SPORT PILOT

For recreational pilots
NOVEMBER 2014 VOL 40 (11)

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SPORT PILOT

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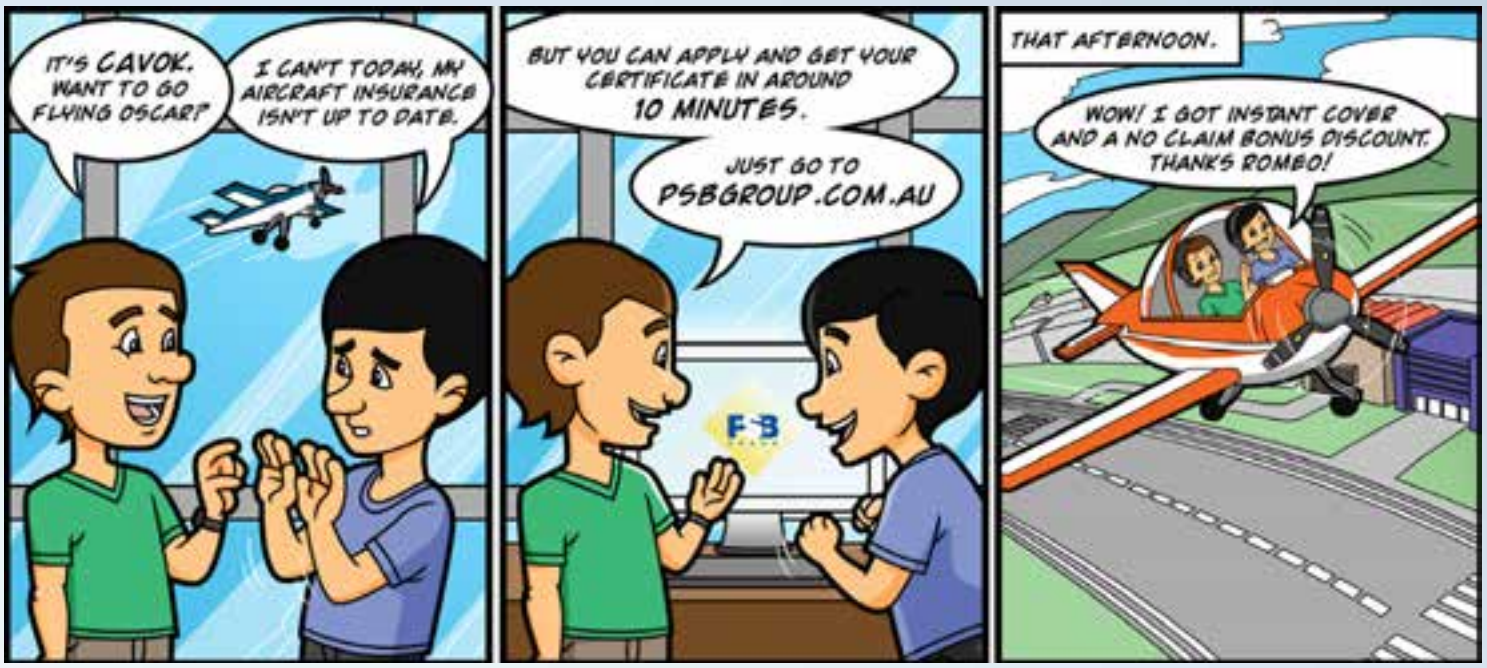

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President's Report

MICHAEL MONCK

Preserving our history

IN the weeks before reading this, your board will have conducted its final meeting for the year and the AGM will have also been held. I'd like to express my thanks to those who took the time to attend the latter and especially our hosts at Lethbridge.

Unfortunately, at the time of writing this, these meetings had not been held and so I can't report on what happened. The magazine is a great publication and we have our membership, Editor, advertisers and others to thank for its content. However, the lead time associated with getting the magazine to the printers often makes it difficult to communicate to members in a timely manner.

To this end, I hope that you take the time to read the newsletter now being published. If you are not yet receiving it, log in to the member's area on the website and register your email address to ensure we can keep you up to date.

OUR HERITAGE

The CEO, Michael Linke, and I were privileged to be invited to the Holbrook Aero Club for one of its regular gatherings during October and I must say I am always pleased to visit this great club. Many people will be aware of its efforts to protect our proud history by establishing a museum to preserve our heritage.

The museum has already gathered an impressive collection of aircraft and is in the process of building a new, permanent, home for them. While I don't own a classic rag and tube aircraft, I feel it is incredibly important to remember this is what started our movement.

I was lucky enough during my visit to have a hands-on experience with a Wheeler Scout. For those not familiar with this aircraft, the Scout weighs around 50kg and has no ailerons. The rudder is controlled via the stick - an unorthodox setup for most of us. The propeller is chain driven from a small single cylinder motor mounted fore and above the pilot. The starter 'motor' consists of a short length of cord similar to what is used on a lawnmower.

I got to taxi the aircraft for a short distance, during which time it became very apparent to me just how strange the control setup was. It was also very apparent just how much fun these aircraft could be. I got a very good feel for what it must be like to actually leap into the air and enjoy a slow but exhilarating climb out. You can hear the motor and feel the wind well before you leave the ground.

A lot of us will have already experienced this, but there are a great number of us who haven't. And there's no doubt some of us aren't aware of how much fun you can have in such a simple aircraft. Should you ever get the chance, I would urge you to make an opportunity to try out this end of aviation. I would also urge everyone to support the efforts of the Holbrook Aero Club to establish the memorial to some fantastic machines which pioneered aviation in Australia. If you can, get in touch with them and lend your support.

FLY SAFE

Finally, I'd like to end this column on a more sombre note. We've had more accidents late in the year and one of these has seen another of our colleagues lose his life. While I haven't yet been made aware of the causes of any of these accidents, it goes without saying we should do everything possible to ensure we fly safely. If you have second thoughts about going for a fly then maybe you shouldn't go. Don't give in to the usual pressures. Don't shortcut your safety checks. And don't put your life in danger.

Longer days are coming and so is summer. This generally means we get to fly more, which is a good thing. Coming home is also a great thing. Let's make it a point to fly safely this summer and do what we can to make sure all of our flights are great and not just good.

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Calendar of events

8 NOVEMBER

Australian Aviation Hall of Fame 2014 Induction

The event will be held at a gala dinner at Joyes Hall in Charles Sturt University in Wagga NSW. The event will also include the announcement of the winner of the Southern Cross Award.
For more information, www.aahof.com.au.

7 DECEMBER

Frogs Hollow Christmas Party Fly-In

BBQ lunch at the airstrip starting at 12pm. All Welcome.
Lat 36 46s Long 149 48e.
For more information, Bob Phillips (02) 6495 9251 or bobatfrogs@gmail.com.

15 MARCH 2015

Darling Downs Fly-In

The Clifton Airfield (Bange's) fly-in has become an iconic event in the region and is the premier attraction for all types of aviation in southern Queensland. Come late pm Saturday 14th for BBQ, drinks. Fly or drive in, see ERSA. On field camping, bring your swag. Advise for catering. For more information, Trevor Bange 0429 378 370, (07) 4695 8541 or trevorbange@bigpond.com.

9-11 JANUARY 2015

Great Eastern Fly-In

The Great Eastern Fly-In at Evans Head has become the must-see aviation event on the flying calendar. Pilots, their families and friends, fly in from all over to enjoy a great summer holiday with a difference. This year the GEFI will celebrate 100 years of military aviation in Australia. The Aviation Heritage Museum has new displays, get up close to the F-111 and, for the first time, there will be a 737 flight simulator for you to try.
For more information, www.greateasternflyin.com.

12 APRIL 2015

Barossa Airshow

The Airshow / fly-in, now in its eleventh year, is a family fun day with rides, amusements, static displays, stalls, food and wine. 10am-5pm. Includes aerobatic displays and helicopter joy flights. All pilots are welcome to fly in for the day or stay overnight. Anyone not familiar with the 600m strip at Rowland Flat should contact Steve Ahrens for a briefing. For more information www.barossaairshow.com.au.

18 APRIL 2015

Loxton Aero Club Fly-in

As well as a great fly-in, the hangar dinner is well known as a great event. All welcome. For more information Kerrie Palamountain palark@tpg.com.au or loxtonaero.com/dinner.html.

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LETTERS TO THE EDITOR

What a Laugh!

After the board elections, I asked RA-Aus how many members actually voted. I was told 420 members voted out of 9,375 who were eligible. Over 95% of our members simply didn't vote. The election system is a failure and subject to manipulation. It seems the 95% would be happy for any properly qualified director to be on the board.

Long ago, the Royal Aero Club of NSW was going broke and our three Tiger Moths were down to one, which then became unserviceable. The 'old guard' directors were immediately ousted in a revolution, led by club members who were company directors and top level business management. Within two years they had purchased 16 aircraft and, in seven years, a total of 28 aircraft. The club never looked back during this period - this is the power of an efficient and skilled board.

The failure of our elections highlights that the constitution which we have to follow is no longer working. The election system - its cost, the staff time involved, the limitation of two meetings per year and a board size suited more to a government review committee - cripples decision making.

We have some very valuable and qualified people on the board, handicapped by this outdated constitution. They have their limited time taken up with fighting off crocodiles and, so far, have none available to be able to drain the swamp with long range planning. Among other items, they have been fighting the CASA crocodiles on our behalf, so no wonder the swamp is still full.

This letter is a message to the board that they follow the recommendations of the consultants, and common sense, and concentrate on introducing interim, simply worded changes to the constitution, which would allow for a streamlined board to be selected and not elected. The time lost will be recovered many times over afterwards. Trying to get the wording legally perfect and covering every eventuality is never going to get it done, so we have to make an imperfect start now. The interim amendments should be for a limited time of less than a year, to allow for further refinements.

The interim constitution needs to specify something like this:

1) Board numbers to be seven, with a quorum of five;

2) The majority of directors to have previous experience as directors of a company with similar turnover of capital or larger, while still allowing for individuals having necessary special qualifications;

3) Board meetings to be monthly, with directors within reasonable travel distances from RA-Aus to involve them where needed;

4) Directors to have remuneration sufficient to cover costs and for time of attendance;

5) For the changeover, the current board is to select its most qualified members as required in (1), inviting outside directors if shortfalls occur;

6) The selection of future directors replacing anyone retiring is to be vetted by a nominated small panel;

7) The membership has the right to vote out any director at AGMs;

8) The changes to be revised in no more than 12 months of its implementation.

I believe if we really wanted to, these items could be written out as changes to the constitution in a day, the wording refined by a solicitor, then be ready to put up to members in a month at an EGM. I would be even be happy to write the changes myself, to be checked by a couple of selected members, for onward processing.

The whole constitution needs to be changed, but this is the first step to allow us to be able do this. Any action is better than doing nothing, and even an imperfect change is better than what we have now. So to the board, what about it?
Barry Wrenford

CEO - *The reform of our constitution is a high priority for me as CEO and the Board of RA-Aus. The process isn't as simple as you describe and i think you will agree with me, we need to get it right. We are a big organisation, with 10,000 members, 15 staff and an annual budget of $2.5M so our constitution and any reform is central to our future success.*

Topaz Critic

What a great looking little aeroplane (Ekolot Topaz, *Sport Pilot* August 2014). Strutless, clean lines, wide cabin, great paint scheme. It almost looks a little CT cloneish? But in a nicer and more conventional way.

But looks may disappoint, because that's about where the good things finish. When you read the article you must keep in mind it is meant to keep the product in the best possible light. Quotes like "why would you need the 100hp engine if most of your flying is around your local patch?" The truth is if you want to fly around your local patch, why would you spend over $100,000? You can do that in a trike for less than half the money. When reading the Technical Data associated with this article, I couldn't ever remember seeing fuel consumption quoted as "the minimum"? That figure may be there to help justify the small fuel tank capacity of 84 litres.

Steerable nose wheel? It didn't say but I suspect not. Toe brakes? No, just a bicycle type grip in front of the centre mounted stick. You've just got to hope it can be steered under braking by rudder. It appears to have the cabin ergonomics of an early Jabiru. The throttle is reported to be somewhere low and left. The instrument panel seems to be a bit of a dog's breakfast but at least it hasn't got the classical centre mounted Tacho.

Negative flap with 80hp? Unless you are at 8,000ft in super smooth air, your airspeed will probably wander up and down in the order of + or – 20 knots. If negative flap is the only way it will do 105kts, you may as well plan for 90-95. Airbus spent millions trialling negative flap only to shelve the project due to the complexity involved.

One would wonder where these designers/ manufactures come from? My guess is that they are straight out of 1975 when this type of aircraft would have been considered an advanced example of a two seat recreational aircraft. However we are 40 years on from there and a lot of cost effective advances have been made. We like and expect a few things that are looked upon as basic these days. Like differential toe brakes and cabin ergonomics, not to mention a few safety inclusions like an Artificial Horizon which some people seem to think are for the exclusive use of airline pilots.

So I guess if you are fat, dumb and happy plonking around "your local patch", you don't mind a small fuel capacity, basic instruments are too hard for you, using negative flap and chasing your cruise speed around (nose up-nose down) from 90 to 105 and you have $100,000 hanging around doing absolutely nothing - this is your aircraft. But all is not lost. It looks good parked outside the hangar.

Wouldn't you think that one day a company would come along and put it all together?
Rod Robertson

Editor - *Actually Rod, the ergonomics of the cabin were very nice. You should try and go for a ride in it and see for yourself. It felt to me like the cabin of a much bigger aircraft. Also the interior finish is sensational. You reckon 84 litres is a small fuel tank capacity? Your bladder is obviously much bigger than most. Re the Artificial Horizon - As you say, only airline pilots need one. RA-Aus pilots are better than that. And by the way, challenging the Editor by writing 'I bet you won't run this letter' in the subject line of your email doesn't work with me. I have a policy of running all Letters to the Editor,*

regardless of the writer's opinion. After all, it's your magazine, not mine.

Encroaching demands

As a flying member of some 15 years, I am displeased with the mooted, encroaching demands seemingly to emanate from CASA without enough opposition from RA-Aus.

While our reps are not the prime cause of my displeasure, I feel they should adopt a likely strategy in combatting the unnecessary demands, instead of patterning RA-Aus requirements on the relevant US ones.

For instance, the mandatory carrying of large, folding maps and bulky ERSA.

In RA-Aus aircraft such as the Evans Volksplane, the Heath Parasol and the Flying Flea – how can the maps and ERSA be safely viewed and interpreted while flying such open cockpit aircraft?

Assuming in such aircraft all this voluminous paraphernalia can be safely and handily stowed at all, where is it be safely rested between viewings? A map might blow away. A loose ERSA can easily slip to the floor and wedge itself inaccessibly among the control cables or rudder pedals, like a block of wood.

Why must we cart such a thick tome at all, most of which has absolutely no relevance to an RA-Aus pilot flitting about within 100nm of home? Who cares whether oxygen, turbine starter fluid or nitrogen is available at Darwin and not on Kangaroo Island? Especially when I'm flying from Kadina to Snowtown?

Also, we seem to be approaching the mandatory and routine testing of altimeters, etc., by accredited testers. This will no doubt impose more costs on all RA-Aus pilots, involving fees to the testing industry, with some parasitic dipping by RA-Aus.

Can we next expect this rich revenue trough to expand to include accredited spark plug testers, control cable technicians, riggers and fabric assessors?

ASIC cards are another bugbear. They represent an obscene and unnecessary expense, mostly bolstering the safety 'industry'. The biennial fee of around $125 is just too much when you consider the majority of RA-Aus pilots, by their very nature, are wholly responsible, committed citizens of Australia, well known in their localities, ranking highly in any range of security risks.

Road users, especially drivers of fuel tankers and industrial fertilizer trucks, would present a far greater risk. Do they have to carry such cards? It's time to stand up and stop the rot.

We have to accept that while we are slaves to the art of flying, most of us RA-Aus pilots are rank amateurs in the scale of pilot expertise. In spite of all the theory, exams and certificates, we just do not get the necessary practice to get anywhere near commercial pilots' abilities. This has to be recognised and allowed for.

I suggest that RA-Aus, in consultation with its members, hammer out a policy addressing the above subjects and negotiate a sympathetic outcome with CASA.
Brian Smith

Operations and Technical Depts - *We agree completely with the RA-Aus philosophy you have outlined and work hard to ensure additional requirements or regulations are not imposed without a valid safety case. CASA has produced CAAP 233-1(1) on Electronic Flight Bags http://casa.gov.au/wcmswr/_assets/main/download/caaps/ops/233_1.pdf which equally applies to RA-Aus pilots and provides guidance as to the requirements for carrying documents. An iPad or tablet will address most of your concerns. Instrument testing has actually been a requirement for all RA-Aus aircraft for many years and is not a new requirement.*

Cruising mixture

I would like to comment on the recent Home Builder article (Mixture Control *Sport Pilot* September 2014).

Like Dave I have also thought of making my own. I am an electronics technician and have the ability to program a micro controller to do exactly as he suggests. But (there is always a but) the hardware cost could be 100 times what he suggests. The Rotax carburettor is $1,000 before you start and the development cost in hours could run into many more thousands.


HOMEBUILDER
DAVE EDMUNDS
Homemade mixture control
"We obviously prefer to fly using less fuel"

In my case, I use a Bing carburettor for a Jab 3300 in a Sonex. I would have to decide if it was worth the effort. First, despite popular opinion, the Bing does a very, very good job of mixture control. They can be found on hundreds of different types of engines over many years of service. If they were as bad as people claim, that would not happen. I am fairly confident Mr Stiff owns an exhaust gas analyser. This would be very easy to prove, as there are several inexpensive electronic mixture readout systems available today which you can attach to your exhaust to give you an accurate reading of your fuel air ratio. There was even one described in a popular electronics magazine you could build yourself using the very latest oxygen sensors.

Which leads me to a possible solution. If you have a manual mixture control and you are worried about where to set it, why not install a mixture readout system and still be part of the loop.

But it is still fiddly if you change altitude a lot. Or you could purchase one of these and a Rotax carburettor, a servo and a small bit of electronics and you would have your automatic system. But you will still have spent $2,000 or so.

Assuming I did reduce my fuel consumption by 10%, it would take me a very long time to recover $2,000. I am sticking with my Bing which gives me 19 l/ph at 125kts.

This equates to 8.26 litres per 100km. I don't know any cars with EFI which can get that sort of economy, while cruising at 230kmph.
Adrian Clout

The nut behind the wheel

Anne McLean hits the nail on the head when she states that "any old fart" can be taught to press a button ('PFM presses a button' Letter to the Editor *Sport Pilot* September 2014). Most of us press buttons morning and night.

However failure of Pure Flaming Magic boxes is not the issue here. Our aircraft are at the basic end of aviation design, but we still have the need of aids such as airspeed indicators, altimeters and even maps.

Would you take-off knowing the ASI was faulty? So don't blame EFBs for poor pilot performance. We rely on technology to fly safely. So the issue is not the failure of the Electronic Flight Bag, rather the disrespect shown to it by the pilot.

His or her attitude to preserving the integrity of an aircraft system, including the EFB, by leaving it in the sun shows an attitude which may well manifest itself in other aspects, such as pre-flight inspections and ensuring the aircraft is operated within its safe limits.

A pilot's attitude towards situational awareness cannot be blamed on EFBs either. If you haven't looked up the CTAF in advance, you can't blame the box.

A decent quality approved EFB product will be able to present the pilot with the same data as a map, in fact that's all they are approved for. It's a moving map.

So I can't blame the equipment for poor pilot performance. In automotive terms it's the nut behind the wheel that's to blame! When something goes wrong in flight its airmanship which determines the final outcome and airmanship starts on the ground before flight.
Brian Cavanagh

Tex goes back into battle

Whenever pilots gather, the subject of security at regional airports arises. We call it security but we all know it is a total farce. The gate codes are common knowledge and, in many cases, you can simply walk around the end of the fence. We all understand and appreciate

the requirement for stringent security and screening at major airports, but we don't get a lot of terrorist activity at places like Normanton, Windorah or Burke.

