ahead of the time I had told them. When I rang my parents, they had a house full of people with them. Most of the other elderly residents of their apartment complex had come to sit with them until their eldest son arrive safely at his destination. It hadn't mattered I reported in early. They had fretted anyway.

Their elderly friends, drinking mum's tea and eating cake, all agreed that flying was much too risky a hobby and they told mum I should give it up, to spare her the pain of it. Mum was in bed early that night with a headache.

I'm not going to make the mistake of having her do that job again. I had a lovely day's flying. But I think I've taken years off her life. ☹️



"So I grabbed my phone and sent mum a text"



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Looks do count

BY THE OPS TEAM



How does your aircraft look to potential passengers or students?

Sometimes we get so caught up in what we do, and how we do it, we don't look at our aircraft and hangars with fresh eyes. Try this simple exercise.

Walk out to the front of your hangar and stand there, looking at the hangar floor and try to see it as if you had never seen it before. You might notice the assortment of things stacked along the walls, the cobwebs along the walls or roof trusses, where the fuel jerry cans are stacked, where the oil stains are, the piles of dirt in the corners and what the condition of the floor looks like (relative to the surface, either dirt, concrete or possibly tar).

Now, go to your aircraft and stand in front of it. Notice its general condition. Does it have fuel or oil stains under the wings or belly? Are there thousands of bugs smashed on the leading edges? How rusty are the bolts holding struts or other components? How clean is the windscreen? Are the spats clean or cracked and ratty looking? Is the interior clean and are there papers, old charts and half empty water bottles behind the seats? Do the headsets look relatively clean, or would you be hesitant to put them anywhere near your head? Is the microphone windsock covered in dirt

or debris, leading to possible concerns about needing a tetanus shot if it touches your lips? Are the seatbelts all twisted and are the seats clean or covered in fluff or dirt? Is the floor covered in dirt and grass clippings, and when was the interior carpet last vacuumed?

Taking this one step further for schools. Is the briefing room full of old papers, magazines stacked in piles threatening to topple over, old oil containers or tyres, cobwebs and coffee mugs? When was it vacuumed or last dusted? Does the student see a clean, well presented and professional looking room, with relevant aviation posters talking about safety, current charts on the walls and paperwork neatly filed?

If you can't bring yourself to look at your hangar or aircraft with fresh eyes, ask a friend or family member who doesn't spend much time at the airport to come out and look at the hangar and the aircraft for you and give you their impressions.

Why is this important? All your potential passengers and students will form an instant

opinion about your potential flying habits, and ability to train them, as a result of looking at your hangar and aircraft. We are all familiar with the saying "you never get a second chance to make a first impression". This is particularly true for flying.

None of us wants to climb aboard a Boeing 777 or Airbus A320 and see the residue and rubbish of previous passengers. Likewise, we don't want to see the captain and crew walking around in dirty, ripped or torn jeans and oil stained shirts.

This is not to say we need to walk around only in white collar shirts and black trousers - or uniforms with epaulettes - but dressing professionally, and keeping the aircraft and hangar clean, provides a great first impression of you as a pilot or instructor and instils confidence in your passengers or students.

So having looked at our hangar and aircraft with fresh eyes what can we do? Firstly, most airports generally have hangar rats (youngsters, and some not so young) enthusiastic

about flying, who hang around talking to pilots and trying to score flights. You could ask them to help you wash the plane (letting them know about the specific areas to be careful near, like pitot ports and fuel and cockpit vents).

You could ask if they will help you clean up the hangar and then take them for a flight as a reward. This helps to build a sense of ownership and pride in the look of the hangar and the aircraft, and who wouldn't want to help wash an aircraft to score a flight?

If you are a CFI, it is possibly even easier, because you can make it a part of the post-flight requirements for each student to at least wipe down the leading edges of the wings. Every student should know the correct way to clean the windscreen (no rubbing in circles, no horizontal movements to avoid scratches, no use of silicone based cleaners).

One enterprising young man I know has started an aircraft washing service at my home airport. The cost is a flight with the owner. He is kept pretty busy and has also scored some rides in some pretty cool aircraft.

This conduct can form part of RAAus strategy to encourage pilots and instructors to conduct themselves professionally in the air and on the ground. This does not mean we are

being paid to take passengers on paid scenic flights (a no-no for RAAus members obviously), but if you are a pilot taking a friend for their first flight in a small aircraft, these first impressions can make a difference. If you are an instructor taking a student for a lesson you are being paid, and for more than your expertise in the air, so you should make sure the aircraft is clean, the hangar tidy and the briefing room presents professionally to instil confidence in the student.

