GLIDING AUSTRALIA

Issue 54 December 2020 - February 2021 magazine.glidingaustralia.org

NSW STATE CHAMPIONSHIPS

FLYING THE VALE - STORY OF A SLINGSBY DART

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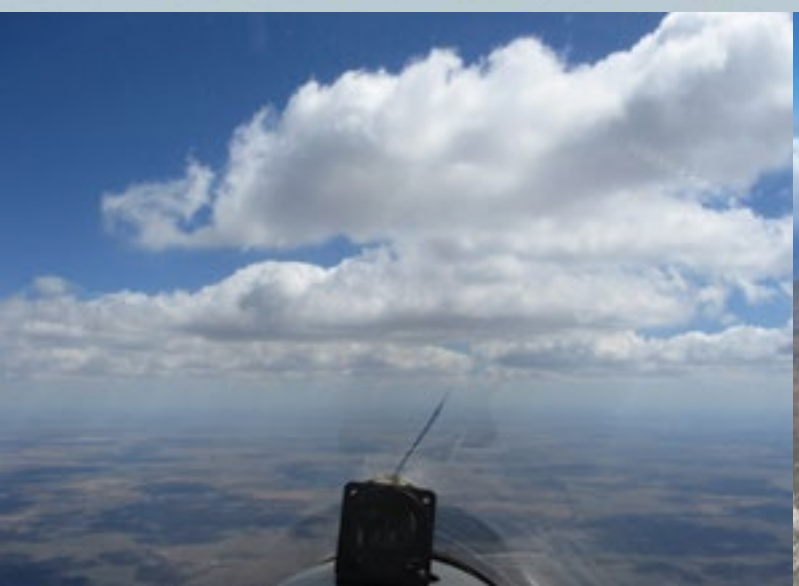

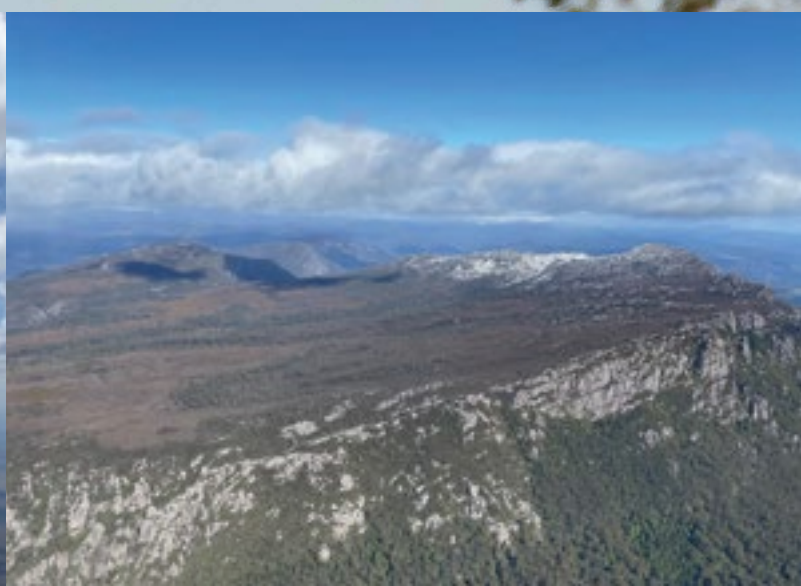

GLIDING AUSTRALIA MAGAZINE

No. 54 December 2020 - February 2021

COVER: MAK ICHIKAWA AT NSW STATE CHAMPIONSHIPS LAKE KEEPIT BY VAL PHILLIPS

WELCOME TO GA 54

The soaring season is well underway with successful coaching courses, competitions and regattas already taking place.

This is the third issue of GA in the new formats. As long as you have an internet connection on your device of choice, you can read GA wherever and whenever you like. Go to magazine.glidingaustralia.org.

You can also download a PDF version of GA from magazine.glidingaustralia.org/past-issues.

You can order a very special DIGITAL PRINT copy of the magazine as well. Each magazine will be ordered and printed just for you, so it will be a limited edition – rare and collectable. Order your very own copy here bit.ly/2TUkFs5

I would love to hear what you think about the new formats and the magazine in general So please contact me any time. Or you can leave me a message on the website at bit.ly/2McMqYu

I hope you enjoy this edition of Gliding Australia Magazine.

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FROM THE PRESIDENT

I'm writing this with only three weeks until Christmas. I simply can't believe that another year has slipped by so quickly, and what an incredible year it has been. From Lake Keepit's hosting of the Women's World Gliding Championship to massive bushfires and floods and then, of course, COVID 19. All these elements have significantly challenged our sport, our clubs and the GFA.

A year ago, who would have predicted that a single virus could have had such an overarching impact on our daily lives and the global economy? Its effects have been devastating and I doubt that anyone has escaped the impact of the pandemic. Gliding activities ground to a halt and in some areas our members were exposed to long periods of lock-down. My home state of South Australia has been comparatively lucky and never experienced the severe restrictions that were imposed in some other regions of Australia, but the recent COVID cluster in suburban Adelaide shows just how fragile the situation is. We all need to be vigilant and continue to maintain good hygiene and social distancing standards.