We pilots are good at whinging to each other about the futility of the system in place, but the only way anything will be done about the situation is for us to write letters to the Minister responsible.

He will not be aware of our complaints unless we tell him. I wrote a letter and got a brush-off along the lines of "it's for the safety of the travelling public." So I wrote another letter and this time I included photos of the codes written on the gate and another of a girl with her arm through the wire opening the gate.

This time I got a considered reply.

Instead of complaining to other pilots (who can do nothing to help you), write a letter (not an email, they are too easy to ignore) to the Minister. If you are not prepared to do that, stop complaining and be prepared to put up with the current farcical situation.

By the way, access to regional airports in the US is unrestricted. They have never heard of anything like an ASIC card. Wasn't it an incident in the US which sparked this security frenzy in the first place?

The minister's address is:-

Hon. Warren Truss
Minister for infrastructure and Regional Development
Suite MG41
Parliament House
Canberra ACT 2600
Tex Battle

Back to school

Just reading through the latest Sport Pilot (September 2014) and it seems Professor Avius needs to go back to school - the Density Altitude calculation (page 49) shows 15-6=11.

Otherwise, as always, an enjoyable read.
Aaron Proctor

Professor Avius - *Well spotted. Glad to see you read it closely.*

Cost effective meetings

Due to the location of the 2014 RA-Aus AGM I, along with many other members, will not be able to attend, due to time restraints, distance and travel costs.

However, I would like to submit a suggestion to enable more members to participate and for the Board to consider their views.

By staging the AGM (and General Meetings) via a webinar, members could log in to listen, send questions and vote on motions, etc.

A Moderator would be required to manage the voting and to pass on members' questions to the Board members.

I regularly participate in meetings and technical webinars where participants are located world-wide; EAA and NASA are just two organisations which regularly hold successful webinars for their members.

AGMs delivered via webinar would give members around Australia a chance to hear and participate in how the organisation is travelling, creating cost-effective savings for them and RA-Aus and resulting in successful meetings.
John Washbrooke

CEO - *John, thanks for the suggestion. RA-Aus is currently exploring ways of making our meetings accessible to all members.*

Magazine delivery

I write to you having collected this morning's mail delivery (September 29) in which I finally received the September edition of the magazine.

If I lived in a remote location with non-daily services, this might have been a non-event.

But I live in the CBD zone of Australia's fasted growing inland city (Toowoomba) and am aware a fellow member in a regional location received his copy more than two weeks ago. The delivery has left me wondering.

Now, I must confess I am one whom has rarely shirked an opportunity to comment at a level best described as 'barely shy of defamation' when it discussing my take on the performance of Australia Post.

However, on this occasion it occurs to me that even the good people at Aust Post aren't this slack. I have to ask, *Sport Pilot,* where in the chain of between pagination, editing, printing, delivery to a bulk mailer and dispatch, has something gone wrong?

To receive a regular monthly title anywhere between the third and twentieth day of the month is already a little too inconstant to my mind. This whopping four-week (I'll round the extra day to allow for the weekend that just passed) wait is beyond acceptable tolerances.

One would have to assume the October edition, if not already printed, would be not farther off than final editing before being sent to the printers.

The publishing of *Sport Pilot* is a business activity - that the publication has a captive readership base is no reason to tolerate inconstant delivery performance.
Adam Byatt

Ed *- Adam's letter gives me a good reason to remind everyone of the process which gets Sport Pilot to you each month. The magazine begins preparation on the first of the month when the CEO and I discuss what stories and issues are to be included (If you have a story you want included in the next month's edition, this is your cut-off date to let me know). By the 20th of the month, a draft copy goes to the CEO for board approval. In the past, that process could take up to 10 days. These days, fortunately, only two or three. The final editing is made and a master copy sent to the printers by the 23nd. A week later the 10,500 printed magazines go to the mailing house, where they are bagged and bulk posted. They are due in your mailbox 7-10 days later. Australia Post performance is generally good but can be patchy in places at times (I'm looking at you Goolwa and Longreach). Sometimes it seems as if some Australia Post staff just put their box of magazines in a corner and leave them there for a week before delivering them. And there's not a month goes by where at least five or six members don't get their copy at all. We have no way of knowing why (we think they are probably 'borrowed' by aviation loving mailmen), but in any event, if it happens to you just email me your name and address and I'll post you out a replacement copy. When I took over as Editor three and a half years ago, I promised the board I would get the magazine to the members in the first 7-10 days of the month (unlike the bad old days). I have kept that promise, but it is an inexact science. In Adam's case, I have had the mailing house investigate why his was so late. They have sent an control copy to him to test Australia Post.*

Got something to say?

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.

editor@sportpilot.net.au

(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).

No Easter NATFLY

NATFLY is under review so RA-Aus can explore ways of improving its flagship event.

In October, the board took the decision to defer the national fly-in pending a full review of RA-Aus' activities and calendar of events.

The decision was made with a view to reinvigorating NATFLY to attract a wide and varied audience.

At this stage NATFLY will definitely not be held on the Easter weekend in March 2015, nor before that weekend. RA-Aus is currently undertaking a full review of the event and a further announcement about the timing of the next NATFLY is expected to be made in January.

For more information, visit the website.

Sport Pilot goes exclusive

AS PART of widespread changes planned for RA-Aus' communication strategy in 2015, *Sport Pilot* will not be available for sale in newsagents for three months as part of a trial.

This process has been driven partly by the need to reign in the costs of RA-Aus (of which the magazine is a major one) and the need to remain relevant to the membership as communications needs change rapidly.

For the moment *Sport Pilot* will still go into the letter boxes of all members – it has by far the biggest readership of any Australian aviation publication. More than 10,000 Australian pilots read the magazine cover-to-cover every month.

The organisation is also developing plans to take *Sport Pilot* online next year and make it available as an App, ensuring *Sport Pilot* becomes available to a much broader audience.

As part of the same changes, there will also be no free yearly calendar distributed with the December edition of the magazine this year.

Changes to Pilot Notes

NOW that the RA-Aus website provides a summary of all accidents and incidents, the Pilot Notes section will no longer be printed in *Sport Pilot*.

The website currently lists accidents, incidents and defects with a brief summary of the outcomes. Not all reports are followed up, however in some cases an outcome of the root causes of the incident is also listed.

These summaries can be found at:

https://www.raa.asn.au/safety/accident-incident-summaries-2014/

At present RA-Aus staff are in the process of creating an easy to use online reporting database which will benefit all members as well as providing a summary of events in a searchable format (similar to the ATSB website).

RA-Aus would like to thank a long standing staff member, Dean Tompkins, who has provided these detailed summaries of accidents and incidents for Pilot Notes for the past 14 years.

Welcome Jared

RA-AUS has welcomed Jared Smith as its newest team member.

Jared has taken on the Assistant Technical Manager position. He will oversee the aircraft registration and renewal process and assist the Technical Manager, Darren Barnfield, with systems and process improvements, as well as new technical developments. Jared has some exciting ideas regarding moving the renewal process online and delivering a more user friendly approach to members' interactions with the technical team.

Jared comes from the civil construction industry as a Project Manager, where he was responsible for multi million dollar infrastructure projects. In that role, he consistently identified opportunities for improvements, implemented change processes and regularly brainstormed solutions. He has a Bachelor's degree in Aviation and Business. In addition, Jared holds a Commercial Pilot's Licence, Command Instrument and Instructor ratings.

Helping us help you

by Jared Smith, Assistant Technical Manager

I HAVE spent my first month at RA-Aus contacting aircraft owners about outstanding registration requirements. It has been very enjoyable talking about your prized possessions and hearing of your flying adventures.

I would like to thank those many owners who have supplied their outstanding documents. I understand the difficulty some of you have to go through in order to comply. I also understand that, in many circumstances, some of you are the fourth or fifth owner of a particular aircraft and sourcing paperwork is even more difficult.

But these are responsibilities thrust upon us and we have to give them the attention they deserve. All requirements for registration, as listed in the RA-Aus Technical Manual, are equally important for compliance. For example, the photo of the right hand side registration markings is as important as the weight and balance or pre-flight final inspection documentation.

It's not us trying to be difficult when we call or write to an owner regarding a registration photo. It is us making sure they are compliant with the regulations.

RA-Aus is responsible to the regulator for ensuring aircraft compliance. If an owner chooses not to comply we have no choice but to send them a final request for information. If they still don't send us the information, we unfortunately have to suspend the aircraft registration until they do. This means the aircraft cannot be flown and cannot be insured.

Auditing files has been going on for a while now, but I can assure you we have made good progress and the end is in sight.

Please continue to help us help you.

>> Left to right: Craig Day (Airwings Flight Centre), Bob Woodward (Airwings Flight Centre), Jill Bailey (RA-Aus Operations Manager) and Katie Jenkins (RA-Aus Safety Manager)

Emergency Exercise Training

by Kate Jenkins, National Safety Manager

OPERATIONS Manager, Jill Bailey and I were invited to Narrandera in September to take part in a local Airport Emergency Exercise training day.

The genesis for the exercise was the Narrandera Shire Council's Emergency Management Committee Meeting in June. The committee suggested conducting a training workshop for the various local emergency response teams. The exercise included a walkthrough of an operational passenger aircraft, a SAAB 340 provided by Regional Express (after it had unloaded its Saturday morning passengers from Sydney). Rex operates the largest fleet of SAAB 340s in the world.

Rex staff delivered a training session which included an emergency service briefing on the SAAB. They also provided an overview of the hazards and risks involved when conducting an emergency rescue of passengers and the emergency response REX headquarters activates in such an instance.

Local emergency service teams were then allowed to get access the cockpit and aircraft systems so they could see the deactivation points for batteries, fuel tanks and internal emergency access points. They were also given the opportunity to conduct a walk around the aircraft to be shown the danger areas and exit points they should consider in an accident.

It was interesting to observe the discussions between the members of the emergency service teams. They were focused closely on the limited space they would have available to remove passengers from the aircraft because of the narrow access points.

The day also provided us RA-Aus staff a unique opportunity to see local council, airport services, emergency services and the local Flight Training Facility working together to coordinate their efforts and understanding the roles each group would play in an emergency. The primary role of emergency planning is to minimise the effect of an incident. It requires a plan and specific procedures.

RA-Aus would like to thank Bob Woodward,CFI Airwings Fight Centre, Craig Day, Instructor at Airwings Flight Centre and Fred Hammer, Narrandera Shire Council for their invitation to take part.

Great Eastern will be great again

by Halden Boyd

ORGANISERS of the popular Evans Head Great Eastern Fly-In are expecting another large turnout at 2015's first aviation event on January 10-11. This time it will mark a special event at the heritage listed aerodrome. It was 75 years ago that Evans Head began playing its important role in Australia's aviation history. The aerodrome was opened as an RAAF Station, the largest Air Force training facility in the Southern Hemisphere during World War 2.

It was home to the No.1 Bombing and Gunnery School and No. 1 Air Observer's School. A total of more than 5,500 personnel were trained there under the Empire Air Training Scheme.

The local Living Museum and F-111 Heritage Aviation Museum are preparing displays to highlight the aerodrome's historical significance.

Veterans have been invited to attend the fly-in to help celebrate and remember its important role. The veterans have also been invited to Saturday night's pilot's dinner, where the theme is 'being all things to do with military aviation'.

So once again a strong Warbird theme will be a highlight of the Great Eastern, now in its 22nd year.

Known as Australia's friendliest aviation gathering, the fly-in has grown to become a huge attraction for NSW North Coast holiday crowds and last year more than 10,000 people turned up. More are expected this year.

As well as a variety of general aviation and recreational aircraft, organisers are expecting a large contingent from the Seaplane Association again.

There will be static displays, markets and joy flights for people wanting to get a bird's eye view of the picturesque seaside village.

A shuttle bus will again operate between the town and aerodrome. Onsite camping sites are also available.

For more information www.greateasternflyin.com or Gai Taylor 0427 825 202.

Good news for FTFs

by Katie Jenkins, National Safety Manager

IN May, concerns were raised by RA-Aus to CASA regarding the expectation that all RA-Aus Flight Training Facilities were to implement individual Safety Management Systems (SMS).

The understandable concern was that CASA had relieved GA flying training organisations (approved under proposed CASR Part 141) from the obligation to have and implement a SMS yet nonetheless intended to impose that requirement on RA-Aus Flight Training Facilities.

I am pleased to announce these concerns about the SMS requirements have been clarified.

CASA says RA-Aus will only be required to have a single organisational SMS. The Flight Training Facilities themselves will not be required or expected to have and implement their own individual SMS. However the requirements for risk management still remain.

It is on this basis RA-Aus will continue to implement and improve its organisational SMS which will be expected to satisfy the requirements that will be specified in CASR Part 149. The RA-Aus SMS implementation plan is currently being reviewed and, as stated above, FTFs will still be required to meet risk management requirements which will branch off from the organisational SMS.

Specifications for an online database and reporting system have been explored to make it easier to report accidents, incidents and defects.

It will also assist in working towards improving the identification and reporting of hazards within our organisation and allow for better management and monitoring of occurrences, along with the associated controls needed to minimise these risks.

We plan to change from reacting to safety concerns as they arise to being more proactive about improving the safety risks within the industry.

Christmas Closing times

THE RA-Aus Head Office will be closed from lunch time December 24, 2014 – January 5, 2015.

VALE Ian Rex Byrne

5.8.1942 - 13.10.2014

by Gary Faulks President Ballina Aero Club

THE Northern Rivers NSW community lost an outstanding resident with the passing of Ian Byrne from injuries he received in a Drifter accident near Ballina on October 6.

Ian was a Committee member of the Ballina Aero Club, having also served as Secretary from 2003 to 2007. He was also Vice President of the Evans Head Memorial Air Museum. Ian was a member of the Ballina Ultralight Flying Club and served as President of the club in 2002 - 2003 when it amalgamated with the Ballina Aero Club.

In the 1980s as an Industrial Arts Teacher at Ballina High School, Ian was pivotal in establishing the High School Aviation Course and was responsible for the construction of a Hughes Lightwing aircraft by students of the course in the early 1990s.

More than 30 students gained their early flight training and wings in the aircraft. Some went on to impressive careers in aviation.

During his busy life Ian was also involved with 41st Battalion, rising to CO of the unit, was a keen surfer and member of the Surf Life Saving Unit and enjoyed a round of golf.

Ian was an enthusiastic contributor to *Sport Pilot*. He sent us this poem in 2012 to express his love of flying.

DEDICATION TO FLYING
It's still the simple things that get me up there,
with the wind in my hair
my brain in a flare,
I'm going nowhere.
Its lift and weight and thrust and drag.
Equilibrium in a parcel of air.
Not getting faster or slower or higher or lower.
Just there... like a bird.... if you dare.

Ian Byrne 3539

FlyEco Diesel wins award

THE new 80Hp diesel turbo injected engine from FlyEco was awarded the Most Innovative New Engine product at AERO 2014.

This follows the success of the FlyEco 102Hp petrol turbo injected engine based on the same engine series from Mercedes (*Sport Pilot* September 2014). The engines have been widely deployed in the FK-Lightplanes FK9, a well-known high wing training aircraft. This version of the FK9 with 102Hp petrol engine has successfully operated in Australia for the past four years. Earlier versions of the diesel are used in FAA approved UAVs for the US military.

Serial production of the diesel equipped FK9 WB range has started at FK-Lightplanes and the first models are expected in Australia early next year.

The engine can run interchangeably on Jet A fuel or standard pump diesel and is noted for its very low consumption in cruise - typically 8 litres an hour at 75% power.

For more information: www.silentwingsaviation.com.

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FLYING TAUGHT ME THIS TODAY

Stories supplied by RA-Aus members which contain lessons for every pilot

Weighty matters

I WAS excited beyond measure. I was attending NATFLY in my new brand new homebuilt for the first time. I prepared all the usual flight planning information - charts, ERSA and fuel requirements. I spent hours trying to fit my luggage, enough undies and toothbrush, into the fairly confined space. It is a two seat aircraft, so I could load the passenger seat up and fill the fuel tank with no real weight issues.

The trip to NATFLY went exactly to plan and I enjoyed the long weekend immensely. When the time came to depart for home, I was approached by a friend and asked if I could give him a lift to Goulburn. His aircraft had developed a problem which required it to stay behind in Temora.

I looked at his long, lanky frame and thought 'Hmm, if I leave behind some gear it should be ok'. I decided the best approach to keep the weight down would be to hold off filling the fuel tank until we got to Goulburn. But I didn't calculate any new Maximum Take-Off Weight. And I didn't really think of the effect of my decision on the weight and balance, because the fuel tank is forward of the cockpit between the firewall and the engine.

It was on take-off, when I applied full power, that I first noticed it. The aircraft didn't respond as usual. That was my first clue. I ran on a little longer, built up some more speed and tried to take-off again and it still felt different to me. This was my second clue. Finally we popped got into the air and all of a sudden I could only see sky. Then it dawned on me.

I yelled to my passenger to grab my heavy tool bag from the parcel shelf behind him and put it on his lap.

He reached around, grabbed the tool bag and brought it around onto his lap. The plane immediately felt more controlled and I was able to lower the nose, gain some speed and climb away. That was close. Talk about brown trousers.

We flew on to Goulburn, where I off-loaded my friend and paused to consider what had happened.

I realised my decision to compensate for my friend's weight (he wasn't heavy, just tall) by not overloading the aircraft with a full fuel tank, didn't allow for the change in the balance of the plane. Less weight in the front, shifting the tool bag (about 7kgs) to the back and more weight in total than I was used to, meant the aircraft responded completely differently.

I went a little quiet as I thought about the effect of that small amount of shifting weight on the aircraft's response and how close to stalling on take-off I had been.

I know most RA-Aus planes are simple to operate. Some publish a maximum weight allowance for baggage which, along with not exceeding MTOW, should keep you safely in range. But I didn't think about that before I took off.

I emptied out some of my bucket of luck that day and filled some of my bucket of experience.

Ops comment: *While the author is correct in stating most RA-Aus aircraft have relatively simple weight and balance and MTOW, it is extremely important to remember these limitations are there for important reasons. It is not just to ensure controllability issues, as noted above, don't occur. Our aircraft are very light and structurally not built to operate in turbulent conditions at higher speeds and higher weights. A combination of overloading an aircraft, turning at a steep angle of bank and turbulence, can overstress an aircraft or create fatigue or stress points for a later unsuspecting pilot to deal with. Consult your aircraft POH for MTOW and weight and balance information and, if in doubt, talk to an Instructor.*

This is the final 'Flying taught me this today' column for the time being. Thank you to all those who contributed.

An excellent weekend

by Rhys Millington

THE Port Pirie Fly-In was held in August at the Port Pirie Aerodrome. The event was organised by the Rotary and Lions service clubs of Port Pirie, with assistance from the local council and the Port Pirie Flying Group.

Excellent weather drew approximately 60 aircraft over the course of the weekend, with around 2,000 members of the public visiting the aerodrome to enjoy the festivities and displays. The majority of fly-in participants were from regional South Australia, in what was an excellent weekend for the region's tourism.

The fly-In committee was very happy with the success of the event and it is likely another fly-In will be held in the near future.