One final benefit to cleaning the aircraft regularly is the opportunity to look at the aircraft up close, which can often provide insight into potential maintenance issues. Cleaning the hangar can sometimes yield benefits like finding long lost tools, jerry cans or aircraft parts that have been lost in the clutter.


Professional behaviour provides confidence and shows you care about your passenger. And, after all, aren't all RAAus pilots professionals? ✪

"After all, aren't all RAAus pilots professionals?"

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Keeping it together

DESIGNING YOUR OWN AIRCRAFT BY DAVE DANIEL

PUT simply, it is impossible to build an aeroplane without some means of joining the parts. As a result, the typical aeroplane is awash with joints held together with a bewildering array of fastening systems, from heavy duty to lightweight and with varying degrees of permanency.

It's also no surprise then that joint design is a critical aspect of designing any aircraft. Get it wrong and the result is likely to be inefficient, heavy, susceptible to fatigue or, worst of all, simply not strong enough.

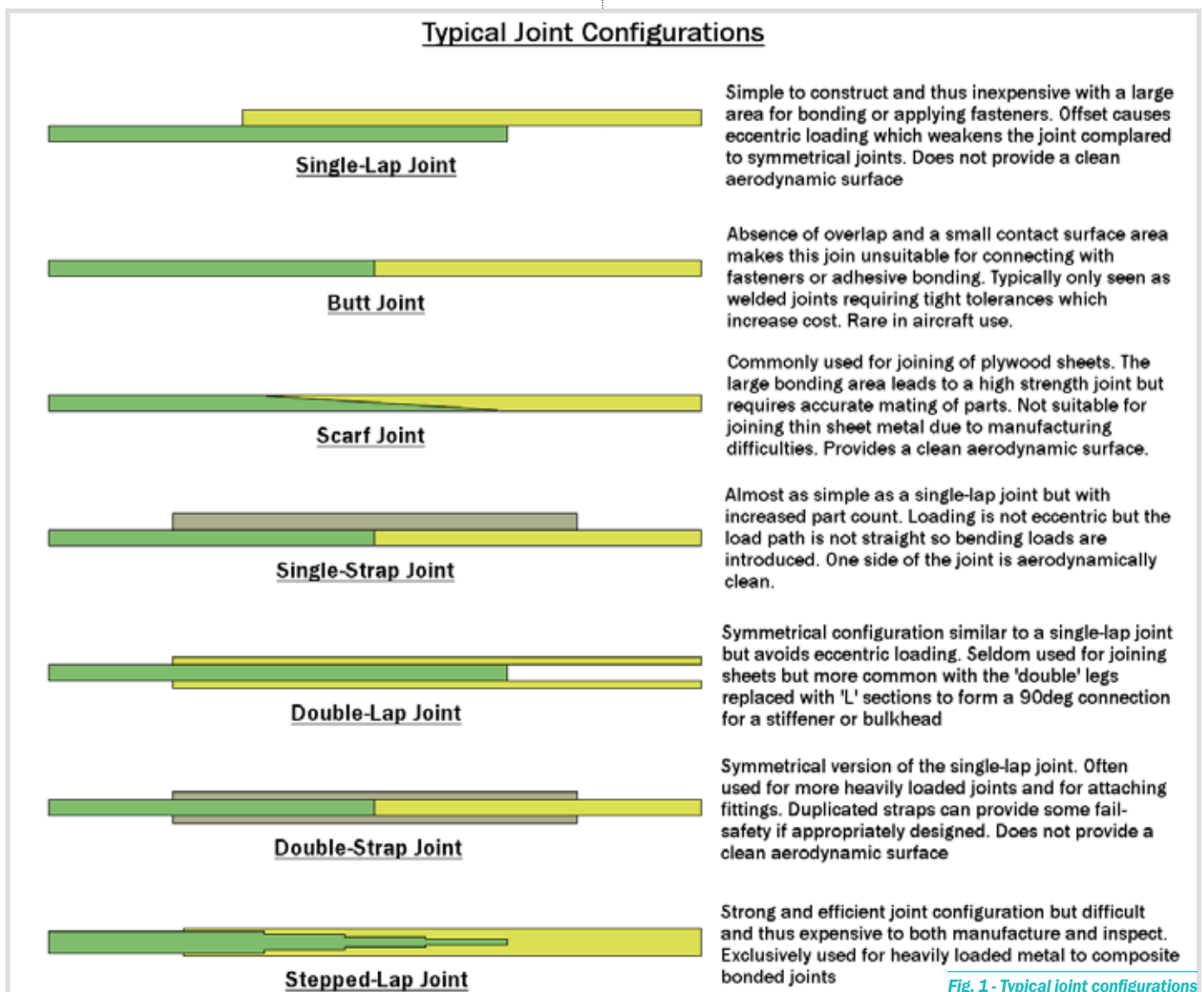
Given the frequency with which joints are required, and considering the potential for catastrophic failure if they go wrong, you may be surprised to discover the detailed theoretical study of 'joining stuff together' is a relatively recent phenomenon. This is not without good reason however.