To assist our members through the crisis, GFA extended memberships by 6 months and offered practical help by supporting extensions to such things as scheduled Flight Reviews and Operational Safety Audits. Many clubs have now returned to almost 'business as usual'. In fact, I'm hearing reports from many clubs that activity levels are very healthy. I know at my home club we are struggling to service the demand with unprecedented new member enrolments. It is certainly stretching our resources, but it's a nice problem to have.

Although the past year has been challenging, I'm confident that the gliding movement will prosper as glider pilots are a committed and resilient group of people. This season, all regions have either already conducted their state gliding championships or are planning to hold them over the next few months. Unfortunately, national competition has been severely curtailed by the COVID effect, but a combined Club and Sports Class, Junior and 20m Nationals is still planned to go ahead.

PART 149

I doubt there is a glider pilot in Australia who hasn't heard reference to Part 149. The concept has been around for more than three decades, but over recent years the subject has become more topical with legislation coming into effect in mid 2018. Part 149 describes the way in which aviation sporting organisations are expected to administer their business and details the relationship between our sport and the regulator, CASA. If you would like more information on what Part 149 is and how it works, you can easily find plenty of information on the internet. Although we are not forced to become Part 149 compliant, if we don't, the future for gliding in Australia and GFA is quite uncertain.

The Board has actively been considering our move to Part 149 over the past couple of years - we certainly did not want to be the first and I believe our caution has been well founded. Following a detailed review at its last meeting in late November, the Board has made the monumental commitment to start the work towards becoming Part 149 compliant.

The effect of Part 149 on individual glider pilots is expected to be minor, but GFA will be required to put in an enormous amount of work to meet the requirements of the legislation. A committee headed by Anthony Smith has been formed to guide us along the journey. I know this will be a challenging and exciting trip for GFA. I also believe that, provided we get it right, compliance with Part 149 will deliver enormous benefits to GFA, as it will force us to look inwardly and to update our processes and administrative systems in a way that will enable a better interface with the regulator and the wider Australian aviation community – it will bring us into the 21st century aviation world.

LEARNING CURVE

It has been nearly four months since I took on the role of President – and what a steep learning curve it has been for me. I am very fortunate to have such a talented and skilled bunch of people to work with. The Board members, Executive team and our paid staff are all absolutely committed to the best interests of Australian gliding and are totally passionate about what they do. Although we have challenges ahead, I strongly believe GFA is in a very healthy state and well positioned to face the future.

Well that's enough from me. In closing I would like to wish you and your families a very happy festive period and a fabulous soaring season.

Stay healthy, fly safely.

STEVE PEGLER
PRESIDENT
President@glidingaustralia.org

FROM THE EO

MEMBERSHIP FEES

Membership fees are now being paid once again. The GFA board gave all flying members 6 months free membership during the early stages of Covid-19. The thinking was that many members would be impacted though loss of income and restrictions on flying, and we wanted to provide a period where members would not have to choose between GFA membership payments while juggling those other issues.

Members whose membership previously fell due in March are now paying their GFA membership in September and we can now see that income coming through. It appears that a few members are not paying their fee at the moment but it is unclear if they have decided not to continue or are just delaying their payment. We will have a clear picture in the new year.

On the positive side, we have had 64 new members join in the past 2 months, which is very pleasing. Only four of these were in Victoria but now that the State is open for business again this should improve quickly.

GO MEMBERSHIP

Claiming a Badge Flight – The soaring season has been quite active already in the north and west of the country, and will shortly be coming to the remainder of the states. It's a great time for pilots to be thinking about and achieving their FAI badges, whether it be Silver C or 300km or 750km flights, or even records.

Flying the task is the major challenge and the greatest fun, and we have tried to make it as easy as possible to claim the flights so that you receive the appropriate recognition.

The key points are that, to comply with the international rules, you need to use a Flight recorder to provide evidence that you have completed the task. You must have declared the task in the Flight Recorder, and have an Official Observer (OO) who can support you and verify your achievement. OLC results alone don't meet the standard.

Your OO can give you advice on choosing and setting up a Flight Recorder and flying the required task. If you cannot declare the flight in the Flight Recorder then there is an online declaration form which you can find in MyGFA – see below for directions. If you want to see who the OO is at your club or nearby, you can check out the list of OOs on Go Membership.

Login to Go Membership and click the green Reports tile. Click on Customer Reports and then Membership Reports to find the Official Observer list. This shows the list of OOs in each club.

Making a Claim – Once you have completed your flight and you have celebrated, you now have to do the 'paperwork', although no paper is involved. The first step is to pay the required fee. In Go Membership, click on MyGFA and find the black button for purchasing a New Badge Claim. Click the 'Book as an individual' button and select the number of legs that you want to purchase. If you don't pay, you will not be able to progress any further.