>> Two-year-old Jayden Cowie, of Whyalla, who loves planes, was shown over the Royal Flying Doctor Service display by grandfather David Cox, of Port Pirie

>> Port Pirie Fly In committee members with special guest Dick Smith - from left, Steve Joyce, Stax Kerr, Dick Smith, Graham Nicholls

>> Photo: Phil Hosking

>> Denise Joyce, left, and Bill Burgess get into the spirit of the Port Pirie Fly-in with event marshall Laurie Joyce, of the Port Pirie Flying Group. They are beside a gyrocopter belonging to John Downing, of Jamestown

"An excellent weekend for the region's tourism

>> Photos: Greg Mayfield of 'The Recorder' newspaper

Gathering of Eagles

by Richard Faint

FOR the past 25 years or so the last weekend in August has been synonymous with a great fly-in at Watts Bridge Memorial Airfield. For many years there was the Queensland Vintage Aeroplane Group's highly successful Festival of Flight. And, in more recent times, the Gathering of Eagles - Australia has filled the bill by attracting a wide range of aircraft with an exceptional turn-out of vintage and ex-military aircraft.

Without doubt one of the major attractions of this year's Gathering was the wonderfully colourful formations of YAK and Nanchang aircraft thundering around the skies. Another highlight was the Winds of War, a group of military re-enactors who went to great lengths to recreate the look, feel and atmosphere of a bygone era, much in keeping with the origins and history of Watts Bridge. Also on display were several of the growing collection of WW1 replica aircraft which are under construction on the field.

Many rare and noteworthy aircraft attended included a rare de Havilland Dove, the immaculate L-200 Morava, two Boeing Stearmans (Stearmen?), a T28 Trojan, half a dozen de Havilland Tiger Moths, several CT4 / Victa Air Tourers, a superb V tailed Waiex and a replica Supermarine Spitfire.

But, as always, the real stars were the pilots and navigators of the more than 130 general and recreational aviation aircraft who flew in to enjoy the day. Great weather, good food, cold drinks, efficient ground marshals and a higher than usual turn out from the general public, all contributed to a highly successful Gathering of Eagles 2014.

A comprehensive photo gallery can be found on the Watts Bridge Memorial Airfield's website at www.wattsbridge.com.au/events/goe2014.php.

>> *Sport Pilot* regular contributor Arthur Marcel and the Sapphire

>> Thatcher CX4

>> Yak 18

Many rare and noteworthy aircraft attended

>> The Stearman drew admirers

Nothing too strenuous

by Dan Carney

>> Me (left) and Simon at Caloundra before departure

FLYING to Birdsville Races had been a goal I had set early in the year.

I have my own Jabiru J170 and have racked up over 200 hours, predominately coastal cross country. So the chance to fly out over the Channel Country was something I really looked forward to. About mid July I mentioned it to a good friend of mine, Simon, and he piped up "I'd love to go". So over the next week we did some research and came up with a plan.

We'd take a few days to get there, overnighting in Charleville and Innaminka on the way, allowing us to stop at The Dig Tree and fly over Lake Eyre. Two nights in Birdsville camped under the wing and then overnight at Simon's folks' place at Chinchilla on the way back to Caloundra, a total of six days, nothing too strenuous.

With a MTOW of 600kg and an empty weight of 325kg, we had 275kg to play with. Full fuel was 95kg, we each weigh in just under 75kg, which left enough for a few clothes, an air mattress, a sleeping bag each and two tarps to act as makeshift swags. We departed Caloundra before lunch on the Wednesday before the races, calling into Roma before continuing on to Charleville.

The next morning we headed south for Thargomindah, where we came across a number of other aircraft, all heading for Birdsville. We refuelled here, because you need to pre-book fuel at Innaminka (and we hadn't). Enroute to Innaminka I noticed a strip on the WAC for Nocundra Pub, so we called in there for a drink. The strip is very stony. I'd avoid it if you are worried about your paint job. But you can taxi right up to the pub and get Mogas. Next stop was the Dig Tree, which had an excellent strip and was well worth the visit. You could easily spend an hour or more there reading all the information about the Burke and Wills expedition and how the Dig Tree came to be.

We then crossed the border into South Australia and headed for Innaminka township strip, not to be confused with the strip at Innaminka Station. Due to the setting sun, we landed RWY 10, which is level for a short distance past the threshold, then slopes away. You need to touch down on the threshold, because a few pilots have come unstuck trying to land further down the strip. There is no mobile reception in Innaminka (same goes for Marree – but in the air we had Telstra reception pretty much the whole trip), so allow extra time to get to town or cancel your SARTIME in the air.

We decided to break up the flying the next day by heading to Marree for lunch, then tracking north over Lake Eyre and onto Birdsville. The walk into Marree wasn't far and, from a local charter pilot, we got tips on the best position to view the Marree Man from the air. It's on a plateau, so track to the south of it at 3,000ft and remember it's very hard to see. Andy, at the pub, gave us a lift back to the strip.

There was little water in Lake Eyre, just isolated pools, but an impressive sight all the same as a salt pan stretching to the horizon. I look forward to going back again when it is full and the country is green. We then picked up the Birdsville Track and followed it to Birdsville. The approach into the airfield is via the racecourse, with calls at 10nm, overhead the racecourse and on base leg. We joined downwind for RWY 14 which had an impressive view of the forest of campers laid out along the banks of the Diamantina.

Out of the hundred odd aircraft at Birdsville, there were only four other recreational aircraft. Hopefully my story will inspire a few more to make an appearance next year. We walked into town for dinner and took in the action Birdsville had to offer, which was mostly drinking beer and being entertained by Fred Brophy and the challengers in his boxing tent.

After a shower and a few pies for breakfast, we caught the bus out to the track and had a cracker of a day. We got to go up in the tower and watch a race, by far the best seats at the track. I souvenired one of the Birdsville Races signs from near the finishing post. Jabs aren't the largest of aircraft and, after trying a few different angles to make it fit (I contemplated leaving Simon to hitch a lift home), I decided to take it to the evening's auction, which was raising funds for the Royal Flying Doctor Service. It sold for $240. I was pretty chuffed with my good deed and Simon was

A gathering at Birdsville

THE iconic Birdsville Races weekend in early September was favoured with fairly mild weather. Each day began with light winds, which gathered strength to around 7/8kts during the day. The wind usually favoured RWY32.

A large number of aviators made the journey this year, including a number of RA-Aus aircraft.

A Unicom radio service was provided during the races period. All incoming aircraft observed the AIP Supplement procedures, which included reporting on the CTAF frequency at 10 miles, at the racecourse and on base leg.

The airport crowd had a terrific time, including everyone who camped underwing.

Ballina Aero Club's hard working and dedicated team of pilots arrived a couple of days beforehand to take over the operation of the airport and set up the special events zone to cater for the expected influx of aviators. The team travelled by aircraft, but there was also a road crew to bring the equipment needed for the project.

There were competitions over the weekend again. 'Most Aircraft from the Same Organisation' was won for a second year by the Sydney Aviator's Group which turned up with seven aircraft. Their prize of $500 was supplied by Diamantina Shire Council. The 'Longest Distance to Birdsville' award was shared between an RV7, piloted by Ian Clark, and a CTsw, piloted by Mark Craig. They flew together from Busselton in southern Western Australia. They shared the prizes of a Garmin D2 GPS Watch, supplied by Cirrus Australia and $400 cash provided by Diamantina Shire Council.

chuffed he had a seat again!

We were up early the next day and were the first aircraft out at first light, departing RWY 14. We had a great run to Charleville and were hopeful of making it all the way back to Caloundra. However, a slow moving rain system tracking to the south east had other plans. We ran into the back of the system at Morven and continued to circle behind it before landing at Mitchell, where we waited a few hours before heading to Roma for the night.

>> Above, the map showing the distance between Caloundra and Marree and above left, the Jab and the sign I auctioned off for the RFDS

The next morning we departed just ahead of another rain system. With overcast conditions and a 20kt head wind, we dodged a few showers along the way back to Caloundra. All up, we flew 2,060nm, had seen some amazing countryside, caught up on a good dose of early pioneering history and met some great people. It's left both of us wondering where we can go for our next adventure.

> *We did some research and came up with a plan*

A special feature again this year was the opportunity to join The Royal Birdsville Aero Club - with all proceeds to the Royal Flying Doctor Service Queensland. The RBAC concept is unique. Membership only entitles you to attend one meeting a year - at Birdsville Hotel during the Birdsville Races week. And attendance is optional. There are no other commitments or fees, no office bearers, elections or formalities. New members only get a certificate. The one condition of membership of this exclusive and mysterious club is that new members are required to donate at least $20 to the Royal Flying Doctor Service Queensland.

If you want to join: email royalbirdsvilleaeroclub@bigpond.com. Further information is also available on the Ballina Aero Club website www.ballinaaeroclub.org.au/birdsville.

Going remote

by Rick Frith

Rick is a Jabiru 160 owner who has spent the past few years touring the more remote parts of Australia. At the urging of flying colleagues, he has written out a few tips and lessons for others planning to go remote.

REMOTE is a relative term. I mean flying in designated remote areas described in ERSA GEN FIS 7. These include extremely rugged areas like south west Tasmania and the Kimberley plateau, and isolated areas like the Tanami or Gibson deserts, where people, airstrips and navigation features are few and far between.

Some things you need to do are obvious - taking emergency equipment, ample water, a basic set of spares and closely monitoring fuel usage en-route. However, other factors, (including a fly veil to stop them crawling up your nose when changing the oil) are more subtle and can make the difference between a great trip and an average one.

Thorough preparation is the key to success; a three week trip may take months of detailed planning. Here are some tips I have learned from about a dozen trips over the past few years, taking my Jabiru J160 from Sydney to Horn Island, Kakadu, the Kimberleys, Uluru, the Pilbara, the Canning Stock Route, south west Tasmania and most places in between.

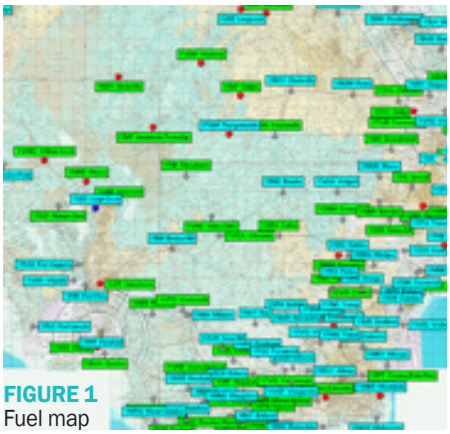


FIGURE 1 Fuel map

ROUTE PLANNING

Fuel

Fuel availability is a major factor when determining your route. Unfortunately, no-one yet maintains a comprehensive, current map of all fuel locations in Australia, so prepare your own. For Avgas, a good starting point is the paper map in the back of the AOPA Pilots Touring Guide which can be added to, or prepare one using your favorite mapping software.

Figure 1 shows part of a map I prepared for a trip in early 2014, with blue representing sites with swipe card bowsers and green sites which required a callout of the refueller. The map will require periodic updating, because supplies come and go.

The most reliable data is on the fuel suppliers' websites (Shell, BP, Mobil and Aero Refuellers) and ERSA. The AOPA Guide and the Country Airstrip Guide also list many other possible sources, but these are less up to date and must be confirmed.

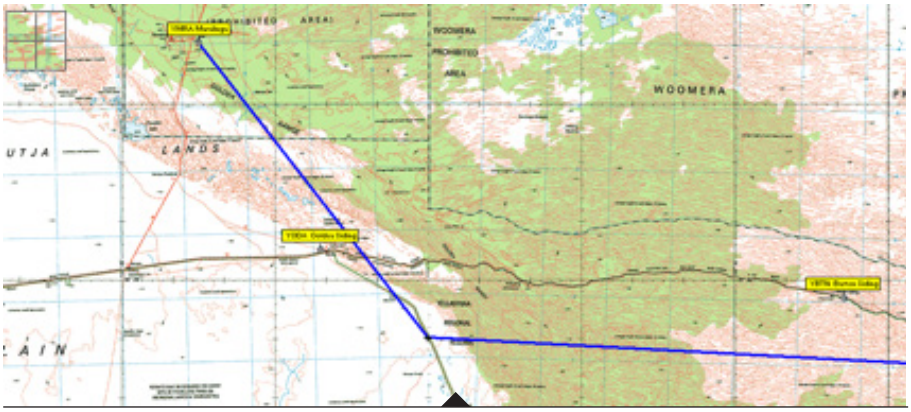


FIGURE 2 Avoiding tiger country

Always check fuel availability at every location early in your planning and do it again a few days before your arrival. Floods or a flock of other touring aircraft may have depleted supplies. One place I went to couldn't sell me fuel because a government inspector had closed the bowser after a failed calibration test. Another depot quarantined all stocks because they were over twelve months old. The pump motor at Giles burnt out and was inoperative for more than a month. Carry cash and a cheque book for sites which don't take credit cards.

If traveling with aircraft with limited range or payload, it may even be necessary to transfer fuel from one aircraft to another, either from the wing tanks or in a jerry can.

In your fuel burn planning, make sure you allow time for sightseeing. Wolf Creek crater, Lake Frome, King George Sound, the Horizontal Waterfalls, Federation Peak, the Bungle Bungles and Big Red, to name but a few, are all worth 15 minutes of orbits for sightseeing and photos. You can easily add half an hour required endurance between fuel stops.

Plan your route assuming 10 or 15kt headwinds and use an appropriate variable reserve. I now carry 15%, which ensures a headwind 12kts greater than forecast before depleting my fixed reserve, at my cruise speed.

Be generous in your fixed reserve allowance – 45 minutes may be ample for a two hour leg in populated areas, but if you fly from Giles to Newman with a headwind it may take several hours and 45 minutes is a relatively small reserve, especially since diversion options are few and far between. I carry 1 hour 15 minutes fixed reserves on long, remote legs.

Often the fuel will come out of a drum and the refueller may not always follow best practice. The drum should be stored on its side or under cover to prevent water ingress and the pump suction should not be lowered to the very bottom of the drum. So always allow a generous settling time before doing fuel drain checks. Check the fuel colour carefully and, if using Avgas, check the smell and how slippery the fuel feels. Avgas contaminated with jet fuel will still look blue, but feels greasy and smells of Avtur. I speak from experience, having dumped 130 litres of contaminated fuel!

Tiger country

It is not possible to avoid tiger country completely since many destinations, including Cape York, Kakadu, south west Tasmania and the Kimberleys are almost all tiger country. The 250k topographic maps from NatMap show terrain and vegetation much better than the WACs. Brown contours mean lots of sand dunes or rugged country. Green areas are scrub or trees.

FIGURE 3 Visual Fixes


>> Turning Final at Cape Leveque


>> Lake Disappointment


>> Horizontal Waterfalls - The Kimberley


FIGURE 4 Veevers Crater - An unambiguous Point Fix

Areas like the Pilliga Forest in NSW, which is invisible on the WAC, are obvious on the 250k topo and can be avoided.

Both Ozrunways and AvPlan now include the 250k topo maps or you can get them from NatMap or Oziexplorer. When tiger country can't be avoided, exposure may be reduced by small route changes, such as tracking coastal for beach landings, or adding 5,000ft altitude for greater gliding range. In mountainous areas, following valleys may mean cleared paddocks along the valley floor.

Figure 2 shows a dogleg I took on a recent trip to minimise the time over scrubland after I departed Maralinga.

Note that even remote deserts often have basic four wheel drive tracks which can assist navigation and would simplify recovery in the event of a forced landing. If flying west across the Tanami Desert from Tennant Creek, you can follow a track to Duck Ponds, then a well made road which is suitable for a safe forced landing onwards to Lajamanu and Halls Creek, Don't just fly from A to B, study the maps and plan the route details carefully.


FIGURE 5 A funnel fix

Position fixes

When flying VFR, I demand a visual fix at least every 30 minutes. No matter how robust you think your GPS might be, it is extremely comforting to make a positive fix in the middle of a desert on a three hour leg.

These fixes must be chosen when route planning through desolate areas because suitable fixes may be few and far between. For example, crossing the Gibson and Sandy deserts from Patjarr to Well 33 on the Canning Stock Route, I needed slight dog legs to guarantee unambiguous features at least at every 30 minutes during the two hour leg (see Figure 3).

In desert areas, features may include a distinctively shaped dry lake bed or an isolated range of hills. Point features such as salt lakes, hills or station homesteads make good fixes to cross check against a GPS, but leave little room for lateral tracking error.

Linear features perpendicular to your track, like river beds, roads (sealed and major), railways (even abandoned), vermin fences, old seismic lines (shown on the 250k topo maps) , a range of hills or vegetation/terrain boundaries (on 250k topo maps) ensure you will intersect them, but do not provide a positive fix on their own. They give an excellent line of position which can be combined with a second line (such as a bearing to a known object) and provide a positive fix. For example, a recent trip I crossed the Strzelecki Track and a compass bearing on Lake Blanche 30nm away gave me a positive fix within a mile or two (see Figure 4).

A funnel of two lines, such as a river converging on a range of hills is ideal because it leads you into the fix point. Approaching Well 33 (Figure 5) shows I intersect the Canning Stock Route, which is parallel to a change in the sand dune direction, just after leaving an area where the dunes run in a curve from east to north west.

Plan your fixes in advance.

NEXT MONTH **Overnight Stops**

Ice bucket challenge

by Peter and Anne McLean

I DON'T pay much attention to the fads like Planking and things like that. Then I heard about the Ice Bucket Challenge. I saw people from all walks of life tipping a bucket of icy water over themselves to raise money for a very worthy cause, Beyond Blue. Never in my wildest dreams did I think I would be roped into this activity.

How did it happen? A local worker around the Yarrawonga area, Tony, walked into our hangar and said, "I was wondering if you could help me. I would like to do the Ice Bucket Challenge in one of your aircraft". I looked around at first to see if I was being set up for a joke. He explained what the Ice Bucket Challenge was. His idea was to tip the water on himself in the aircraft as we flew along. No, it was no joke. Tony was very serious. At that point, I started to consider how I could make it happen for him.

The first thing I did was look at a briefing and a Threat Error Management Analysis. This took about a week. I had to test how much water could be placed in a bucket so that when Tony launched it over himself in the rear seat of the aircraft it would not:

A - damage the aircraft;

B –breach CASA regulations about dropping something from an aircraft;

C – be unsafe for the passenger;

D – be affected by weather and the airspace around the aerodrome.

So testing began. I filled a large ice-cream bucket with water. I had someone tip the water from our viewing deck, which is four metres above the taxiway. I then measured the amount of water which hit the taxiway. I discovered three litres of water from four metres up ended up as a mist by the time it reached the taxiway.

This flight would be done at 300ft over a closed runway. Another threat was mitigated. But how would three litres of water go through a propeller? I have flown through heavy rain before so I had a good idea of the effects. I decided two litres would be a maximum and no ice. The water would be at a temperature of one degree. It would also be dropped from over the passenger's head and not launched backwards. More threats mitigated.

Next question was what if the bucket came free and went back through the propeller or flew out and hit something on the ground? So

>> Taking an airborne bath for a good cause

I started to consider how I could make it happen for him

more testing took place, with a number of different lanyards. I decided on one which would not be too obvious to onlookers, but which maintained the best safety for all areas of the flight. This process took time and there were many trials but, because I did the testing and I would be the pilot, I was happy with the outcomes.

I even considered which aircraft would be best. I was planning to use the Airborne XT-912, however its air intakes would ingest water. I decided to use the Air Creation Tanarg. Its air intakes are mounted within the engine covers which meant no water would be ingested. There was also more room for the passenger in the back.

All that was left was the weather. I had planned to do the flight in the morning at 0700 hours when there was a light wind from the north-east. We were held up for a day, but everything came together and the flight went off as planned, but only due to the planning and the tougher briefing process we went through.

However, this article was not really intended to talk about how an Ice Bucket Challenge was made possible. It was really about one man's desire to donate time and money to a charity called Beyond Blue. A lot of money was raised and yet there were no TV cameras or media there. Well done Tony and I am glad I could help.