Engineers of yore quickly amassed enough empirical evidence, initially through trial and error, and then through progressively more scientific testing, to be able to design functional, and acceptably reliable joints without resorting to detailed theoretical models.

As a result, there was little impetus to pursue what was essentially an academic exercise when the practical information required for design was already available. In any case, it turns out the maths behind modelling even superficially simple joints is hugely labour intensive so, until the advent of modern computers, there was no practical alternative to the established empirical methods. And even today, once you get down to individual components, theoretical modelling however good, doesn't make sense. Bolt strength data derived from destructive testing of the real thing is always going to trump theory based calculations.

Before I get into the specifics of different methods of fastening its worth taking a look at joints in general, just to get a feel for them. First up, small aircraft by their very nature are lightweight, often semi-monocoque structures. This means most of the joints are between thin sheet materials, driving the design towards large numbers of lightly loaded fasteners or even adhesives.

Of course there are still a few connections at the opposite end of the



Joint Eccentricity

Applied load pulls sheets into alignment causing the joint to rotate

Bending loads weaken the joint and risk fatigue

Peel forces are induced at joint

Eccentrically loaded joints can be stabilized by attachment to other torsionally stiff structures, effectively strengthening the connection by preventing joint rotation.

Rotation of the joint creates secondary loading on attached structures, forcing them to rotate with the joint if they have low torsional stiffness

Fig. 2 - The problems with eccentric loading

scale too, such as wing-attach fittings where a single bolt or pin may have to carry several tons of load, but even with these extremes there is still some commonality.

Fig. 1 shows a selection of common joint configurations. Simple lap joints are the easiest to produce but suffer from the arch-enemy of joint strength, eccentricity (and I'm not talking about owning 47 cats and wearing a smoking jacket and thongs). Eccentricity in a joint occurs where the forces on either side of a connection are not aligned, exposing the joint to a torque in addition to the usual tension or compression. Applying torque to a joint leads to bending and a host of other secondary effects, all of which weaken the connection as outlined in Fig. 2. Joggles improve the situation somewhat, as do single strap joints and both offer a cleaner aerodynamic surface on one side. But the load path through the joint is still not straight, so bending is not entirely eliminated. Double lap and double strap joints are symmetrical, and so minimise bending, but at the cost of increased complexity, part count and the loss of an aerodynamically clean surface. For an optimum way of connecting two members, glued scarf joints come pretty close to perfection. Unfortunately they are limited in their application and so mostly turn up in wooden structures. Machining thin metal sheets into the shallow taper required for a scarf joint is challenging and the mere thought of glued joints in critical metal structures causes most engineers to break out in a cold sweat! Finally, stepped joints have their place when heavy loads need to be transferred, especially between metals and composites, but they are expensive to manufacture and certainly rare, if not non-existent, in ultralights.

Now you may be thinking, "I've looked at a few planes, and they are full of simple lap joints!" And it's true, for all their drawbacks they are very common, the only saving grace being that many joints are not that highly stressed. Skin thicknesses are often driven by handling and durability

considerations rather than ultimate strength, especially in light aircraft, so designers can get away with using simple lap joints, despite them being less than optimal. The other explanation for the abundance of single lap connections is that joints are often attached to other supporting structure. Single lap joints are weak because they rotate under load. Mount them on top of a rigid frame however, and the support makes a lot of the problems go away - or at the very least get transferred to the supporting member.

I have mentioned before that one of the prime difficulties of aircraft design is understanding the loading. But when it comes to designing joints, there are plenty of traps for the unwary, even in apparently simple configurations with known loading. To take a single example, Fig. 3 shows a simple bolted 'L' bracket connecting two sheets at 90°. Ignoring the fact that this is a poor joint design (so don't copy it), let's take a look at how intuition can get us into trouble. If a 1,000N load is applied to this bracket you could be forgiven for assuming there must be a 1,000N tensile load applied to the bolt. Unfortunately, in reality 1,000N is not even close. The offset between the applied load and the bolt creates a prying action causing the toe of the bracket to press against the structure on which it is mounted. The bolt then has to withstand both the applied load and the prying load combined, which in this case turns out to be well over double the applied load. This is not an isolated problem; joint design is full of subtleties like this waiting to catch out the unwary designer.