THIS IS PART OF MY BRIEFING AND THE THREAT AND ERROR MANAGEMENT ANALYSIS

MISSION SORTIE TASK

The mission is to conduct safe circuits from a runway at Yarrawonga Aerodrome in accordance with the CAAP 166-1 (3) and the CAR, CAO, provided by the CASA. These circuits will start from the YFT hangar and use the Yarrawonga Aerodrome taxiways, runways and airspace. The aim is to fly one circuit off RWY 01 and re-join the circuit for a 300ft low pass along RWY 05 for the water drop, then re-join and land again on RWY 01.

MISSION SORTIE TASK THREAT ERROR ANALYSIS

The Threat Error analysis has been tested prior to this briefing. However, the threats and the mitigation techniques are as follows:

THREAT 01: The possibility of a bucket coming loose in flight.

MITIGATION: Bucket must have a lanyard attached. The lanyard must restrict the bucket from hitting the aircraft propeller with Tony's arm fully extended.

THREAT 02: Water from bucket getting into aircraft electrics or engine.

MITIGATION: All of the aircraft electrics, seats and engine intakes were protected by correctly fitted waterproof sheet. In the case of the intake, the design of the Air Creation Tanarg engine and fairings, after tests were conducted, was not found to be a problem.

THREAT 03: Communication. Due to the nature of the flight, communication between the pilot and passenger would be conducted via hand signals.

MITIGATION: After two hours of checks and tests, the PIC was happy with the result for the flight.

THREAT 04: Water being dropped from aircraft.

MITIGATION: Tests were conducted from the YFT viewing deck at a height of four metres from the ground. Tests proved that two to three litres of water, thrown at a speed which an able-bodied person was capable of throwing, would result in only a fine vapour by the time it reached the ground. Because the aircraft would be flying at 300ft and at a speed of 60kts, the vapour would not reach the ground. This would not breach the CASA regulation in relation to dropping of articles from an aircraft. The amount of water to be dropped was to be 1.5 litres. During the taxi, take-off and up to the run-up point, the bucket of water would be covered by a fine film of plastic, secured with tape. This film of plastic and tape would be removed during the run-up and handed to the pilot to be secured in a safe place. The ear defender being worn by the PAX would also be removed and handed to the pilot to be secured in a safe place. Only at this time, when all items are safely tethered or secured, would the water be deployed.

THREAT 05: Area of operations and WHAT IF.

MITIGATION: Wind would need to be no more than 10kts. Aerodrome would need to be clear of circuit traffic. The runway to be used for the fly pass would be runway 05 with an altitude no less than 300ft AGL. If an engine failure was to occur during this low pass the PIC could easily fly the aircraft onto runway 01 for a smooth touchdown.

Blowing in the wind

by Norm Sanders

CONSIDER the hard working and unsung windsock. On duty, rain or shine, 24/7. The windsock is one of the two most identifying features of an airport. The other is a runway of some sort (very likely surrounded by tall trees and/or power lines).

The windsock has a valuable story to tell for those willing to listen (or look). The windsock is automatically the first thing an experienced pilot notices upon arrival at the airfield. What is the wind direction? Steady or variable? Speed? Gusty or smooth?

There are actually standards for windsocks so they all indicate pretty much the same all over the world. The FAA in the US spells out the mechanical requirements for construction, along with calibrations.

Per FAA standards, a 15kt (28 km/h; 17 mph) wind will fully extend the properly functioning windsock. A 3kt (5.6 km/h; 3.5 mph) breeze will cause the properly functioning windsock to orient itself according to the wind. If the windsock has blown away, the wind is greater than the 75kt design limit.

In Australia, CAAP 92A-1(0) insists a wind direction indicator be a tapering fabric sleeve, 3.65m long and white in colour. The CAAP also spells out the obvious, that it needs to be located so it is clearly visible from the air.

In general, secondary windsocks will be yellow. However, many smaller fields have only one yellow windsock, which at least is better than no windsock at all or an old bed sheet tied to a pole.

As per the CAAP, windsocks ideally should be located away from buildings and trees. At Tyagarah, where I am, both the windsocks are somewhat compromised. The yellow one by the Gliding Club is only vaguely accurate in anything but a northerly wind.

The windsock design has the bigger, open end facing into the wind which may seem a bit illogical to some. In fact, airports used to have big tetrahedrons mounted so they could swing into the wind with the pointy end to windward. This had the advantage that all you had to do was land in the direction the tetrahedron pointed. With a windsock, of course, take offs and landings are in an opposite direction from the way the windsock is pointing (just like a flag).

All this fancy windsock technology is only of any value if it is used. Pilots generally don't have trouble determining wind direction for take-off, but a surprising number make mistakes on landing. These are of two kinds:

1. Not understanding how to read the windsock (fairly common, especially with ATIS dependent GA pilots who are used to being told over the radio which runway to use) and;

2. Not checking the windsock before entering downwind. Pilots often assume the active runway is the same one they took off from a half hour ago. At Tyagarah, a south-westerly favouring runway 23 can easily be suddenly overpowered by a sea breeze blowing down 05.

The other trap at Tyagarah is the fact that the jump plane will almost always land on runway 23 no matter what the wind direction so he doesn't have very far to taxi. His ground speed may be high, but he has the option of reversing the pitch on his prop and screeching to a halt. Unlike the effectiveness of brakes on many recreational aircraft like the Editor's (Actually Norm, I replaced the entire system earlier this year and the problem went away, hallelujah - Ed).

Overflying the field to view the windsock is good practice. Another valuable habit to develop is to check the windsock on downwind no matter what.

A windsock is one of the few items in aviation which is free. Use it wisely and often.

Overflying the field to view the windsock is good practice

(First posted in Flight, Sept 22)

3 Drifters and a trike go to Gunn Point

by Mark Christie

GREG Moo and I fly to Gunn Point a lot. One of the reasons is the wildlife.

Pelicans, turtles, crocodiles and stingrays are just some of the wildlife we see on our aerial safaris up to the edge of the Vernon Islands.

On this day, another Drifter pilot and a trike pilot joined us for their first group sojourn to this natural wonderland where many campers pick out a cleared spot beneath the trees along the foreshore to spend a weekend fishing, racing quad bikes or four wheel drives up and down the beach.

Pre-flight checks completed we lined up on 07 and, because I had the GoPro running, I was the last to take off, which gave me the chance to take photographs of the others.

As you can see, it was early when we left. As we climbed to our cruising altitude of around 600ft, the still air was a pleasure to fly through. Still cool enough to warrant a long sleeved shirt but certainly not as cold as my freezing flight experiences in Victoria.

Early morning fog gathered over the grassed plain near the Howard River. The eucalyptus groves which compete against the encroaching mudflats provide a rare visual spectacle for those of us who live up north.

We always seem to see more aquatic life when the tide is low but today the tide was high. One constant are the turtles. I never fail to see turtles swimming slowly up creeks or in the ocean, their brownish oval shaped shells as distinct as the other common sight, stingrays with their black diamond shapes and thin tail indicating which end to keep away from.

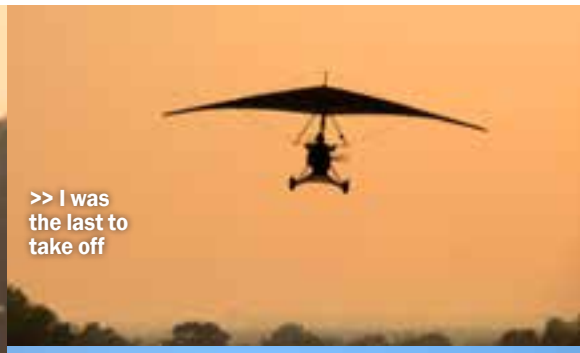
This weekend we saw quite a few people camping on the beach and, after arriving at the Blue Rock Holes, we performed several slow orbits looking for wildlife, especially the large crocodile that seems to have marked the Holes as his own territory.

There is a large flock of pelicans which lives near the rock on the Gunn Point side of Shoal Bay, a popular fishing location. I guess the pelicans aren't there just for the scenery either.

Although the animals were being shy, the scenery was stunning and heading back along the coast we enjoyed the smooth flying which early morning flights offer.

As we made our way back up the Howard River I was able to capture our shadows on the water. Although we were well spread apart, both vertically and horizontally, the morning sun made us look quite close together. Before long we called to advise we were approaching and soon afterwards we joined the circuit at our airfield, MKT, concluding another great flight over the Top End.

>> It was early when we left



>> I was the last to take off

>> The still air was a pleasure to fly through

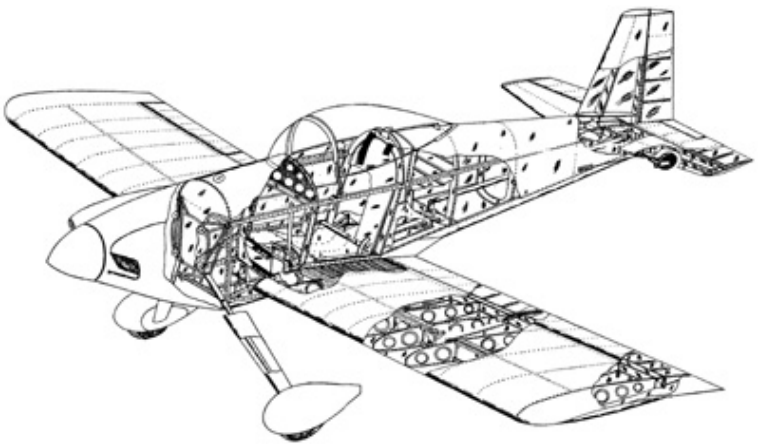
>> The pelicans which live near the rock

>> Making our way back up the Howard River

>> Early morning fog

It was another great flight over the Top End

Pocket



The finish inside and out of this aircraft is hard to fault

WITHOUT a doubt, the fastest plane in the RA-Aus stable at the moment has to be Ken Eyear's RV-3B. This O-360 powered pocket rocket (which has featured a couple of times on the front cover of *Sport Pilot*) even leaves most GA aircraft in its wake, including other RVs and light twins. With the propeller revolving at a modest 2,350rpm, it cruises at 160kts and can keep the pace for four hours. That's a lot of territory covered in a short time.

Not only that, being the B variant of this famous design, the plane is safely aerobatic (noting, of course, that aerobatics is not permitted in RA-Aus aircraft). Earlier RV3s had wing issues. They required modifications to safely pull a full 6g. The B wing design solves all those earlier problems. As an RA-Aus pilot, Ken has never turned this plane upside down. He is perfectly content to go places straight and level.

Ken lives and works at Lismore in north eastern NSW. He is a qualified cabinet maker by trade, but just one look at the workmanship in the RV3 is enough to confirm his skill with metal as well as wood. The finish inside and out of this aircraft is hard to fault. The paint work is outstanding.

This is not the first RV Ken has built. He started with an RV4 some years back and says he learned a lot about improving Vans' basic design. With 19-7584, he has made several alterations to the plans, which he says are still the original 1980s version. All of these changes he first checked with the home office in the US and all were approved. For instance, he substantially strengthened the cockpit side walls for greater safety in the event of mishap.

Rocket

by Arthur Marcel

He increased the tail surfaces skin thickness from 16 thousandths of an inch to 20 thousandths to eliminate the 'oil canning' he had experienced at some power settings with the RV4. He used full length panels on the wings (no wing joints). He also pre-heated these panels as he riveted them, which made for a very tight wing. When tapped with the finger tips these wing panels have resonance; there is no thudding. Ken also used a full length panel for the bottom of the fuselage instead of the three piece arrangement in the original plans.

The Lycoming motor is still on its first life. Ken has put 240 hours on it after it was bulk stripped and top overhauled by a local GA engine maintenance organisation. It is in very good condition and sounds absolutely fabulous through the four independent exhaust stacks. It drives a three blade composite propeller which improves the plane's climb performance, but with a slight reduction in speed compared to a two bladed prop. Ken says 2,500 fpm is easily achieved below 5,000ft. He also says the aircraft is simple to land. He normally approaches at 70kts, coming back to 60 over the fence. Three pointers are done at about 45kts with wheel landings a little faster than that if desired. There is ample luggage space behind the pilot seat, but at the moment Ken has that space occupied with an auxiliary fuel tank.

Ken wants to finance the construction of a 'fifth wheeler' type caravan, in which he and his wife hope to tour Australia. He says, though, that after a year or so touring, he will return to Lismore and build another plane. Well done, Ken Eyears!

It was designed, certified and manufactured in just three years

>> It's not just a powered hang glider


>> It doesn't take up much space


>> A launch pad of only 35m required

>> The wing is crisp and light

The Pixel iFun

by Chris Brandon, Air Creation

HOW'S this for a fun machine? We have developed a new single seater trike we want to sell to the world.

The Pixel iFun 250xc is not just a powered hang glider. It's a single seat trike - designed, certified and manufactured in just three years. The new trike has its roots in the strength, reliability and heritage of the Tanarg and Skypper trikes.

The aircraft is fitted with the Polini THOR 250 engine, a water cooled two stroke known for steady power output and good performance at every rpm. The die cast light-alloy aluminium cylinders offer better thermal stability. The Nickel-Siliceous coated liner improves the piston wear and resists abrasion. The THOR 250 engine also has closed circuit fuel recovery and a 12 volt electrical circuit.

The iFun wing is crisp, light and takes just 15 mins to assemble. It has a stall speed of 23kts, a VNE of 60kts and a cruise speed of 50kts. It launches in just 35 metres (landing is even better).

The total empty weight of the aircraft is 95kg, with a graduated fuel tank capacity of 16 litres. Range is approximately 400kms. The useable payload is 123kgs with full fuel.

The instrument console has all the necessary features - Altimeter, ASI, Water Temp, Flight Time, Tachometer, VHF Radio/Coms and a 12 volt socket for your IPad and cruise control throttle in dash.

The Pixel iFun 250xc can have either manual or electric start. It swings a 2 blade HELIX propeller (1.5m diameter) via the Polini THOR centrifugal clutch - entirely designed within an oil bath, with a mechanical helical gearbox.

You won't have more fun in the air.

The Ops team

Ops Manual changes

MEMBERS will be pleased to hear Issue 7 of the Operations Manual is with CASA. We will be sure to let you know the minute the new manual is ready to share.

This article is to let you know of the key changes to the manual and their potential impact on you.

The review of Issue 6 was carried out to reflect the changes which had taken placed in industry practices. It was driven by requests from members, Instructors and CFIs, along with changes brought about by Operations in an attempt to clarify or simplify requirements.

Summarised below, these changes are divided into sections as they appear in Issue 7 for easy reference.

CAO 95.10

- CAO 95.10 has been amended, removing references to regulations which are no longer active. This is really a paper exercise because the privileges and responsibilities remain unchanged, but the regulations which were referred to no longer exist.

Definitions

- Further definitions of RA-Aus Examiner, and Aircraft Type to provide clarification.

Section 2.01

- Changes to Powered Parachute Pilot Certificate issue now requires examiners add a logbook entry referencing the specific wing and base endorsement, (Par 2) and removing the cross country endorsement provided specific requirements are met (Par 6). This was brought about by the rapid changes and improvements to wing and base designs and a significant increase in the numbers of powered parachute designs from overseas.
- The addition of a Hang Glider Towing Endorsement for 3 axis and weight shift (Par 11), which was previously an entry in the pilot's logbook.
- Removal of High Performance and Low Performance endorsements, which are not relevant any more due to aircraft design innovation and change. Replaced by a logbook entry by the examiner confirming appropriate aircraft type training has been conducted. Time on types will be recognised from logbook entries (Par 13). Existing aircraft already being flown will be recognised at the next BFR or other training event with an instructor. No member will be prevented from flying an aircraft they already do. This initiative is intended purely to ensure if a member trains on one type, and then purchases a different type, they obtain suitable aircraft familiarisation on aircraft systems, emergency protocols and aircraft performance characteristics.

Section 2.02

- This section has been expanded to provide specific information to members regarding correct log book entries, with the addition of a paragraph about deliberately making false entries into a logbook.

Section 2.03

- A new section has been added which deals with Compliance Checks. This section will permit RA-Aus delegated personnel to conduct assessments of pilot pre-flight planning and compliance and may replace a CASA ramp check. Our organisation will be responsible for our own compliance.

Section 2.04

- This section now has a table showing the specific endorsements available for each aircraft group (Group A - 3 axis, Group B - weight shift, Group C - combined controls and Group D - PPC) and the abbreviations used on the Pilot Certificate card.

Section 2.07

- Clarification of what type of flight review or endorsement training is accepted by RA-Aus as an equivalent to an RA-Aus BFR. This includes an outline of specific CASA endorsements and the MTOW of aircraft deemed acceptable for RA-Aus to recognise a BFR (Par 5.e, 5.f, 5.g).
- Increases required Pilot In Command hours for Pilot Certificate holders to carry passengers in Powered Parachutes (Par 10.b).
- Specific 50 hours minimum Pilot In Command requirement prior to completing Formation or Low Level training for an endorsement.
- Further detail on the new Hang Glider Towing endorsement and Type Training requirements (Pars 16 and 18).

Section 2.08

- An increase in required Pilot In Command hours (100) prior to undertaking training for an Instructor rating (Par 4.b).
- Clarification of the requirement for instructor renewals in alternate groups of aircraft if instructor ratings are held for more than one group of aircraft (Par 11).

Section 2.09

- An increase in RA-Aus instructing hours to 150 prior to upgrade to a Senior Instructor rating (Par 5.a).
- The introduction of a Special Approval (SA) for an experienced pilot who does not currently hold an RA-Aus Instructor rating, but has considerable experience in a specialised field, to be issued with a Special Approval (SA) for training and recommendation for issue of Glider Towing, Hang Glider Towing, Waterborne Hull or Float, or Low Level endorsements to RA-Aus Pilot Certificate holders. This is a privilege already enjoyed by pilots in the GA system and recognises the specialised nature of these endorsements, which can be trained by pilots with appropriate experience levels. There are specific criteria for medical standards, justification of the need and a letter of recommendation from a CFI willing to supervise the training (Par 7).
- These SA accredited pilots will hold the approval for two years, and are issued on a case by case basis by the Operations Manager or delegate.
- Increases in requirements of hours as Pilot in Command for Senior Instructors to train Low Level (50 hours PIC), Waterborne Float or Hull (75 hours PIC and 100 water landings) endorsements. Clarification of the privileges of a Senior Instructor in regard to endorsement training (Par 9.d).
- Recognition of renewal of a GA Grade 2 or higher Instructor rating for renewal of an RA-Aus Instructor rating (Par 15).
- Clarification of the requirement for Senior Instructor renewals in alternate groups of aircraft if Instructor ratings are held for more than one group of aircraft (Par 17).

A copy of the new Operations Manual will be available on the website

Section 2.10

- An increase to 250 RA-Aus instructing hours for issue of a CFI Approval for Group A and B aircraft and a reduction to 150 in required instructing hours for Group D (Par 4.a and 4.b).
- Clarification of the FTF and CFI Approval requirements (Par 9).

Section 2.11

- An increase to 600 RA-Aus instructing hours for issue of a Pilot Examiner Approval and to have held a CFI Approval for 24 months or more (Par 2.a. and 2.b).
- Clarification that a Pilot Examiner may not conduct Instructor training without the written approval of the Operations Manager or without holding an IT approval (Par 5.a and 5.b).

Section 2.13

- This section was extensively rewritten to improve clarification of recognised qualifications from CASA, GFA, RPL, Defence Force or other organisations, including overseas qualifications (Par 1.a - 1.c) and the requirements for gaining a Group B, C or D Pilot Certificate (Par 2. and 2.b).
- The section was also divided into requirements for converting to a Pilot Certificate (Par 5-7), Instructor (Par 8-9), or Senior Instructor rating (Par 10-12), CFI Approval (Par 13-15) and Pilot Examiner Approval (Par 16-17).