Joints design is a large and at times highly technical subject, so I can hope to do little more than provide a basic overview of the subject here. However, there are qualities specific to the different joining methods which are certainly worth comparing, so over the next few months I will look at the common joining methods used in aircraft construction, their benefits, drawbacks and hopefully highlight the pitfalls and common misconceptions, starting next month with adhesive bonded joints. ☹

A Simple Fitting with Not-So-Simple Loading

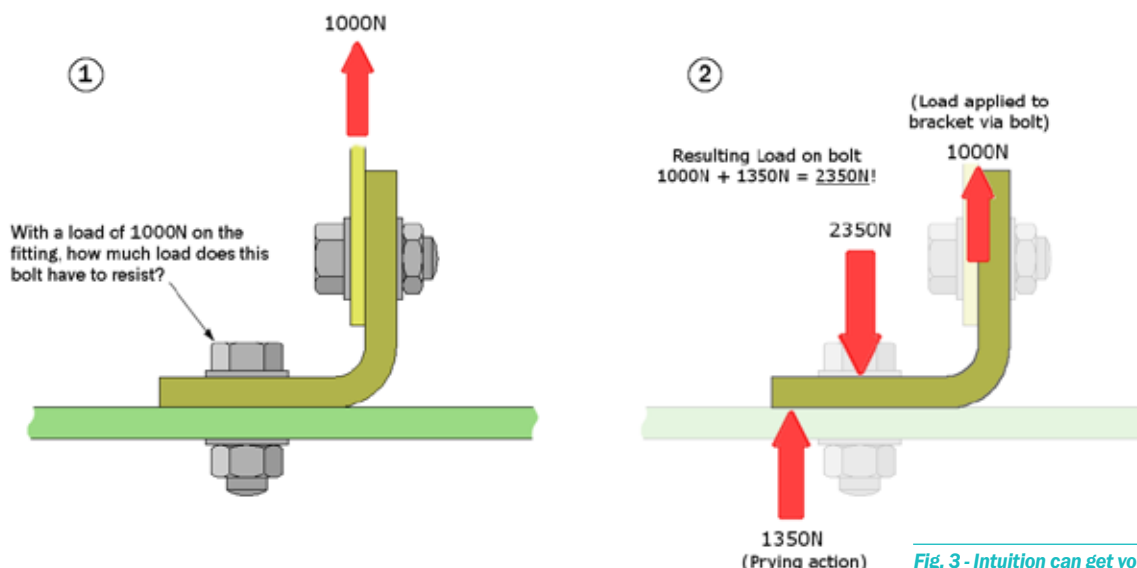
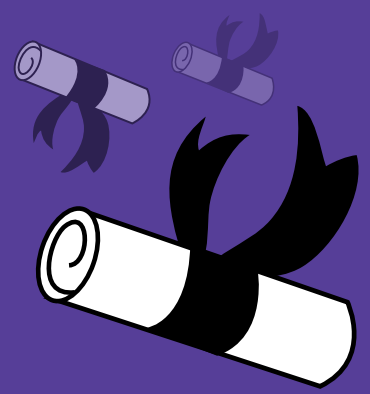


Fig. 3 - Intuition can get you into trouble

Too old or too young?

BY PROFESSOR AVIUS AVIATION GURU



A QUESTION I'm often asked is – am I too old to become a student pilot?

As the professor is, himself, an instructor who some would consider a little bit aged (it seems the older we get, the definition of old diminishes) and having trained students of all ages, it is often a struggle to give a simple answer.

According to the regulations, there is no minimum or maximum age someone can learn to fly. There is a minimum you have to be to hold an RAAus Pilot Certificate (15) but nothing which says you are too old.

The health limitations (basically a driver's licence with some exceptions) might disqualify you and a medical certificate is required once you reached 75 years old but the window of opportunity to begin flying training as an RAAus Student Pilot is quite broad.

I've had a number of students who started young. One began training before his 12th birthday! And a few others who started prior to 15 years old. Each was fortunate to have parental support in both finances and providing the opportunity.

The young brain is definitely a sponge. The ability to absorb new experiences seems to be unlimited, probably aided by enthusiasm and eagerness. But there are also limitations, including a limited bank of life experiences to draw on for decision making and, sometimes, the attitude of being 'bullet proof'. All aspects need to be identified and managed by the instructor.