Section 2.14

- This section was extensively rewritten to align with industry phrases and in an attempt to improve clarification of suspension, cancellation or variation of an RA-Aus Pilot Certificate and associated qualifications (Par 1-4).
- Additionally, the appeals process was clarified (Par 6-7).
- A definition of a fit and proper person was included (Par 9-12).

Section 2.15

- Clarification of the difference between a permanent and temporary Instructor Training Approval was provided (Par 3.b).
- Greater detail for the requirements of record keeping of Instructor candidates was provided (Par 15) and for required pilot log-book entries (Par 16).
- Greater detail of minimum ground instruction equipment has been provided (Par 17 and 18).
- Required publications for the Instructor training course (Par 19).

Section 2.16

- This is a new section intended to provide greater clarification of the medical requirements. Pilot Certificate requirements have been provided separately (Par 1-4) to Instructor or higher approval (Par 5-7).

Section 3.01

- Clarification of the requirement for establishment of an FTF has been provided with additional paragraphs outlining the process for issue of a CFI Approval (Par 5).
- Clarification of the minimum requirements for the classroom, model aircraft (not required for Group B and D if the actual aircraft is nearby), aircraft requirements, documentation, web based versus paper documents and Risk Management System (Par 6).
- Clarification of the minimum aerodrome requirement for an FTF (Par 7-8) and better explanation of satellite FTFs (Par 9-15).
- Additional detail for FTF inspections by Operations or a delegate (Par 16-17).

Section 3.02

- Greater detail informing participants of the dangers of flight training (Par 3).
- Incorporation of Ops Bulletin 0113 regarding the minimum heights for stall recovery during training (Par 5).
- Clarification of engine off operations (Par 9).
- Greater detail of flight test and examination information (Par 4)
- Incorporation of Ops Bulletin 0211 regarding Human Factors training requirements for issue of a Pilot Certificate (Par 8).

Section 4.01

- This section has been generally revised to reflect latest industry and organisational requirements.

Section 4.02

- This section now includes additional prefix numbers for aircraft registration categories, including 17 - Experimental LSA, 18 - Experimental weight shift and PPC, 23-Factory built LSA, E - Experimental LSA 3 axis and weight shift and 26-GA-Type Certified.

Sections 4.03 - 4.07

- Improved diagrams and detail including latest industry and organisational requirements.

Section 4.08

- Revision to include latest industry terminology and organisational requirements. Accidents and incidents are now defined as Routinely Reportable and Immediately Reportable matters and reporting requirements have been clarified.

RA-Aus Training Syllabus

- The RA-Aus Training Syllabus is now a separate document with separate revisions which include a separate unit for 3 axis training which more closely aligns with the Generic Student Progress record along with industry standard syllabi.
- Weight shift and PPC syllabi have been edited to more closely align with industry standard syllabi.
- A new Syllabus, Unit 1.10 Hang Glider Towing denotes the requirements for the new endorsement.
- Another new Syllabus, Unit 1.11 Type Training provides information for the minimums for training a pilot onto a new type.
- Unit 1.16 Waterborne Hull and Float Syllabus has been revised to reflect industry standard syllabi.

Revisions have also been carried out to the RA-Aus HG Towing Manual (Version 4), RA-Aus Waterborne Operations Manual and the RA-Aus Glider Towing Manual.

Members will be provided with a free electronic copy of the Operations Manual via the website, if you prefer you can contact admin@raa.asn.au and pay $16.50 for a CD (with the Operations and Technical Manuals, along with other relevant information) to be posted to you.

Limited printed copies will be provided on request to members, however in keeping with appropriate cost recovery protocols, there will be a charge for printed copies. Flight Training Facilities will receive a printed copy for ease of reference for students.

KEEPING IT SIMPLE doesn't mean you're stupid

by Kreisha Ballantyne

A WHILE ago, a little online quiz popped up on social media, claiming that any technology developed after the user's 35th birthday would not be instinctive to use. The quiz proved it by offering to work out your age, merely by asking you to click on various images of technology. The result? Spookily spot-on, at least for me.

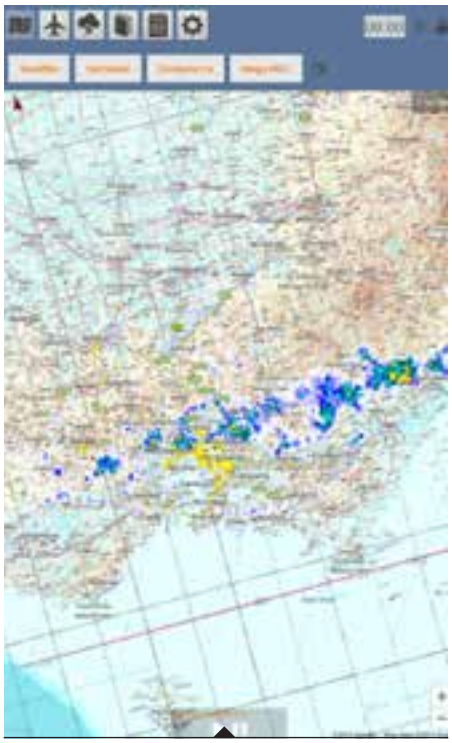
However, I took offense, immediately, at the idea that my age could be pigeon-holed by technological savvy. After all, I argue, the VCR was invented when I was under the age of 35 (by a longshot!) and I never, ever learned how to pre-program it to record TV shows. And, as I type this, I'm wearing a Pebble Smart Watch, developed only last year, with which I have a fabulous relationship (it can turn my music on and off without my ever having to leave my chair!)

The journalist in me forced me to go out and ask everyone I knew about their relationship with technology and the ease with which they adapt to new gizmos and gadgets. Across the board, I noticed one thing: my pilot friends were far, far more likely to be early adopters of technology than my arty, creative friends. Of those friends who fly, every single one owns an iPad, or Android tablet, and a smart phone. Every pilot I know uses either a desktop planning program, or an electronic flight bag, to plan their flights, irrespective of their age.

When it comes to technology, we only have to chart the success of the smart phone among pilots to demonstrate that we, as a group, are more than willing to adapt to new gadgets if it makes flight tasks easier, safer, or less time consuming. When I asked my pilot pals which features drew them firstly to purchase a smart phone, and then, later an iPad, the answer was, universally: the weather services; the NAIPS app; the development of moving maps and inbuilt charts on the iPad. While each person's relationship with technology was subtly different, everyone agreed the internet, smart phones and flight planning apps had made our lives as pilots much easier.

However, over the course of these conversations, I did notice one thing: even pilots have a saturation point, a point at which there's too much information.

Common complaints from pilots have long been that weather reports and forecasts are unnecessarily difficult to decode and that



Weather overlay is a good feature to have

flight plans can be cumbersome to create and submit to NAIPS; but alongside those traditional comments, I have recently noticed a whole new set of issues: that EFBs and desktop flight planning programs are becoming too feature-rich.

I spoke to EFB app developers Bevan Anderson and Bas Scheffers, of AvPlan and OzRunways respectively, to ask them their thoughts on this subject.

"Keeping things simple usually means fewer mistakes," says Bas Scheffers. "OzRunways has highly detailed performance calculations; great for high-performance, high-altitude and high-fuel burn aircraft. But for recreational aircraft, that will - at best - give you a slightly more precise answer that is within the margin of error of simpler methods anyway. And if you get the figures wrong, they could be far out. So keep it simple; just enter climb, cruise and descend TAS and burn, and you can't go wrong."

The key here is to know your EFB well, and 'hide' or deactivate the features you don't use or need.

"Currently, app developers of EFBs are locked in a 'features arms race', particularly on an international level," says Bevan Anderson. "As tablet technology improves, the inclination to add more features is natural. AvPlan is very much user-built, in terms of our taking on the feedback of our customers and building their requirements into the app.

"Over the past year, we've had increasing feedback from users who are finding the app a little feature heavy. Of course, there are many who love the feature-rich version and we certainly don't want to compromise that, so the obvious next move was to create a LITE version. And that's exactly what we've done.

"We appreciate there are many pilots who just want to hop in their aircraft and enjoy their flight without getting bogged down in detailed planning. For some flight profiles, controlled airspace, IFR routes and weight and balance are unnecessary features," says Bevan (See side panel – AvPlan LITE)

So, does keeping it simple mean you're missing out? Not at all! There are as many different flight profiles as there are pilots. Knowing what you require for planning your flight – be it weight and balance or simply 'direct to' navigation – is the first step in keeping it simple.

As Einstein himself said, "if you can't explain it to a six year old, you don't understand it yourself."

Kreisha Ballantyne is AvPlan's Customer Engagement Manager

AvPlan LITE

AvPlan LITE contains the following features:

Certified Under CAR 233 (1) (h)
Seamless MEGA Moving Maps
Direct-to Navigation
NAIPS Weather Forecasts
NOTAMs
Rain Radar Overlay
ERSA, AIP, AIP Supp
HUD
Stopwatch
Lightning Overlay (iOS only)

AvPlan LITE minimum hardware/ operating system requirements:

Apple iPad 1, iPhone 3GS, iPod 4th Gen, iOS ver 5.1 or Android 4.1.
www.avsoft.com.au

***Sport Pilot* has five subscriptions of AvPlan LITE's Android version to give away. Email editor@sportpilot.net.au and tell me how EFB's have changed the way you fly.**

Ligeti Stratos 3 update

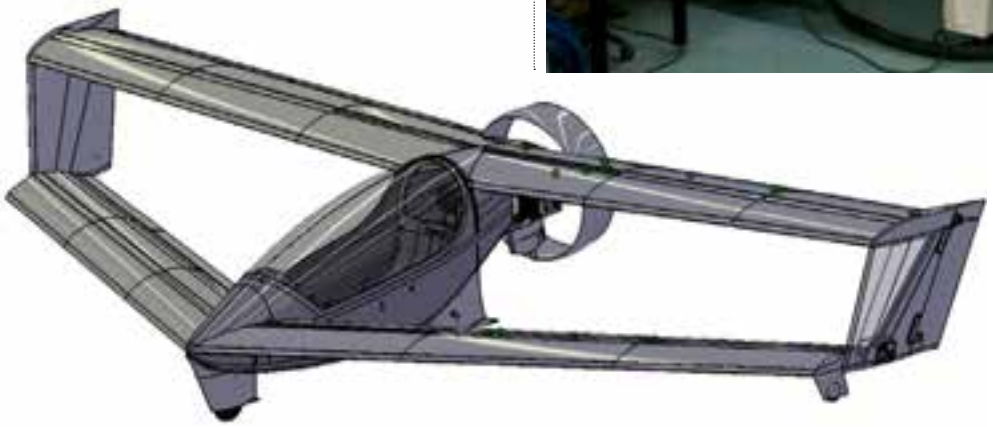
by Arthur Marcel

CHARLES Ligeti's son, Ron, has been making remarkable progress with the third variant of the original Stratos design - the Stratos S3.

Ron's day job is with Boeing, designing and building new composite structures for aircraft. His background includes both civil and military aircraft. More than qualified to step into his late father's shoes, Ron hopes to inspire others to design and build aircraft completely different from what is already out there.

The Stratos S3 project is as high tech as they come. Charles built the S1 from sketches, but Ron is using powerful CAD applications to build the S3. He told me CAD was time consuming at first, but resulted in a fully documented design that was quickly scalable to any size with sub-assemblies and parts precisely dimensioned and exportable to computerised fabrication machines like CNC routers. Ron actually owns his own sophisticated CNC router, bought brand new for this project.

>> CNC machine



>> 3D CAD view of aircraft

DESIGN

Ron began by investigating the data and dimensions of the original Stratos. Most of the information had been in his father's head. Ron only had a few scraps of notes and a simple non-dimensioned three view drawing. He also had some wooden templates to help with the major datum locations, but they were old and not absolutely accurate. He did, however, have the first prototype aircraft. The problem with trying to reverse engineer a composite aircraft, though, is that it cannot be disassembled.

Unlike an alloy aircraft, the individual pieces of a composite aircraft cannot be taken out of the structure to be measured. So a certain degree of estimation was required. Ron used the design stages of his S3 project to greatly enhance his professional skills, using relational and mathematical formula based modelling. This technique is only lately becoming standard practice in the aerospace industry and has yet to reach its full potential. Ron believes it will not be long before fully programmable design rules, linked with structural optimisers, enable computers to do most CAD design. He says the possibilities for this technology in aircraft development could be very far reaching. With the S3, he has been able to design, document and manufacture parts in a manner his father could barely have dreamed of.

VERIFICATION

Ron is the first to agree that you never know what will really happen until you fly an aircraft. He has manufactured a series of remote control test models of various sizes and control layouts. Factors such as aero elasticity, stability, stall and spin characteristics, inverted flight, speed, range, control surface flutter and control input parameters have all been tested in relation to the box wing configuration of the Stratos. Ron believes his testing program has greatly narrowed the ballpark in terms of what to expect when he eventually flies the full sized aircraft.

Of particular interest to Ron, understandably, are the stalling characteristics of the S3. He found that at normal forward C of G, the S3 bobbed its nose with no spin tendency. Moving the C of G rearwards deepened the stall with increasing propensity to spin (recovery from which, however, was perfectly conventional). More aft C of G tended to equalise wing loadings so they stalled together (instead of the canard first). With both wings stalled the nose would still lower, but more altitude was required for recovery. Ron believes the manned version will let the pilot know when the C of G is too far aft by the way it flies. He says a correctly balanced S3 will be like any normal aircraft, stalling at a given speed but being more forgiving, with nose bobbing stalls and no tendency to spin.

CNC

Ron says that if you only want to knock out a prototype aircraft, hand building your parts from drawings is quicker than doing a CNC machined aircraft. However, if one day you want to repeat build parts or manufacture more aircraft, and you don't CNC, you effectively start from scratch each time. CNC routing (as opposed to CNC hot wiring) can machine wood, foam, plastic and metal in three dimensions. By modifying the hardware of his normally three axis router to enable four axis machining,

>>:Wings mated to fuselage

>> Radio controlled model

>> Engine test bed

>> Ron with prototype S3

Ron is now able to machine a complete wing core on all six sides in one operation without re-indexing, therefore ensuring accuracy and repeatability. He just pushes the go button and walks away, coming back to a completely finished part.

ASSEMBLY JIGS AND LAYUPS

The Stratos box wing design requires a high degree of accuracy when aligning parts. Ron used his CAD facility to design an assembly jig, relating it exactly to the aircraft components. The jig was then CNC'd from high moisture resistant MDF, a material with excellent dimensional stability. The first assembly stage was to join the wings and fuselage. The second stage aligned the fuselage, wings and wingtips. For the layup, Ron has had the assistance of his wife, Tanya, and workmate, Alex Taylor. Ron's mother, Helena, is also assisting.

> *CAD is time consuming at first, but results in a fully documented design*

As with Dean Winton (and his Opal restoration), Ron Ligeti obviously has a deep emotional connection with this project. Every member of our association should be behind Ron and Dean in the spirit of their endeavours.

FLIGHT INSTRUCTOR'S FORUM

Facilitated by the aviation guru Professor Avius

Mirror, mirror on the wall

THE Professor was unlucky enough to witness an act of bad decision making and airmanship by a senior RA-Aus instructor recently.

This has led me to make a call to arms for all us instructors to take a good look at ourselves, our decisions and our actions.

For it is the way we conduct ourselves, setting an example to others, which will have the greatest bearing on the actions of those who look up to us.

A few weeks ago I arrived back at my home airfield 15 minutes before last light. In the fading afternoon light there was about 8km visibility. It was also hazy. The low cloud rolling in was also a certain indication of impending fog. It became so hazy that, approaching the airport, I activated the runway lighting and made a straight in approach. I was happy to have arrived home in the nick of time.

Feeling the moist chill in the late afternoon air, I hurried to unlock and open the hangar doors, an action which took a further 10 – 15 minutes.

But while pushing my plane into the hangar, I heard and saw a sight that made my eyes sore and my blood boil – an aircraft taking off and remaining at low level, destination unknown, heading off into the fading light of the, by now, very hazy, dark sky.

The pilot (an instructor) must have made it to his destination. Otherwise we'd have seen it on the news.

The question which begs an answer though is "Why?"

Why did he take the risk? Why put his life at risk? Why would he put his family and friends in the potential situation of themselves having to ask "Why?"

In aviation, as is with any high risk activity, the wrong side of right is an unforgiving position to find yourself in. When things go wrong, they tend to go wrong swiftly. The magnitude of a small mistake or poor decision can become graphic in its consequences.

The Australian Transport Safety Bureau has recently released its SAFETY WATCH initiative. This looks at safety concerns which have come about from their investigations.

ATSB has identified a number of key hazards which increase the risk of an accident.

These include;

Flying lower than necessary;

Reduced visibility;

Not being aware the engine fuel supply is not working;

And not recognising the implications of something going wrong.

ATSB continues to investigate accidents – many fatal – which involve pilots flying with reduced visual references. Don't be fooled, even under day VFR it is crucial pilots can see where they are going. The two main risks associated with flying in limited visibility include

Loss of orientation, leading to loss of control and an uncontrolled flight into terrain;

And insufficient visibility to see and avoid obstacles while remaining under control; known as controlled flight into terrain (CFIT).

Who, if it is not us instructors, is going to provide the good example to students about the rules of the sky, the correct procedures, protocols and risk management?

So let's look at how we conduct ourselves in our aviation based actions. Leading by example is perhaps the most effective means of passing on safety as our highest priority.

References: *ATSB.gov.au/Safety Watch/Safety Awareness*

DESIGN NOTES

DAVE DANIEL

FIGURE 1
Trailing link gear with rubber donuts is compact, has reasonable damping and lends itself to both steerable and castoring nose wheels

Happy landings

THIS month I am turning my attention to arguably the least appreciated aeroplane component - the landing gear. It's easy to dismiss the 'gear' as simply the thing your plane sits on when it's not flying and relegated to nothing more than excess weight and unwanted drag the moment you become airborne. But there's so much more to it than that.

The gear also has to handle potholed airstrips, rough taxiways and absorb your occasional 'less-than-perfect' landings, and don't forget steering and braking half a ton of aircraft, all while weighing as little as practically possible - not an easy task.

The design requirement for landings is fairly simple: Soak up the excess energy of the landing and either convert it to heat or rapidly store it and then release it gradually enough to avoid bouncing back into the air.

The gear also doubles as a load limiting device, protecting the aircraft's structure from the trauma of a controlled collision with Terra Firma. Design for a maximum descent rate of around 500fpm is typical, (roughly equivalent to a landing with no flare) resulting in maximum deceleration loads in the region of 3g or close to a ton on each main gear leg for a 600kg ultralight.

Of course vertical loads aren't the only concern; it must also contend with horizontal loads. Wheels which are stationary in flight must rapidly accelerate to a couple of thousand rpm on touchdown. These spin-up loads apply drag forces to the gear legs which can themselves be in the order of hundreds of kilograms.

Finally, there are badly executed crosswind landings to consider – 'kicking out the crab' too late or being caught drifting downwind can impose some hefty side forces. It almost goes without saying there's a good reason why aircraft designed for training typically have much more solidly built landing gear.

GET SPRUNG

Spring rate and damping will dictate how your gear behaves. A high spring rate means a stiff spring, which reduces the amount of travel your gear needs, but at the cost of increased loads on the airframe. Soft springs will reduce airframe loads but require greater travel to prevent a heavy landing 'bottoming out' the gear - not unlike hitting the airframe with a large hammer and with similar results. Springs can only store energy so, if you want to stay on the ground after landing, some damping is also required. Damping is the ability to dissipate energy, usually by converting it into heat. Unfortunately a large amount of damping is hard to achieve in a simple, compact and lightweight package so, as we shall see, light aircraft often end up with poorly damped gear.

NOSE TO TAIL

From the very birth of powered flight, the question of where to put the wheels has been a point of contention. Tricycle gear has the advantage of dynamic stability - the plane will automatically try and point the nose in the direction it is travelling, requiring less pilot skill and technique to master, it also allows a greater crosswind capability. Conventional or taildragger gear, on the other hand, is dynamically unstable; when cornering the plane will constantly try to tighten the turn requiring well-honed rudder skills to avoid a ground loop. Conventional gear is not without its benefits however. The design is inherently more suitable for rough or unprepared strips because the weaker tail wheel is not in contact with the ground for most of the take-off run.

Short field performance is also generally better and there is a slight weight and drag advantage. While you may not see many tail wheel airliners these days, I don't recall having ever seen tundra tyres fitted to tricycle gear, so this is definitely a case of horses for courses.

FIGURE 2
Cantilever spring gear is simple, low maintenance and with good streamlining will produce minimal drag

"The gear has to handle potholed airstrips,rough taxiways and 'less-than-perfect' landings'

GET THE RIGHT GEAR

From cheap and cheerful to fancy and expensive, there's definitely no shortage of diversity in landing gear design. Starting with minimalism, there is still the odd design around with the wheels rigidly attached to the airframe and relying on the tyres alone for shock absorption. Whether this saves weight is debatable because the fuselage needs to be strong enough to withstand serious shock loading, but it's certainly simple. Of course you can also opt for no wheels at all, and tail-draggers operated exclusively from grass or dirt strips often do away with their tail wheel, opting for a tail skid instead, not only saving weight but also providing improved directional stability and a modicum of braking.

Gear sprung with bungee cord is the next step up and remains relatively simple to design and manufacture. Maintenance is minimal but bungees slowly lose their spring over time causing the gear to sag and become less effective, requiring their periodic replacement. Bungees work in tension and so need room to extend to do their job. It makes bungee gear bulky. A more compact alternative is to use rubber donuts in compression, often in conjunction with a leading or trailing linkage, allowing harder rubber compounds to be used while still providing the required travel. Enclosing the rubber donuts in a cylinder and placing metal disks between them introduces friction when the gear is compressed and adds damping to the system.

Plain cantilever spring gear has become a popular choice both in spring steel and composites. It ticks nearly all the boxes for a light aircraft - simple, rugged, low maintenance and lightweight. The only real drawback is the minimal damping which is provided solely by the tyres scrubbing sideways on the runway as the gear deflects. A firm landing may find you back in the air much sooner than expected, providing a golden opportunity to do a better job on your second (or third) attempt.

The pinnacle of landing gear refinement is the oleo-pneumatic strut. Combining air compression for spring effect and forcing oil through a meeting orifice for damping, oleos are undoubtedly the best performing landing gear available. Of course high performance comes at a cost and oleos aren't cheap. They also require significant ongoing maintenance. You do occasionally hear tales of oleos which have lost their air or oil which can lead to a nasty shock if not discovered during a pre-flight inspection.

UP, UP AND AWAY

There is no doubt that retractable gear adds sex appeal to an aeroplane. However, much like swept wings, retractable gear really doesn't show much benefit at speeds under 150kts. Even for an aerodynamically clean ultralight, the difference in cruise between well-faired fixed and retractable gear is barely 5kts, which comes at the expense of extra weight, complexity, maintenance and cost - not to mention the risk of a gear up landing due to pilot error (of course that would never happen to you, but the higher insurance premiums attached to aircraft with retractable gear shows it is happening to someone). An alarm which sounds when full flap is selected with the gear up is a wise investment.

As a final thought, the next time you go flying take a closer look at your humble landing gear, if not to wonder that something so lightweight can resist the weight of a medium sized family car without breaking. Then consider the possibility that at some time in the past it already has...

Celebrating 30 YEARS

AUF/RA-AUS 1984-2014

2014 marks the 30th year Australians have been legally allowed to fly ultralight aircraft under the auspices of their own organisation. From humble and chaotic beginnings, AUF/ RA-Aus has grown into the largest aviation representative body in Australia, representing more than 10,000 pilots and 3,500 aircraft.

WHERE IT ALL BEGAN

OCTOBER 1979 Department of Aviation asks the ultralight sector become self-regulating, quoting the success of gliding, hang gliding and parachuting. The Department says it will not make any changes to the ANOs until ultralight fliers achieve satisfactory self-regulation and, if we don't, they will be happy to do it for us.

October 1979 to mid-1980 Early attempts to form a national self-regulating body are unsuccessful.

1981 Les Harris (then SAAA) begins discussions with the Department on the concept of two categories of ultralights. The first is the same as the existing 95.10 but with the weight rationalised from a MTOW of 400lbs to an empty weight of 250 lbs (subsequently 254) and the second for a heavier aircraft with a higher wing loading requiring basic airworthiness standards, to be flown by a pilot with a certificate of competence issued by a national self-regulating body.

February 1982 The concepts are refined into proposals and the Department expresses agreement in principle - further acceptance on their part dependent on the formation of a satisfactory national self-regulating body.

April 1982 At Mangalore 82, the concepts and the Department's tentative acceptance of them, are conveyed to the ultralight pilots attending the convention. Those present (97 people) decide a national self-regulating body be set up.

April 1983 Representatives are nominated by most ultralight organisations to the national body, tentatively called the Australian Ultralight Association.

April 1983 At Mangalore 83, a meeting of the nominated representatives and members change the name to the Australian Ultralight Federation. David Betteridge is elected President and Phil Peterson Sec/Treasurer.

21 September 1983 The Minister for Aviation recognises the AUF as the national self-regulating body for ultralight aircraft.

Late 1983 AUF applies to the Federal government for a grant of $52,000. These grants are made to bodies which undertake work a government department would otherwise have to perform.

2 April 1984 The department issues Aviation Regulatory Proposal 83/8 for issue two of ANO 95.10 to the AUF for comment.

April 1984 At Mangalore 84, the scheduled inaugural AGM of the AUF is not held, but informal discussions take place.

May 1984 A steering committee is formed to prepare for and hold the inaugural meeting of the AUF. The members of the steering committee are Chairman, David Betteridge, and Secretary, Patrick Trevascus. The committee is given the task of creating a constitution, incorporating the AUF under the Associations Incorporation Act 1981 and establishing priorities for the AUF.

21 June 1984 The Australian Ultralight Federation is incorporated.

October 2004 AUF name is changed to RA-Aus Inc to better reflect the changing nature of the aviation carried out in its name.

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Department of Aviation

Office of the Secretary

P.O. Box 367, Canberra City, 2601, Australia
Telephone (062) 46 9212
Telex 62221

-6 JUL 1984

Mr Patrick Trevascus
Secretary
Australian Ultralight Federation Inc
P O Box 181
ABBOTSFORD VIC 3067

I refer to your letter of 22 May 1984 concerning the formative processes of the Australian Ultralight Federation.

Further to my discussions with your President in Canberra on 26 June 1984, I wish to reiterate how pleased I am with the progress made by the Federation.

Officers of the Flight Standards Division were able to make considerable progress in this important area at the same time and I am certain we can all look forward to a productive and cordial relationship.

Yours sincerely

(C.W. FREELAND)

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Section 7

Registered No. : A 1556

CERTIFICATE OF INCORPORATION

This is to certify that AUSTRALIAN ULTRALIGHT FEDERATION INCORPORATED

is on and from the 21ST JUNE, 1984

Incorporated under the Associations Incorporation Act 1981.

Given under my hand at Melbourne this

21ST day of JUNE, 1984

Deputy/Assistant Registrar of Incorporated Associations

The authorities could see we were serious and responsible

>> Viva Scout

>> Bedson Resurgam MK1

>> From early 1987 at Wilton NSW (LtoR) Bill Dinsmore, Ian Young, John Haggedoorn standing in front of 25-0081 the first production Lightwing (after the prototype) odered by the Sydney Ultralight Flying Club in 1986

>> The Condor/ STOL aero

Where it all began

by Chris Conroy

An excerpt from a 2012 forum at NATFLY

BECAUSE of the tyranny of distance, development of the ultralight movement in Australia took place in a number of centres. While there was some communication, they were virtually independent of each other and surprisingly parallel to a large extent. The process was enlivened by a number of radical individuals who caused the more moderate of us considerable embarrassment.

All we wanted to do in the early years was to get our bums off the ground. A cross country of 100nm was almost unthinkable because of fuel capacity, weather, hypothermia and snail-like speeds. We just wanted to fly and this we did, even if it was almost always in sight of our departure point.

Much of our building and flying was done without the umbrella of government oversight and, as a result, when the bureaucracy could no longer ignore it, it was decided legislation had to be written to cover an activity which was basically anarchic but already so well established it could not be ignored.

The late Brian Creer and I spent several weeks writing submissions to Elaine Darling, who headed up the House of Representatives Standing Committee on Transport Safety. Along with submissions from a number of other individuals, the authorities could see we were serious and responsible and respect for the movement began to grow within the government.

After the AUF was formed at Mangalore in the early 1980s we had an organisation with the corporate structure and credibility to represent the members in any matters relating to the government. Things looked very much better than previously, when we were constantly under the threat of visits from the police at whatever paddock from which we flew.

Australia led the US by a long way when it came to writing legislation. The early rules, such as a 300ft ceiling and not flying over built up areas or sealed roads, were silly. But at least we avoided the problems faced in the US where fragile, foot launched powered hang gliders suffered catastrophic structural failures while temporarily airborne and broke many ankles and legs before an outbreak of common sense struck the FAA.

Early in 1985, I spent a couple of weeks at Oshkosh as the guest of the founder of the EAA, Paul Poberezny. Along with Steve Whittman, John Monnet and others, we discussed the early days of the EAA. Their advice as to the best ways to approach and relate to the government was invaluable.

We were not accepted with open arms by GA pilots, resentful of the comparative ease with which we could gain a Pilot Certificate and fly. But the movement is now very popular with many former GA pilots who can economically fly our modern, reliable aircraft, many of which are more advanced than their GA counterparts.

We also had to contend with a hostile and sensationalist media which, in its studied ignorance of all things aviation, seized upon the slightest accident or problem and characterised us as irresponsible, suicidal maniacs who flew 'ultralight' aircraft and put the general public at risk of being killed in their thousands as we descended from the skies like a hailstorm.

This had great appeal to an equally ignorant and hostile general public who did everything in their power to deny us flying fields and stifle the movement. This led to the lamentable elimination of the word 'ultralight' from our identity.

HOMEBUILDER

DAVE EDMUNDS

ELECTRIC ENGINES

IN the 1950s, a US naval aviator with too much time on his hands made the banal observation that "if it ain't round, it ain't sound."

This statement was supposed to associate the naval preference for radial engines, which approximated round, for the purposes of the statement, with the new jet engines.

The statement could also encompass electric aviation engines.

The electric engine, particularly in its modern incarnation, is just about ideal for light aviation use. It is very simple, with just one rotating part. It can be built light and can be built to greatly eliminate power pulses. Best of all, modern electric motors are well over 95% efficient, with a further loss of a per cent or so in the controller.

But despite this, we are not going to see them in widespread use for some time.

The basis for an electric aircraft motor is the brushless DC (BLDC) motor, which comes in several versions. In structure, it turns a traditional DC motor inside out. That is, the rotating armature carries the magnets and the coils are stationary, wrapped around the armature. A reverse configuration is also used, whereby the rotating magnets are wrapped around stationary coils. RC people refer to these different configurations as inrunners and outrunners.

This configuration requires some electronics to determine the position of the magnets relative to the coils, so the requisite current can be applied to attract and repel the magnets from the coils to move the armature.

This is now a very well-established technology, available off the shelf or in reference designs from many electronic component manufacturers. In addition, the development of very high-current and efficient solid-state switching components allows for highly reliable and efficient operation.

The problem is energy storage.

Typically lithium batteries store energy at 576,000 joules per kilogram. I read this on the internet (so it must be true). A litre of Avgas weighs 720gms and stores 32 megajoules per Kg. That is, Avgas has around 55 times the energy density of Li-ion batteries.

It gets a little better. The internet tells me that soon we may see some form of lithium battery with around twice the energy density. Of course, there are many references to breakthroughs, but there always are in any technology.

Further, as a BLDC motor-controller combination is around 95% efficient, and an Avgas powered engine is around 20% efficient, not as much electric energy is needed. And the electric engine is considerably lighter, so perhaps an extra 40kg is available for batteries without breaking the weight budget.

Taking all of these factors into account, we still need around seven times the energy budget of an electric plane to get close to a petrol plane.

>> Pipistrel Electro proof of concept aircraft

Look at a specific example - a Jabiru J160. This aircraft carries 120 litres of fuel. Assuming the electric engine is 40kg lighter and requires 25% of the energy. An electric engine would require 30*0.72*32 = 691 megajoules of energy to have the same duration as the standard J160. Using our energy density figure of 576,000 J/Kg for a Li-ion battery, we would need 6.91*10E8/(5.76*10E5) = 1,200kg of batteries. Clearly our 40kg engine-weight saving and the further 86kg of fuel not carried is not going to help a lot.

So it is not on.

Except for two possibilities.

It may just be possible to build a training aircraft with less than one hour's duration designed for ab-initio training. The advantages would be dramatically lower maintenance and energy costs. Petrol costs around the same as electricity per unit of energy, but you would only require 25% of the energy. The engine life is effectively unlimited. The electric engine only requires a couple of bearings to support the armature, which is the propeller shaft, so effectively requires no maintenance. If the battery pack is easily replaceable, it could be swapped out at the end of a flight and replaced with a fresh one while the other recharges. Of course, recharging time is another issue.

Secondly, fuel cells could convert some fossil fuel energy source to electric power. There was considerable hope for fuel cells some years ago, but discussion of them seems to have diminished. Fuel cells typically use a platinum catalyst and platinum is very expensive. So, fuel cells do not use a lot of it. The problem then arises that you need an exceedingly pure hydrocarbon fuel if you do not want to poison the catalyst and kill the fuel cell. And in an aircraft application you would need a battery to supply full power or an oversized fuel cell. So, apart from the fact that they are unobtainable, they would add complexity and require an equally unobtainable fuel.

So what about putting solar cells on the wing? After all, there are experimental solar powered planes around.

The wing area of the test Jabiru 160 is 8m2. One sun conditions, that is, the energy available from the sun at midday on a nice day is 1KW per m2. Assuming you covered the entire upper wing surface with high-efficiency 20% cells, you could, on a nice day, expect to add 1.6KW. To be fair, at say 4,500 feet, this may be closer to 2KW.

If you remember the calculations from last month, the test Jabiru requires 20KW in cruise. So the addition of solar cells adds just 10% to your cruise time. Not enough to make a difference.

It would be nice to believe there is a straightforward development path to an electric aircraft, but there is not. There is a fundamental limitation in electrochemistry which means the necessary breakthrough in the energy density of batteries is not going to happen. There will be incremental improvement, but that is not enough.

For more information: http://www.sonexaircraft.com/research/e-flight/electric.html; http://greenwing.aero/?p=2781

NEXT MONTH The future of home building

members' market

2671 JABIRU SP 500/6 19-3717

Well maintained hangared. 449.5 hrs. 123kts @19ltrs hr. Sweetapple cruise prop, custom extractors, 10 ply mains, 85ltr tank. STD gauges electric turn coordinator, volt meter, fuel flow meter. XCom VHF & headsets, + UHF & 2xGPS. Grim voltage regulator, Anderson jump start plug. Deliver anywhere. $48,000 . 08 9921 8790

3342 HANGAR SPACE BOONAH AND MURWILLUMBAH

Aircraft hangarage available at Boonah and Murwillumbah airfields. Highly sought after locations. Price by negotiation dependant on aircraft type. Chinook Aircraft also for sale suitable for parts only. Best Offer. Enquiries to scenicrimaviation@gmail.com or contact Mark 0413025178.

3426 CHEETAH XLS

Cheetah XLS 24-7072. 98 hrs airframe and engine. Jabiru 2200 PP. Single owner always hangared. Easy to fly and maintaine. 90ltr tank, spacious cockpit. Digital inst with analogue backup. 75kts cruise. Based Bunbury, WA. Reduced to $28500 Must sell. Contact George on janspo@westnet.com.au or 0406226566

3458 JABIRU SP UL 19-4319 FOR SALE

This aircraft is in immaculate condition with low hours and nil incidents,always kept in its hangar and fully serviced,would suit a new aircraft buyer. Paint and interior trim done professionally,asking $38,000. Selling due to retirement after many enjoyable years. Contact Len on 07 32035546 or email rily54@bigpond.com for more details.

3485 JABIRU J160C FACTORY BUILT

J160C factory built 2006. Option 2 Panel with Dynon EFIS, Garmin 296 GPS, Micro Radio & Transponder. Recent top end engine overhaul & upgrade. Always hangered, beautiful to fly. $40,500. Call Alan 0427 763 375 or more info at www.jabcor.com

3489 JABIRU SP6

Regd 19-3845 to 27/11/14; TTIS A/F 453 HRS ENGINE 25 HOURS (3300/120HP) HYDRAULIC LIFTER. GARMIN 126/8GPS,ICOMA200 RADIO/ INTERCOM,ASI,ALT,RPM,EGT,TURN CO-ORD, OIL PRESSURE AND LIGHT, VSI, CHT, OIL TEMP, ELEC FUEL PUMP, COMPASS, LOCK, WHEEL PANTS, TWO PLACE, BUILD BOOKS/ EXTRAS VNE 132 RAY 0411 956734/ 03 51555181 rjwheels@gmail.com ASKING $35000, O.N.O.

3490 JABIRU 170C

August 2008 factory built. 435 hours TTIS Option 1 panel plus Microair transponder, FC-10 fuel computer, garmin 196 GPS. 10ply front and mains. Always hangared. All AD's complied with. $62000 Contact Kevin 0417131816

3498 JAB LSA, NEW ENGINE - BARGIN!

Total Hours: 2030 Engine Hours: 20 Price: $28,500 Factory built aircraft, new 2200 engine with only 20 hours on it, new control cables, new brakes (J120 units), new battery. Best value anywhere! Sweet to fly, cheap to operate. Always hangared, LAME maintained. Transponder mode C. ph 0434 082 023

3548 JABIRU J160

Hanger ed in Adels Grove 30 hours since motor installed, has 2 x Icom radio's 1 com system Garmin transponder Efis Altimeter Airspeed VSI (vertical speed idicator) Tacho Oil pressure Oil temp CHT (cylinder head temp) Volt Cargo door call Rod 0747485502 price dropped to sell $40,000. Great buy.