At the other end of the spectrum, my oldest ab ini-

tio student was 73 or 74. Flying was something which had been on his bucket list for 50 years. He told me that before his TIF. His story had a familiar ring to it. Got the bug when he was young but had no money. Got married – still no money. Started a family (still no money); family grew up and moved out (now he had a bit more money, but the career meant he had no time).

But eventually his time came.

He made the decision to go for a TIF – probably one of my longest (not in the air – he peppered me with questions on the ground before and after the flight). Then he made the decision – he wanted to continue. His progress was slow (but very deliberate) and the theory was a challenge to him, but he didn't give up. He continually led with "This might be a silly question but..."

As I told him, the only silly question is the one that isn't asked. He knew from life's experiences he wasn't bullet proof, he was a good calculating decision maker and a little slow on mastering some of the flying exercises – he insisted on analysing everything in detail. But, most importantly, he was enthusiastic, keen and willing to learn and didn't try to rush things. He progressed then eventually went solo. When he taxied back from the runway he was grinning like a Cheshire cat. After a short debrief, he told me he had achieved his goal and thanked me.

And that was it. Now he had achieved his dream he didn't want to proceed further – the experience had been ticked off his list. Could he have gone on and completed his Pilot Certificate?

Yes. Could he have achieved his cross-country endorsement?

Yes as well. Could he have gained a passenger endorsement? Most certainly because he had the right attitude, was willing to learn and wasn't afraid to ask questions. To this day I respect his decision and the self-

satisfaction he gained from his achievement.

The saying "you can't teach an old dog new tricks" might be partially true; but it's only limited by the old dog's willingness to learn something new.

As instructors we have the responsibility of developing our students' proficiency operating the aircraft and making the right decisions, teaching them to respect the rules and helping them becoming a good member of RAAus. The student pilot (of any age) is very much like the young dog, the early training sets the foundations.

My student who went solo on his 15th birthday still flies (he's now studying at university) and he often asks me to accompany him on a flight, just for revision. He has the right attitude, is a proficient pilot and hopefully one day will complete an RAAus Instructor rating. I experienced much satisfaction when he flew his first solo (nearly as much as he did), even though he did have to wait until his birthday; but my satisfaction peaks each time I see him accept his responsibility as a pilot and shows he continues to be willing to learn and develop new skills.

I am a big fan of IMSAFE and suggest you as an instructor also need to practice and demonstrate self-discipline and not be lured into flying with a student when you cannot honestly and confidently tick off the checklist. Students are a reflection of their instructor. They will be a product of the example you set.

So how old is too old (or too young)?

The lower end may be a mature 12 year old, but there are factors to be considered: How long it takes the student to get to solo and how long between each lesson – no more than two to three weeks is ideal. They can't go solo until 15, so maybe around 13-14 subject to height, maturity and respect for authority (especially the rules) might be better.

At the upper end? You are only limited by your fitness, attitude and willingness to learn.

So you see, age is not the primary factor – it's really about responsibility, attitude, maturity, decision making and it's got to be fun. ✖



National Safety Month 2016

BY KATIE JENKINS SAFETY, RISK AND COMPLIANCE MANAGER



CLEAR MIND
CLEAR PROP

AFTER the success of National Safety Month last year, RAAus will again focus on promoting safety in October. The 'Clear Mind, Clear Prop' slogan will be promoted with the aim of raising awareness about human factors in the RAAus membership.

WHAT IS IT ALL ABOUT?

National Safety Month is aligned with the CASA Human Factor initiatives released in July 2015. By identifying the significant safety-related trends and risk factors within recreational aviation, RAAus is working solidly toward developing safety related communication and educational material for members. Over the past six years, there have been 51 fatal accidents in RAAus aircraft; our investigations and analysis has determined 87% of these were the result of human factors or poor pilot decision making. So the question has been: how can RAAus as an organisation, prevent these accidents from recurring?

A CULTURAL CHANGE IS REQUIRED

A change in behaviour, mates looking out for each other, pilots feeling confident enough to discuss their mistakes openly so the lessons they learned can be passed on to others. Hangar talk is highly effective communication. How we achieve this cultural change is the tough question but, with a number of planned strategies, we believe over time we will begin to see change.

The planning process for the month has already commenced with some of the following safety promotions to be produced:

- Clear Mind, Clear Prop Safety Initiative Booklet with all Sport Pilot magazine subscriptions. You can view last year's safety insert on the RAAus website by following the link. <http://tinyurl.com/z6pfc9u>
- Themed hangar talk presentations being developed for our CFIs to deliver. They focus on safety-related trends.
- A series of safety videos to be made available on the RAAus YouTube channel.