3606 FOR SALE SONERI PROJECT

Complete set of plans & photos,..compass, altimeter,ASI,Garmin GPS, Icom radio with VOR, Gas Colator, Flight timer, balance ball, Fuselage constructed comes with fabric, glue to complete plane. Aeropower 80hp engine, two props & spinners . all bolts,nuts,and rivets. all that's required is assembly.Contact:Barry on baajrowell@gmail.com or 0418659900 Price: $9700.00

3621 KR2 ALMOST COMPLETE PROJECT

Registration lapsed KR2 99% complete. Needs prop, some re - assembly, a few brackets and fasteners, odd jobs and paint. Subaru ea81, flaps, tricycle u/c easily re-converted to tailwheel. New canopy. Includes intercom. Nice to fly, cruise approx 120 kts. Menocanflynomore forces sale. $11,500 ono. Martin 0419 333 525

3625 NEW US MILITARY Nomex Flight SUITS

I have a small number of genuine US military flight suits for sale. These are brand new and made from flame resistant Nomex fabric in Sage Green & Tan Only. Please ring about sizing. Special sale price of $200 each Contact Mark Harris on Ph 0418 345464 or email mbhprods@optusnet.com.au

3627 PRIVATE AIRFIELD

600m private airstrip, Murrumbateman area, 20 mins Canberra, highway access, 12 x 12m hangar, OCTA. House 5 bed, 3 bath, tennis court, 4 car garaging, established gardens. 40ac income producing property, currently running 70 prime lamb ewes. Shearing, machinery, hay, workshop sheds, large cool room, 2 stables. $1.3m. Phone 0432689136

3660 JABIRU J160-C

Immaculate condition factory built October 2006, 570 TT engine and airframe. Well equipped Dynon D10A, Microair transponder, radio, PCAS, autopilot, Garmin GPS, cabin covers. Always hangared, regular maintenance and nil accidents. One owner Jabiru and never used for training. Contact: theo@graftedvines.com.au Mob: 0418 805204. Located S.A. $47,000 + GST

3735 NORTHERN RIVERS NSW

Northern Rivers NSW. Property 228 acres. 700m airstrip. Cottage, hangar, workshop, all usual farm facilities. 3.3kw solar power + solar HWS. Runs 50

breeders. Suit retiree, club, group ownership etc. Dual river frontage. Asking $648,000. For further details, photos etc 0427 115225 or didja@skymesh.com.au

3759 REVMASTER ENGINE

2100 cc. Revmaster VW. The engine is disassembled and consists of mostly new components with many used but serviceable items as well. Too much to list here so if you contact me I can supply full details. Asking $ 3000 and keen to sell. Dean 08 87331235

3766 SPACEWALKER II

"SPACEWALKER II" Something different for the aviation connoisseur! Dual Open Cockpit. Lycoming O-235 Built by retired engineer to better than production quality. Low airframe engine hours. VH-Reg (NOTE: This aircraft can easily be re-registered with RAA) Full history. Absolutely immaculate inside & out. A joy to fly. Ph 0428883311 $69,500

3787 TERRIER 100

Terrier 100 19-3509 485 hours on 100 hp Subaru EA81 engine and airframe. Standard instruments, Garman 196 GPS, Microair radio/ intercom and always hangered. Good condition and is hangered at Woodstock near Townsville QLD. $35,000 Ph. John 0410857103.

3865 FOR SALE JABIRU J200

Airframe TT520 hours, Factory rebuilt Solid Lifter Engine102 Hours. Recent Jabiru Repaint, Factory Service. GA Panel, Analog instruments, Microair Radio, 2XGPS,Total Fuel 140Litres. Strobe Lights, external power, Cold Start Adaptor, spare Prop. Lovely plane, cruise at 118kts at 21Litres, Heated Cabin. Located Dubbo, $72,000ono contact Jeff, 0418 843954

3879 FOXBAT A22

Foxbat A22 24-4270 820hrs uhf vhf transponder AH fuel scan lowrance airmap 2000 GPS verticle card compass new prop just completed 100 hrly VGC $62,500 contact 0438981301

3889 JABIRU J120

Factory built, Transponder, 295 Garmin GPS, Cruise 100kts at 2900rpm, Average 13.8l/hour. 1070 hours. great condition, fly's very well. Must sell Call Brett for more details 0419 694365. Email - harthy79@gmail.com . $35000. Or make a reasonable offer. Dalby QLD.

3907 RANS S12 AIRAILE 2-PLACE DUAL CONTROL

RANS Airaile S12 in excellent condition - nil accidents Flown 330 hours only on Rotax 912 Always maintained by Level 2 mechanic/engineer Kept in spotless hangar at Wedderburn Airport in Sydney Lovely-to-fly aircraft with long rego New Lexan windscreen, tyres, battery, boost pump, radio intercom $30,000 (negotiable) Contact Neville (02)47019499

3908 X AIR F

x air f 19-3276 TT194 hrs Eng 54 hrs Rotax 618, 3 blade prop, just reweighed, usual instruments, microair radio 2 x headsets, garmin 96C Gps, ELB, reg. to 3/15 $10,000 with custom trailer John (03) 97461010 0408351072

3909 ZENITH CH 300

ZENITH TRI-Z 2+2, LIGHT SPORT AIRCRAFT. CRUISE 110 KTS, RANGE 900 N.M. LYC 0-320, ALL ALUMINIUM AIRCRAFT. T/T 32 HRS. ALL OLIO UNDERCARRIAGE, ALL INSTRUMENTS, GPS, RADIO, TXPDR-MODE C, STALL 48 KTS, WITH FRESH 100 HRLY.. CONTACT BOB, 02 64959251 OR bobo-shkosh@yahoo.com $38,000 O.N.O.

3914 JABIRU J 400

First flew: March 2005 TT: 450 hours basic Jabiru instruments with turn co-ordinator radio, transponder, Garmin 295 GPS through bolts done at 442 hours. new piston rings, valves and springs fitted by Jabiru flywheel mod done Price: $50,000 If interested, please contact me Rory on 51551392 or 0448551392.

3942 VP1A VOLKSPLANE

VP1A Volksplane. Total hours only 1143, 21 hours since engine rebuild. Registration number 19-0484, Full flying tail, enclosed cockpit. Only using around10 litres per hour, ICOM radio and GPS fitted in cockpit. Thompson Propeller. Well maintained overall and ready to fly. Only $7500 o.n.o. Call Harry 0412 426581 for details

3945 AIRBORNE EDGEX 582 STREAK 10,000 AUD !!!

Bleuhead 582, full Bert Flood rebuild 125 hrs ago, Brolga prop, Streak Wing, logbooks, manuals, radio and helmets. Everything ready, just travelled Perth to Brisbane, luggage bag, jerry-can harness, full travel covers. Qld registered trailer with jerry-can holders, toolbox, oils, spares, winch, ramps, $10,000only! Contact Wim 0417 066 123 Brisbane voortman.seasia@bigpond.com

3946 SAVANNAH

Rotax 912s 100hp TTIS 390hrs. New 3 blade warpdrive prop. Tundra undercarriage.Long range tanks 7 hours endurancce. 560kg MTOW.L2Maintained. Steam gauges + electric turn & bank. Garmin GPS 196.Xcom radio intercom & headsets.Nil accidents.Always hangered.All books & manuals. Excellent condition.Euroa Victoria. Ph Joe 0427941072 $50.000.

3950 GAZELLE CA25N

Bought new 1997, always hangared, brand new Rotax 912-A2, gearbox, prop and workshop manual. Bright yellow condition, maintained by LAME/L2. Pleasure to fly, affordable fun flying. Good for 20 knot Xwind. Can be flown into CTA with appropriate pilot qualifications. View 24-3505 at YBTH $38,750.00 obo. Call/sms Mike Faine 0427406521

3956 RANS COYOTE II S6ES

$22,000 246 airframe and 86 engine (Rotax 582) hrs. L2 maintained with all recent history. Airworthy in March 2014. Registered to March 2015. ICA 210 radio and King transponder. ZEON MRX PCAS. Portable Garmin GPS loaded with Worldmap. Original construction manual. Registered trailer, extras. Ph Jeff 0405569205. govo49@hotmail.com.

3968 LIGHTWING GR 582 FOR SALE

Lightwing GR 582 $22,500 Factory built so can be used for training. Grand champion 95-25 class at Natfly in 2006. Excellent condition - always kept in a hangar. Only had two owners. Many extras. Will deliver Contact Bob Burns for further details Mob:0412041701

3991 JABIRU LSA 55/3J

factory built great aircraft to fly always housed in hangar, engine well maintained with all required updates done 135 hrs on engine and 604 on airframe. Lambswool sear covers, full dash with extra instruments. phone John 0428727152 johniep@bigpond.com.au $33500.00

3996 JABIRU LSA

This Jabiru LSA is a factory built 2.2 model that has a new engine with little usage hours. It also features new cable, new undercarriage and J120 brakes. It's barely used and always in the hanger - in good condition. Comes with one spare propeller. Contact David @ 0434082023 $28500

4000 SAPPHIRE

SAPPHIRE 19 3866. 168hrs 503 Rotax, 3 stage flaps, 58lt wing tanks, cruise 80kt+. Always hangared, ICOM radio. Hangared at Lakes Entrance VIC. $17,500 ono. Ph Jack 0429 801 548 or 03 5156 4355

4005 RV12

RV12, VH-XKH,25Hrs TT,Rotax912ULS,MTOW below 600kg,has AP,Transponder,lighting,interior lining,etc. All components new.Build by multiple RV builder and SAAA technical counsellor.Two pack paint all over white(put your own motif on)Hangared in Mittagong YMIG NSW. Asking $98,500.- no GST If you have any questions please contact me on:0411290472 or 0248844143 or kahamer@bigpond.net.au

4013 NIEUPORT 11 PROJECT

Fuselage tail plane and two lower wings already built. Enough aircraft grade aluminium to complete upper wings. wheels and plans included.$500.00 Townsville NQ Phone Steve.0412354757

4045 FOXBAT A22LS

Foxbat A22LS.year 2013, white, 24-8344, 100hp. Rotax Injection Engine, Dynon SV1000 with auto pilot, yokes,Icom210 Radio,tundra tyres,L2 serviced, no accidents, top condition,low hours,$106,500 email jonank@live.com.au

4047 WANTED

Wanted 2 seat Bantam anything considered. contact keith 0427 687001

4048 TEMORA PROPERTY FOR SALE

9.5 acres, 3 bedroom cottage needing work, electricity/water/phone all connected. New colorbond 15mx8m shed, concrete floor & water tank, also has dam on property. Directly across the road from airport & Temora Airpark Stage 3 Development, 3.5 Klm's to CBD. $139,000 Ph. 0412468494, email: ninetyoneairportst@yahoo.com.au for more info or photo's.

4050 AUSFLIGHT DRIFTER A582

Brolga 4 Blade prop, Electric start, 70L Fuel, Intercom, Icaro Helmet. Lots of spares. Aerial seeder and electric dingo bait dispenser. $13 000 Located near Roma Ph 0427 800 373

4056 ESQUAL VM1

Almost completed all glass Esqual VM1. Fast cruising machine. Upgrades to the fuel, canopy frame and throttle system . Carbie heat as well . Rotax 912 with a Rospeller constant speed prop. Wiring done with factory harness .110 litre fuel tanks .Strobe lights Andrew Repton reptonsa@bigpond.com 0409371001 $90000

4057 AIRBOURNE

EDGE X 582

AIRBOURNE EDGE X 582 Blue Top. Streak 2B wing; 72 hrs, engine Blue Top oil injection; rebuild 216hrs. included; Icom radio, GPS, helmets , suits, log book & manuals. Windsor NSW $10,000 Phone Mark 0425151420

4058 TECNAM ECHO CLASSIC P92

Tecnam Echo Classic P92 2007 Model, This aircraft is in Excellent Condition and is a Pleasure to Fly, 200 hours on New Rotex 100HP Engine, 755 Total Time,Serviced every 25 Hrs, UHF, VHF, Mirco Transponder, Siren, Intercom, Many More Extras, Always Hangered, $$$ POA Contact Ben, (07) 46554018

4063 JABIRU J160 SHARE

A share in a syndicate of 7 in a 2007 factory built J160 based at Aldinga SA. $7000. Always hangared. Level 2 LAME maintained. Go anywhere, cheap to fly. ph Bart 0418816158 bjlewie@hotmail.com

4077 TECNAM EAGLET

Tecnam Eaglet Reg No. 24-7008 Rotax 912 ULS 4 Stroke 100 Horsepower, Total Hours 685 Dynon EFIS D100 Panel, Garmin 296 GPS, Garmin SL40 VHF, Garmin GTX 327 Transponder, Electric Flaps, Electric Trim, Toe Breaks. BurnRate 15 LPH Maintained By A Level 2. $110,000.00 Ono Contact Franco 0400 591 401

4079 JABIRU J160C

Jabiru J160c Rego 24-4766, 1 owner, a/c eng TT 1330, LAME maintained. VGC, Microair radio & transponder, digital compass ASI, VSI, ETC, OIL P/T CHT, ALT, Elec flaps spare prop always hangared, maintenance/flying logs, Nil accidents, $50000 ono, Clifton QLD, Ph Daniel 0409465812 or Daniel@housereports.com.au

4099 JABIRU SP500 6 CYLINDER ENGINE

Great little factory built a/c: 6 Cylinder engine: 100 Litre wet wings: 6 inch wheels: Garmin GPS: Standard Jabiru Instruments: 2 head sets: Fast cross country a/c: Registration expires 05 Sep 2014: Always hangered and located near Kilcoy: Nil accident history: Price reduced to $41000: Contact John 0402-133-742.

4100 JABIRU J200B

Jabiru J200B, 19-3872, Immaculate aircraft, Natfly winner, Solid lifter 3300 engine, 365hrs TTIS, serviced 25 hrly, Full panel, Certified American Instruments, IcomA200, UHF, Transponder, Fuel flow meter, Independant brakes, Custom upholstery, Garmin 296, Two pack paint, carbon prop, Cummins spinner, Always hangered, Must see. Geelong, Vic. $79,000 Ph 0418 131838

4102 RYLSTONE AIRPARK HANGAR RENTAL

Two slots available in late August at Hangar 49 located on the all new Rylstone Airpark. All new, insulated, painted floors, kitchenette for a casual stayover. Rylstone airpark is located 2.5 hours from central Sydney Full details tucano-replica.blogspot.com.au & click on Hangar Rental Contact Gary 02-96221916 AH raf.tucano@gmail.com

4125 PIPISTREL VIRUS LSA

275 Hrs A/F and Eng, Rotax 912, 120Kts cruise at 13l/hr, 585kg MTOW, 304kg BEW, 25kg luggage, 100l long range tanks, GPS, AI, VHF, mode C transponder, ballistic chute, cabin heat, full composite airframe, punkinhead cockpit cover, lovely to fly, surplus to needs, hangared near Townsville, $69,000 Ph 0497465526

4126 TECNAM P92 RG

Tecnam RG fantastic plane to fly and own fast cruise slow to land full panel 2 radios transponder garmin aera 500 gps, vac DG and AH all work by L2 and L4 friend selling to make room for new plane 750 hrs rotax 912 $88,000 phone Tony on 0429132128

4127 EUROPA CLASSIC

Europa classic only 58 total hrs GA registered but can be Registered RAA full GA panel elec trim,AH,DG,transponder icon radio with intercom and strobe it comes with its own purpose built trailer two new ANR headsets pilot with Bluetooth 125 knot cruse on 13 litres $60,000 phone Tony 0429132128

4128 LEA KESTREL

Lea Kestrel, with 447 Rotax and Sweetapple prop. Complete with enclosed trailer. Aircraft has only flown around 50 hours since built. Currently unregistered, hasn't flown for a while, but only minor work required to return it to the air. Located in Brisbane. $8,000 ONO. Call Doug on 0732063042.

4129 WANTED

PSRU for Subaru EJ22. Consider toothed belt or gear-drive. Must be able to handle 130 HP and be in good condition. Phone Chris on 0419486125 or email chrisstewart6@gmail.com

4135 AIRBORNE XT912 TUNDRA CRUZE

Airborne XT912 Tundra Cruze wing. 430hrs. Comes with helmets, head sets, flight suits, training bars, radio, intercom, Punkin Head trike covers. Always hangered (currently at Dixons Creek in Victoria). Transport can be arranged and a trailer may be available to purchase or borrow. Contact Brett 0419610041 Price $38000-

4138 ZENITH 601XL-B FOR SALE WITH 3300A

Only 34hrs TT . LAME / L2 built with 3300A solid lifter. Has KT-76A ,Icom A210 JPI EDM 700 Sensenich prop,Strobes,,Aileron/Elevator electric trims, electric flaps, Grove brakes, Corrosion proofed .Todd's canopy, can be re-registered as ELSA 600kg .Empty weight 372kg. Fuel 92L .Cruise 115 knots .$48000 ono 0402079305

4139 LIGHTWING GR 912 HELIVIEW TAILDRAGGER

Lightwing GR 912 Heliview Taildragger. 2100 hr TT. 75 hrs on NEW Rotax 912. 1925 hrs /14 years remaining. Manual unlocking tailwheel. 6 ply tyres. Fuel flow meter . ICOM A200. ANR Headsets . Wheel Spats / mount hardware. 290kg BEW, 480kg MTOW. L2 maintained. TR/DEL available. $ 45,000 0427 113 207 Peter

4140 PLAN BUILT SONEX

Plan built Sonex. First flight Dec 09, 95 hours engine and airfame. StratomasterMaxi single instruments, ICOM radio, separate analogue ASI, Cruise 90-95 kts@16 l/hr. Aerovee engine. Located Lethbridge Airport, $30,000, near offer would be accepted. Please contact Ronald Stares 03 9314 3513. Please cotact me by phone only

4143 JABIRU J230D

JABIRU J230D Reg 24-7419 Factory built May 2010, 260 hours, Option 6 Panel, Dynon D180 EFIS Garmin 495 GPS, Microair Radio & Transponder, Twin Strobe Lights, David Clark Headsets, Always Hangared from new. Nil Damage. Contact Ian - 0419703926

4144 SWAP

kenworth for skyfox Classic w model kenworth prime mover yr 1983 new tyers to many new things to list value over $50.000. consider swap for skyfox taildragger in exellecent condition as new with trailer.No screaming two srtokes have to be something special. 0427369688 skmurdoch@hotmail.com

4146 FLIGHTSTAR IISC

Brand new, one of the last ones to come from the US. Assembled with excellent attention to detail. Fully enclosed cabin, dual controls, custom carpet interior, Falcon instruments, in-flight trim, brakes & mylar coverings. Not fitted with an engine and will be sold as is.Best reasonable offer. 0412 506 242

4156 JABIRU SP500

Beautifully built &professionally maintained, always hangered,one owner,250hrs,all mods,all flight&engine instruments inc GA panel with Garmin GPS,radio/intercom,transponder,vac pump,artificial horizon,turn&bank,fuel gauge,fuel flow meter,cabin&elec carb heat,85 Lt fuel,2Pac paint,quick release wings.$35,000.Ph 0418573212.

4158 ZENITH CH 750

Zenith CH 750 Is GA too expesive to operate? Maintain your own Precisely built designed MTOW 655 Stall 35k cruise 85k.110 lit. fuel .Continental 0200 Sennsenich prop. Dynon EMS GPS ICOM 210. Bush tires.STOL. Ideal spotter or muster.bubble doors, flies doors off. .More on RAAUS marketweb-site. $72000 Call 0413306684

4159 SIERRA 100

Reg 19-7658 Jab 2200A (New) Thompson Prop. Matco wheels and brakes. Icom A210 radio and intercom, headset and Magellan GPS. Test hours only (As New) always hangered (no longer flying - age). A gift at $25000. Gawler SA 0885222505

4160 SPRING SALE

EXCALIBUR.582 as new. Wide tandem body. Elect flaps. Instrument package. Quick detachable clear doors. Exp. Builder. Hangared last 6 years. Offered at $29,900. Robin. Upper Hunter Valley. (02)65466012

4161 AIRBORNE EDGE 582

AIRBORNE EDGE. Excellent condition. 156 TT Streak 11 wing. Tundra wheels. Detailed log book. Icom fixed mount radio. Intercom. Two headsets and helmets. Training bars. Punkin Head covers- wing, base, prop. Garmin 196 GPS. Custom trailer. Location Hartley. Fly out or trailer. $20.000. Aden 4784 1098 :

4164 HIRTH 3701 EFI

Hirth engine model 3701 electronic fuel injection 100hp. Only 10hrs run. In as new condition but requires new computer. Complete with full exhaust system. No gearbox. Several photos available. Call or email to view photos and further information. $6,000. Phone 0408 124 350 or email texmango@gmail.com

4165 FLYSYNTHESIS STORCH S500

FLYSYNTHESIS S500,,, EXCELLENT COND., 24,, REGO.,, 80HP ROTAX,, 370HRS,, NEW HOSES,, NEW FUEL PUMP,, NEW IGNITION MODULES,, NEW CARBY DIAGRAPHRAMS,, GAS STRUTTS FITTED TO DOORS,, AVMAP,, ELECTRONIC ENGINE DISPLAY,, TWO BOUDEN CABLES FITTED TO ELEVATOR AND RUDDER,, PUSHRODS TO AILERONS,, 32KT STALL,, 100KT CRUISE,, STEEL UNDERCARRIAGE LEGS jabiru160@yahoo.com,,, 0415 888 692

4169 HEADPHONES. EQ 1. WIRELESS.

Two EQ 1 WIRELESS HEADPHONES. Purchased 04/02/13. 8 hours use only. Pristine. Complete with documents, headphone bags, chargers and cables. Headphones have recently had the latest digital upgrade from the manufacturer. My aircraft sold, therefore no further use. $750 EACH. 0419136069.