For a taste of what's to come, check out a video we recently presented at the Sport Aviation Forum. <http://tinyurl.com/js5qlhv>.

- A Safety Summit to occur during the October AGM in South Australia (which will also be broadcast online).
- Safety promotional items.
- The rollout of a Knowledge Bank on the RAAus website which will contain safety-focused factsheets and FAQs.

At RAAus, your safety is our priority and for the month of October we aim to continue the discussion. ☺

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It's all in the timing

BY ANTHONY SIBARY



“There is a need to endure things I do not like”

WHY is the weather doing this to me? I cannot believe how little time I have been airborne lately. Perhaps it is just because winter is like that. Perhaps it is a combination of season and timing.

I have mentioned this before, but my dreadful run of poor timing has continued. When the weather has been great for flying, I have been unable to take advantage of it. There is something incredibly frustrating about being at work when the weather outside is beautiful.

Especially when my workplace is under one of the approaches for Bankstown. What is awesome is that now at least I can look up at an aircraft and know that I can fly too.

Maybe not today or tomorrow, but someday soon I will be airborne again. The weather gods will be smiling on me and it will be a truly great day.

In the meantime, I have been living the Gemini dream - taking on many projects and attempting to complete them all at once. Hitting the cross country study materials has been an opportunity to get my head into 'flying' mode again which has been great.

Those of you who, like me, are on the other side of 45, will appreciate just what it can be like studying for exams. I am not making excuses, rather confirming what I have known for some time and that is, we humans learn by doing. So when we have to focus on the theory component, it can be somewhat tedious to say the least.

If I'm completely honest, my tolerance for things I do not like doing is ebbing away as I type this. But with getting older comes the ability to look at the bigger picture, as it were, and I now see there is a need to endure things I do not like in order to get where I need to be.

Fortunately, the cross country learning materials I purchased from Dyson-Holland are perfectly matched with the RAAus syllabus and I've been able to work my way through all the activities with ease. The ground training manual - cross country endorsement, as it is known, has been a constant companion of late. I am not saying I have answered all of the sample exam questions correctly, just that the content is interesting and unlike my university experience some years ago, the theory is actually relevant to flying.

And it is the need to possess patience and develop mental endurance I believe is so important to the cross country pilot.

Flying a constant heading at an airspeed you have calculated will give you best range. Navigating over terrain and areas you have not flown previously. Have the wind conditions changed? Do you need to fly to your alternate airport / field because the weather has changed at your original destination and VFR flight is no longer possible?

These are a few of the questions I ask myself and, without patience and mental toughness, perhaps it would be wiser to stay in the circuit?

Even though I always wanted to fly, I know looking back I did not always have the correct mind set when I was younger. I believe I do now and I guess that can be put down to life experience and my 'middle age'.

The journey to gaining my cross country endorsement is underway. Now, if I can just get my timing right and string together some good days of flying weather, all will be well.

As always, see you in the pilot's lounge for cocktails and debriefing. ☺

By gosh

THE BEST BITS ABOUT BUILDING YOUR OWN BY DAVE EDMUNDS



Wright Flyer

IN my first article in this series some time ago, I recommended going to Oshkosh, Wisconsin for Airventure, the Experimental Aircraft Association (EAA) annual fly-in and convention. I have just been for the second time, the first was five years ago, and still believe this is nirvana for anyone interested in aviation.

Photographs of the event do not do it justice. So here are some statistics. Attendance over the week was 563,000. The number of aircraft flying in to Oshkosh and local airfields exceeded 10,000, consisting of 2,855 showplanes, 371 warbirds, 1,124 homebuilts, 1,032 vintage aircraft, 135 ultralights, 101 seaplanes, 31 rotorcraft, 41 aerobatic aircraft and a few others.

There were over 1,500 scheduled events, workshops, lectures, flying events and the like,

“There were continuous overflights by an astonishing range of aircraft”

of which perhaps 1,000 were unique. In addition, there were more or less continuous overflights by an astonishing range of aircraft, including a B17, the one and only flying B29, a C5 Galaxy, F18s, MIGs and Mustangs as well as a variety of homebuilts and commercial aircraft. That was before the formal flying exhibitions started in the afternoon.

There were 891 commercial exhibitors.

The event encompasses the 607ha and four airstrips of the Oshkosh airport, as well as the two adjacent grass strips of the EAA and the seaplane base.

It does take a week to get around and see

it all.

I believe that, by far, the majority of homebuilts were Vans RVs, perhaps over-represented this year because as it was a 30th anniversary for the company.

The homebuilt area was where it always is, on a corner of the campus, which leaves it some distance from the centre of the action. Similarly, the ultralight strip is a considerable distance away on the other side of the campus, and both areas are small compared to the other venues.

The organisation of the event is a tour-de-force. While attendance must be well over



Thatcher CXS



Sunflyer, from Nevada, 2-seat electric training aircraft

100,000 on some days, there is no crush, the toilets are clean and plentiful, there are short queues at the various eating places, the transport works and the grounds are kept in immaculate condition. The extended grounds are very attractively landscaped with copses of large shady trees. It is hot and humid at this time of the year in Wisconsin.

I have found on both my visits that there is no particular winning attraction, the overwhelming wealth of things to do and see is itself the winning attraction.

I expected to see more on electric aircraft development. The main development in electric aircraft was the interest shown by Airbus. The E-fan aircraft was on display and, in a lecture on the issue, Airbus made a few interesting observations. Firstly, they showed that the company and European aviation more gener-

ally, cannot meet its carbon abatement commitment without moving in this direction. The second point was that the company believed it had to start from zero in the development of an understanding of electric flight. They plan in the next few years to produce an electric aircraft for sale, designed for the training market.

Sonex did not have its electric aircraft on display, but did have its little jet, based on the Onex, which it demonstrated in flight. This aircraft uses a remarkable Czech engine, about the size of a volleyball. Rumour has it that the engine costs \$US55,000. A larger version was also on display by a company using a prop-jet version as an upgrade on something that looks like a Piper Warrior. They may not be very practical due to their fuel consumption, but are beguilingly attractive and the engines look like jewelry.

Electronic instruments of all sorts were displayed in the large hangars by the large companies, such as Dynon and Garmin, as well as a host of other players. The prices do not yet reflect the plunging cost of the electronic components. Clearly, the investment in product development is still being recovered in the purchase price. This will be an interesting space to watch over the next few years.

A number of companies showed products related to digital design and manufacture. One particular example was a Canadian company which scanned parts for P47 Thunderbolt aircraft and reproduced them. There were a number of exhibitors showing various aircraft bits and pieces, exquisitely manufactured using various digital techniques. I have written about this burgeoning field in recent articles, and we can expect to see a great deal more.

By Gosh

THE BEST BITS ABOUT BUILDING YOUR OWN BY DAVE EDMUNDS



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Fokker Tri-decker scale copy



Bentzen Sport, recently restored





During the event, the EAA and software developer, Solidworks, announced that the Solidworks product would be available free of charge to all EAA members. The product will be the full version, but requires users to commit to non-commercial use. Solidworks is perhaps the dominant industry-standard product in the digital design space. I think it is probably overkill for most of us, but it is an interesting and important development. Solidworks runs only under Windows.

It would be remiss of me not to mention the one downside of Airventure...the food. To be fair, gourmands do not come to regional US centres to investigate their interests, so suffice it to say that, while the food is cheap, its only virtue is that it stops you feeling hungry.

The coffee is worse.

I hope over the next few issues to write about some of the things which caught my attention, starting with some travel advice for those interested in going next year. Now is the time to plan your trip.

RESPONSIBILITY

For some time I believed, along with many others, that the FAA, the equivalent to CASA in the US, had a dual responsibility, both to promote general aviation and to work as a safety regulator. I've discovered this used to be the case, but a congressional enquiry some years ago following a number of crashes found the two roles were in conflict. That is, the regulator was disinclined to insist on measures which

might affect the interests of commercial operators. So, the legislation was amended to delete any responsibility related to the promotion of general aviation.

This comment is made in reference to the Jabiru saga and issues I have raised in previous articles concerning the approach of CASA to this issue. I should thank Dr Jonathan Aleck of CASA for drawing it to my attention. Clearly there is considerable logic concerning the decision by the US legislators.

The decline in general and recreational aviation should be of great concern to our government, and there needs to be a body with an explicit mandate to drive development in this area, but CASA would appear not to be that body. ☹





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How much has been awarded in the GYFTS program in the past three years

23

New instructor applications approved in the past year

3

New RAAus Flight Training Schools approved in the second quarter of 2016

369

Pilot Certificates issued so far in 2016

41

New aircraft placed on the register so far in 2016

26 JULY

RAAus Inc became RAAus Ltd

10,000

Likes on RAAus' Facebook page

250

Occurrences reported by members since the new online reporting system was launched

80_M

The wingspan of a Qantas A380 is longer than its length (72.9m).

Source: Qantas



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Photo shows some options

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WHERE IS CAGIT?