4172 JABIRU J160 PRANGED

Jabiru J160 Pranged. For rebuild or spares Best offer Ph 0488 241 181

4173 JABIRU J230-D

Factory built June 2010, 392 hours, Hydraulic engine, Through bolts upgrade, Option two panel, dual GPS Systems. Too much to list. Serviced every 25 hours, Only used for long trips, bitumen strips only flown by owner/pilot. This aircraft is as brand new and meticulously maintained, Nil incidences. 0400713996 - $82,000

4174 SUPA PUP MK4

Supa Pup Mk4 30 hours TTIS . 80 Hp Jabiru Engine , $18,000 + GST any reasonable offer considered . Located Port Augusta SA area . nonning@bigpond.com . 0428 481814

4175 ROTAX 582 MODEL 90

Rotax 582 Model 90 c/w C 3:1 gearbox. Total Hrs not known, 3hrs since decoke, Bore & rings, compression check, crank bearings all checked out good . New water pump impeller , seals, and thermostat. Still on aircraft, you give it any test $2500 other details Lloyd 0438884343

4176 ROTAX 582

120 hour Rotax 582 UL long motor kept as a spare. Checked out by LAME to show insignificant wear. fully serviced Including new plugs,. C box and pull start other parts available. bargain @ $3200 information call Lloyd 0438884343

4177 WANTED JABIRU PROPELLER

Wanted 60x44 propeller for 2200 engine in good to excellent condition, thanks Russell 0427627477

4180 TL CARBON STING

Flight hours 600 Hobbs 700hours Rotax. 912 100 HP. SR3000 Woodcomp propellor. Manifold pressure gauge. Garmin296 Garmin SL40. Garmin GTX327 Dynon D10A, OAT, ASI. Rev counter. Oil temp, pressure, fuel pressure and water temp gauges. Standby fuel pump. Strobes, nav lights. Lame maintained, always hangared. $83,000 Graham Trewhella 0428230750/(03)54288124

4181 JABIRU 170-C

Jabiru 170-C . $ 67,500 Ono . 2008 Airframe 212 hours engine 212 hours. EFIS, Aera 500 GPS. New tires. Reg till 2015. Always hangered. Nil accidents. Serviced every 25 hours . TAS 100 kts @ 15 LPH . Fuel capacity 135 LTRS . Contact Grant MB 0431280356 Email grantdiedrich@hotmail.com

4184 HANGAR PARKING AVAILABLE BENDIGO VIC.

New Aircraft hangar parking available BENDIGO Vic. 22 x 20 meter size. Level 2 and level 4 maintenance available on site! Centre clearway included for ease of exit and entry. Phone Dave: 0411066135 Inspections welcome. $50 per week including caretaker/manager.

4185 LIGHTNING

Half share available in this fantastic aircraft. Very low operating costs. Based at MOORABBIN but would consider other nearby airfields as a base. Also willing to consider rego change to RAA if needed to attract the right buyer.

4186 DRIFTER SB582

Very low hour SB582 TT 723 with blue head Eng - TT231. New wing and aileron skins just fitted. Tail skins in excellent condition.Comes with spare tyres and wheel spats (not fitted).Two Peltor helmets with Intercom. Vhf radio. Located Boonah.$18500 OBO must sell Email - platinumexcavations@gmail.com for photos. PH-0413200506

4187 THRUSTER T500

Thruster T500 2 seat aircraft side by side, 582 water cooled dual carby duel ignition, 65hp 2cyl 2 stroke engine. 70ltr fuel tank, carbon fibre 3 blade propeller. All ad's complete and up to date. All flight instruments radio headsets in good condition. Philip 0407 851 963 $11,200

4190 1.1KLM AIRSTRIP

243 acres - 4 brm home, Fully air-conditioned. 21 solar panel system 2 x 27000ltr water tanks 4 sheds 5 car carport 4 dams 3 bores 1 windmill and seasonal creek. 1.1klm airstrip with 850mtr cross strip mapped out. 10 minutes to Gatton township. Sell $750 000.00. Negotiable. Phone 0407851963

4191 LOHLE P5151 MUSTANG KIT

Complete kit registered with RAA, including Suzuki geo 3 cyl engine, Raven redrive. Airframe mostly completed with retracts installed. I have finally admitted to myself that I will never finish this aircraft, and it needs a new home. Located Avalon Victoria.$25,000 Ph Richard 0427 737 787

4193 WANTED TRANSPONDER

Wanted transponder and encoder. Prefer round type to fit in control panel. Must include encoder, wiring harness, instructions, etc. Must be recently certified and in good working order. Preferably Mode S, but will consider other transponders. Going in a Jabiru LSA. Please send details and price to flyjason78@gmail.com or 0404032027.

4199 JABIRU LSA

Jabiru LSA 1999, Total 4056, Engine 584, level 2 maintained, Mechanical very good 10/10 , Body 7/10, All new control rods, Solid lifter engine, Cold start kit, ICOM radio, Transponder mode C. Please ring as I will not respond to text messages. Call Rudi 0438 402 254 $25,000 (+GST)

4201 JABIRU LSA

Jabiru LSA 55-3643. Factory built November 2011. 2200 Engine and Airframe TT 450 hours. Standard panel. Microair radio with headphones. New brakes and tyres. Great condition, always hangared. Never used for training. One owner. Inspection invited. Located Wynyard, Tasmania. Price $37,500 ono. Contact Denis on 0429066966 or denis.l.bullock@gmail.com

4203 SINGLE PLACE PROJECT

Near complete project. Full analogue instrumentation, radio and headset, 2.7 Litre Corvair engine, 66 inch Bolly prop, Grove undercarriage. All aircraft grade construction, complete building records and photos. Build cost $27000, asking $6000 - for recovery cost of motor and new instruments only. Full details - phone Roger - 0407545579

4204 WANTED INTERPLANE SKYBOY

WANTED: Interplane Skyboy. If you have an Interplane Skyboy for sale please contact me. Contact: Derek on 0466 486 733

4206 WANTED GARMIN 296 OR 396

Wanted Garmin GPS 296 or 396 in good condition.. Vinceburling@internode.on.net 0409026639

4207 TIPSY NIPPER - SLINGSBY T66 SN S123

Selling Tipsy Nipper - This single seat aircraft is a wonderful flying plane , fast, nimble with a 1000 fpm climb rate. Tip tanks for 4 hrs at 90 plus knots. Great fun plane solid and well maintained , low hours 2200 Jabiru. Call Roy on 0404756407 to enquire

4209 URBAN AIR UFM 11 LAMBADA MOTORGLIDER

factory made in Kevlar & Glass, Rotax 912 80HP. Fantastic climb ,90Knot cruise. ASI, VSI , EngMgmt , Radio, Transponder , AH, Variometer, Feathering prop. Converts in 5 mins from 11 to 13 meter glider for higher L/D. Electric Flaps. Maintained like new. Call Roy , 0404756407 02 0242943900

4210 WANTED JAB J230 NO ENGINE

WANTED: Jab J230 no engine Contact: Don Woodward donwoodward@outlook.com 0410 890514

4212 CLASSIC

Searey for sale new engine 2014 (912 ULS-3) TBO now 15years,2000hrs whichever comes first. Always Hangared, new condition, spares, tools, seaplane kit, full instruments,moving map GPS. A$90k ono. Long Range Fuel Tank, Ground Power, build supervised by retired TAA engineer. Can do CASA and RAA endorsement.

4217 STEEL BREEZE POWERED PARA-CHUTE

Best Powered Parachute NATFLY 2013. Demo aircraft first in Australia at 2013. Full LSA registration.Chrome molly main airframe. Dual seating. Ground Steering. Suspension. Rotax 582 electric start. Oil injection. Foot Control. Elliptical wing. Affordable flying and able to store at home. Perfectly maintained. $24500. 30 hours. Pakenham, VIC. Ph:0423133056, rob@australianppc.com

4218 AEROCHUTE DUAL 503 AS NEW

Suit new buyer, everything you need to fly away. Sep/2010 30hrs, rego Sep/2015. Extras inc. electric start, Lynx intercom with dual radio and Bluetooth, VHF/UHF radio's. Wing just had first factory check/re-trim. Composite water/dust proof professionally built trailer, separate fuel and camping gear compartments, stainless fittings. Info/pics m:0488900857 e:darren@ourinfo.biz Tasmania

4221 SKYFOX CA22

Skyfox CA22 Factory Built Tail Dragger. 580 Total Hours. 80 HP Rotax 912. Cleanweld wooden prop. Excellent condition, L2 maintained. Complete with EQ1 Wireless Headset System and PLB. Hangared in WA $33,000.00. Tel Andrew 0400 246 906

4222 SUMMIT 2

POWERED PARACHUTE Well maintained.Full LSA registration.Rotax 582.Mustang S500 box wing. 2 stroke oil injection. Main airframe 6061-T6

aluminum aircraft grade. Big tundra wheels. Ground steering. Suspension. Dual throttle control and dual seating. Foot control. Easy to fly.One Owner. Details on Australianppc website. 60 Hours. $$ POA. Located Pakenham VIC. Ph: 0423133056, rob@australianppc.com

4223 XT 912 TUNDRA

Airbourne XT 912 trike 2011 base/engine 35hrs arrow wing convertion 2013 5hrs. 2 x helmets / headsets , training bars ,engine cover. Always hangared never trailered excellent condition would suit new buyer $52000 ono Newcastle nsw ph 0419275589

4225 SAPPHIRE

Don't spend your summer on the ground, looking up and wishing you were flying! This Sapphire was fully refurbished with new items - electric start R503, 3 blade Bolly prop, battery & electrical system, tyres, digital EMS, instruments, radio & handheld GPS. Call for full details 0408516816 (evenings)

4226 503 ROTAX AEROCHUTE

Great con, many extras,tacho,foot webbing& floor front,solo weight,flying suit x2,stone guard, wind sock & pole, air filter and prop cover,rectifier/regulator, wide top plate, fuel sep funnel, microtim altimeter,all manuals, option to buy lynx headsets x2@ 5 hours use. Great entry level buyer will be happy. 14000ono Negotiable

4227 RANS S4 COYOTE 1

Original owner/builder, clear coated , Rotax 447,Bolly Optima 3 blade prop, 800fpm climb, ASI, VSI,ALT, tach, hrs, dual CHT, radio, garmin GPS, reliable, docile, easy to fly with 60kt cruise, 3.5hrs range plus reserve. New bungees, disc brakes, regularly serviced, with books, enclosed trailer & tools. SA. $15500 0418894380. glendavidauto@bigpond.com

4229 EUROPA MONOWHEEL

EUROPA MONOWHEEL Brand new aircraft. 25 total time. Flies beautifully. 130 kts cruise @ 17 lt/hr. Rotax 912 with Airmaster AP332 propeller. Dynon Skyview panel. XCOM radio. 2K professional paint work. Selling because builder has lost medical. Test flying by RAAUS certified instructor. $85000 ono Contact Drew Done 0427316524 dj.done@bigpond.net.au

4230 AUSTRALIAN LIGHTWING SPEED

316hrs.TT. Rotax 912ULS Hughes/Bolly inflight variable pitch prop. All flight and engine gauges, GPS, Mountainscope Nav.System & Xcom radio. 120 litres fuel, 105-115 kts. Hangared at Tumut. $65,000 must see to realise good value. George will meet you at Tumut with prior appointment on 02 6291 9912. Info from snowman@snowmaking.com.au

4233 AMPHIBIOUS TRIKE

Fly off water or land with this fun machine. Ramphos Trident 912 80hp. Strutted H15 wing. TT 115hrs. All the gear you need including 2 life jackets, 2 Icaro helmets, 2 headsets. LSA Registered 27th June 2015. $45,000. Phone Paul 0439 922 323.

4234 SKY FOX GAZELLE CA25N

Lame maintained, 80HP Rotax powered, Bolly 3 bladed propeller, folding wings, GPS factory fitted, flys well, 1919 hours, all Ads up to date. Hangared at Tyabb, Vic $33,000 contact Roger 0419 891 431.

4235 SEAMAX M22 AMPHIBIAN

Beautifully presented and finished Seamax seaplane. Glass cockpit, Leather seats, widest cabin in it's class for comfort.123 hours airframe and engine. Cruises 100 knots. Present owner can endorse for Water Hull, retractable undercarriage, AP. Always hangared, presently at Gympie. Would consider syndicate with 3 to 4 members $155,000 0402958444

4236 JABIRU 230D

Factory built 2009. Airframe 1452hrs & Engine 1118hrs. Engine rebuilt 1084hrs by Jabiru. Was GA now RAA reg. Jabiru option 5 night VFR dash, strobes, landing lights, leather seats, 2 coms.
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Solar electric trainer

A NEW high tech solar electric training aircraft call 'Sun Flyer' has entered the next phase of development.

Aero Electric Aircraft Corp of the US has begun initial R&D flight test operations with the solar-electric technology demonstrator at Centennial Airport near Denver. The demonstrator made its debut at Oshkosh in late July. Flight tests will continue for the next six to nine months while the two-seat prototype Sun Flyer is being assembled.

AEAC says initial test results confirm the overall benefits of solar-electric propulsion, especially the very low operating costs. Additional benefits include reduced maintenance due to fewer moving parts, low-noise flight and solar recharging on the ground and in flight.

For more information, www.aeac.aero.

TECNAM DELIVERS ASTORE

TECNAM has begun deliveries of its newest LSA model, the Astore.

Customers in New Zealand, Korea, Brazil, South Africa, Spain, Kuwait and the US were first on the list. Tecnam says the Astore combines Italian styling, the latest technological innovations and higher standards of comfort.

The low wing, single-engine aircraft comes equipped with the new Garmin G3X touch screen glass flight display system and an Apple iPad mini. The airframe is metal with fairings and upper radome in carbon/glass fibre with epoxy matrix.

The aircraft can be powered by either a Rotax 912ULS2, 912iS or the turbo charged 914UL2 engine.

The company says the delivery of one of the new aircraft to New Zealand coincides with the Astore's certification in Australasia.

For more information, www.tecnam.com.

16
Accidents involving flying training in Australia in 2012 (GA)

Source: ATSB

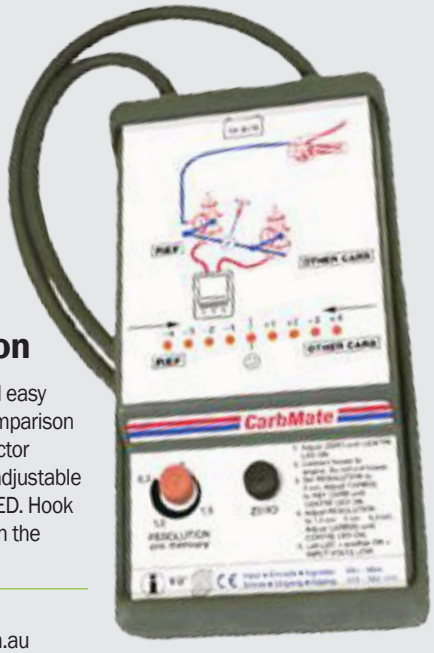
85
Accidents reported to ATSB involving RA-Aus aircraft in 2012

Source: ATSB

600KM
Range of a Magni M22 gyrocopter

Source: Airborne

Carburettor Synchronisation



CarbMate offers quick and easy synchronising by direct comparison of a set of carbs / fuel injector throttle bodies. Range is adjustable from 2 to 0,05cmHg per LED. Hook up two or five cylinders with the optional adapter kit.

Price $150.00
Web www.skyshop.com.au

Survival Life Raft

Four man single tube pack.

Six new designs for corporate or general aviation use. Single tube with bulkhead design creating two separate chambers. Built to last a lifetime with proper care and attention.

Ultralight weight (7.3kg) and compact (4 x13 x16"), easy to carry, store and manoeuvre in emergency situations. Soft-pack valise made of practically indestructible nylon with secure nylon Velcro type closures.

Constructed of heavy-duty FAA approved neoprene coated nylon fabric. Optional self-inflating, highly visible orange canopy to aid in search and rescue operations. Contains metal cylinders and valves eliminating corrosion and greatly reducing the weight. High-tech CO_2 automatic inflation system, inflates in 10 seconds.

Optional survival equipment kits are available to meet FAR 91, 121 or 135 requirements. Inspect and repack recommended annually.

Price $3,595.00
Web www.ozpilot.com.au

OFF THE SHELF

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Low Cost ADS-B IN

Commercial ADS-B IN products cost $1,000 or more. OzRunways is offering a clever, low cost alternative. Using the Raspberry Pi mini-PC, off-the shelf hardware and free open source software, you can build your own for a fraction of the cost. Like any portable ADS-B device, ADS-Pi is not certified. It is experimental and of assistance to situational awareness only. It is not a collision avoidance tool.

The kit contains:

Raspberry Pi model B+ board, case for Raspberry Pi, WiFi dongle, DVB receiver dongle, pre-programmed 8GB Micro-SD card, USB power cable, 2 port USB cigarette lighter adapter (2.1A + 1A), Printed quick start guide. Website says they are sold out due to high demand but they have ordered more.

Price A$219.00
Web http://adspi.ozrunways.com

Smartphone Wind Meter

This wind meter turns your smart phone into a high-tech meteorological tool. Download the free app and plug the wind meter into your ear phone jack. It gives you a clear overview of average, actual and maximum wind speeds, as well as a real time graph. The unit of measure can be changed by tapping the screen. The one piece, molded rotor and the low friction Teflon bearing makes the wind meter extremely durable. Sand or dirt can be easily cleaned out with water.

Works with all iPhones from 4 onwards, all iPads from 2 onwards and Samsung Galaxy S2, S3 and S4.

Price USD$49.95
Web www.sportys.com

HAPPY LANDINGS

SPEED DEMON

US kit plane maker, Altitude Group, which specialises in high performance kit planes for the Experimental market such as the Radial Rocket and Formula GT, has a new model approaching completion and it promises to be a beast.

The new composite ship is called the P85. It is a derivative of the Radial Rocket with changes to accommodate a liquid cooled V8 engine, delivering 375hp through a re-drive with a 1.7:1 reduction ratio.

Assembly and construction of the first P85 is already underway. The company expects to begin flight testing by the end of the year. It's still fund raising to get the aircraft into full production. The company launched a campaign where sponsors can donate USD$65 in return for a T-shirt, a commemorative photograph of the first flight and a discounted price for the kit.

For more information www.altitudegroupllc.com.

>> Construction of the first P85

>> P85 concept

>> A 1.7:1 reduction ratio

Got an aviation moment you'd love to share? Your kids or maybe your club get together? Send a photo as a jpeg attachment and a short explanation to editor@sportpilot.net.au

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The new **G3X Touch** is a large touchscreen, glass flight display system designed for experimental amateur-built and light sport aircraft (LSA). The non-certified G3X Touch system offers pilots easy-to-read, easy-to-use, high-resolution 10.6-inch flight displays with split-screen functionality and a host of advanced interface options – all at a great price.

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* Not TSO'd. For experimental aircraft or for certified aircraft with a CAR35 approval

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ICOM

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