TEMPORARY NEW HOME

AS forecast in the last edition, CAGIT has a new home.

Early in June, Noel Thomas, from the Alice Springs Aero Club wedged it out of MKT in the Northern Territory and set it up proudly in Alice Springs. Where it remained for less than an hour.

NSW pilot Mark McLachlan and son Scott, were visiting Alice, saw their chance, lifted the trophy and swept it off to Moruya on the south coast of NSW. Like Alice Springs, Moruya is a fairly popular aviation destination so unless Mark hides the CAGIT somewhere clever, don't expect it to remain there long either.

If you or your crew are contemplating a high speed heist of recreational aviation's most coveted prize, its best to keep up-to-date with its latest location by checking the CAGIT Hunters Facebook page, administered by Dexter Burkill, Peter Zweck & David Carroll www.facebook.com/CagitHunters/.



CAGIT handed on to Mark Mclaughlan (left) by Noel Thomas

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✕
OFF THE SHELF



BIG GLASS

Avdyne Corporation used this year's Oshkosh to showcase some innovative configurations that leverage the wireless capabilities of its IFD550 Series FMS/GPS systems and its new IFD100 iPad app. The system can be coupled to an iPad mounted directly over the usual instrument 6-pack. The app can display a large-format Synthetic Vision attitude display with three-dimensional presentation of traffic and obstacles. The panel is easily convertible back to its 6-pack configuration by simply removing the iPad from its bracket.

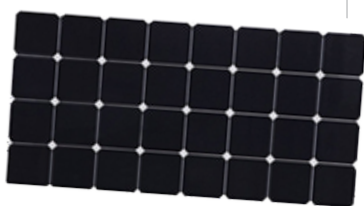
"Because the IFD550 has a built-in Attitude Reference System and integrated WiFi capability, we can wirelessly send all the GPS, flight plan, ADS-B plus attitude information directly to the iPad," said CEO Dan Schwinn. "It's a novel concept, but we see it as a way of giving owners of legacy aircraft who might otherwise never have installed big glass, the ability to now have access to Synthetic Vision on a large screen."

- **PRICE** N/A
- **WEB** avidyne.com

PORTABLE SOLAR POWER

Wicks Aircraft & Motorsports has launched its Solar X-Press, a portable, 400-watt solar power generator. The panels, weighing only 1.8kgs, are automatically controlled by an MPPT charge controller, a waterproof computer which maximizes energy output. The unit has both a solar panel gauge which displays how much power is being generated and stored and a battery meter which indicates charge level. The inverter provides access to 1,500 watts of AC power, enough to power a campsite or operate small lawn maintenance tools. It also features a remote switch and a 2-amp USB charger port for charging smartphones or tablets.

- **PRICE** N/A
- **WEB** wicksaircraft.com



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- **WEB** skylines.com.au



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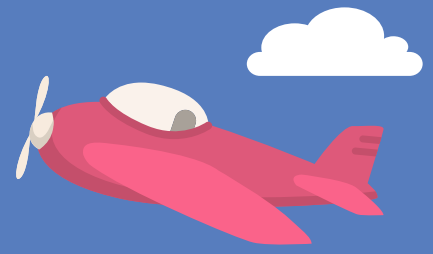
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- **WEB** skyshop.com.au

Jordan flies the nest

BY FRED NOLAN



MOREE Pilot, Jordan Hunt, has completed his final solo navigation exercise after three weeks of weather delays.

He flew over four hours around the northwest NSW countryside in the Moree Aero Club's Jabiru J170C aircraft, landing enroute at Coonamble

and Lightning Ridge.

Jordan then headed to Melbourne to start an intensive full time theory course for his Commercial Pilot's Licence, to take up a career in agricultural aviation.

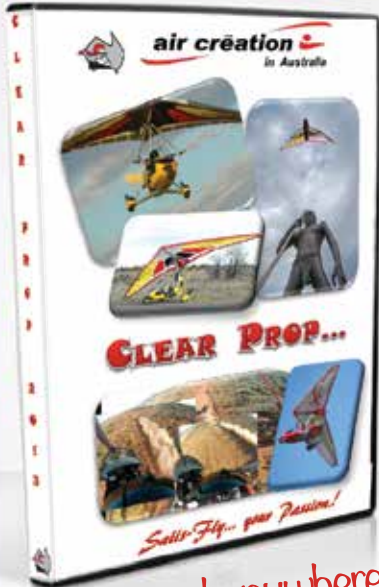
As his CFI I can tell you Jordan is well suited to achieve his goal in commercial aviation. ✈

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