You will receive a payment receipt that also gives you the link to the claim form. If you have declared the flight in your Flight Recorder, you don't have to fill in the latitude and longitude details. Next, select your OO from the drop down box provided and upload your IGC file from the Flight Recorder. Details of your claim will be sent to your OO and also to the FAI Certificate Officer Beryl Hartley.

If your flight is approved, you will receive an email as evidence of completion. You will need to upload this confirmation when you apply for the Credential. If you achieve a badge, you may purchase the actual badge from the Events/GFA shop section of Go Membership. Enjoy!

TRAINING DEVELOPMENT

A new focus will be placed on the Glider Pilot Certificate (GPC). Our membership survey over the past five years has consistently identified the need to improve pilot training through to Solo and to the GPC. There is an article on this topic elsewhere in this magazine and I would encourage you to have a look at that.

The Operations Department and Soaring Development Panel have done a lot of work to update the resources for the Trainers, both Instructors and Coaches, and for student pilots. This will be launched in the new year and will be trialled at some Flying Start and Flying Further courses. If you want to accelerate your learning, you should look for one of these courses at your own club or at another club that offers mid-week flying.

TERRY CUBLEY AM
EXECUTIVE OFFICER
eo@glidingaustralia.org

GOVERNANCE & INTEGRITY

The Governance & Integrity committee of the Board has been reviewing and updating a number of policies including Child Protection, Discrimination and Bullying, and Inclusion and Diversity. The updated policies can be see in the Document Library on the new web page https://glidingaustralia.org/. Under Member Area, click on Documents/Search Documents, and then click on AAIntegrity Policies.

The committee will be updating the Member Protection policy and the Complaints & Discipline Procedure in the new year. Clubs and members are encouraged to review these Integrity Policies, and clubs are encouraged to use the policies within their organisations.

A dispute has continued between the GFA and the Mount Beauty Gliding Club (MBGC) for the past 18 months, resulting in the affiliation of the MBGC being suspended and then cancelled. MBGC appealed this decision and an appeal panel comprising five Victorian Club Presidents reviewed the evidence and decided that the penalty applied was too severe and ruled in favour of the club.

Affiliation has been reinstated and the Club's new Committee is in discussion with GFA to ensure the club's long term viability. The discussions appear to be making

☛ continued over page

positive progress. Under the current rules disciplinary options open to GFA are extremely limited. The review of the Discipline procedure will aim to provide more options with regard to penalties that can be applied to ensure they are in keeping with just culture and procedural fairness principles.

Alf McMillan has been appointed as the GFA's Member Protection Information Officer (MPIO) who can provide advice and support to clubs and to individual members.

You can contact Alf at MPIO@glidingaustralia.org.

PART 149

Sport and recreational aviation organisations, including Gliding, may apply to become Approved Self-Administering Aviation Organisations (ASAO) under Part 149 of the Civil Aviation Safety Regulations 1988 (CASR).

Becoming an ASAO will enable gliding to take on increased responsibility and authority to manage the sport in cooperation with CASA. The Parachute Federation (APF) have achieved this outcome and RAAus are close to finalising their process. GFA has agreed to apply and have established a committee to manage the process and develop the relevant documents.

Much of this work concerns ensuring that our current Ops Regulations and Manual of Standard Procedures (MOSP) Procedures are modified to suit the new regulation. This will be a six to nine month process but should mean that we retain and improve our independence. An update will be provided in the new year.

COVID IMPACTS

Australia typically hosts a large number of international glider pilots each season, coming to experience our weather and culture. Since COVID has meant that these pilots have not been able come this year, many of our full-time operations are finding that they cannot afford to provide the facilities that we have all become used to. Try and support them if you can, and you will then understand why the international pilots keep coming back – the service is great at these sites.

This article was prompted by a recent conversation with a club president who asserted that there was no need to standardise training and that each instructor should be allowed to instruct students as they see fit. I beg to differ.

Hopefully, you will remember that we launched Soaring to the Future (S2F) with the slogan Standardise, Modernise, Prioritise. That was explained and expanded to mean –

- Standardise – training, documentation (pilot training book, etc), procedures, courses.
- Modernise – electronic log keeping, cashless payment systems, integrated bookkeeping, flying registers, engage with social media.
- Prioritise – arrange courses to suit members such as week long courses or dedicated weekends, prioritise flying and fun.

This slogan came entirely as a result of member feedback from the GFA member surveys of 2015 and 2017. Note that in this case, 'standardise' does not mean that a one-size-fits-all approach should apply, but rather that the briefing content and basic techniques should be the same. Training must, of course, be tailored to each pilot.

SURVEY RESULTS

When I look at the results of the surveys from 2015 I find there are over 200 comments suggesting and demanding improvements in the way that we do our training. Much of this was about increasing the standard and improving the standardisation of the training and requesting more efficient training such as consolidated 5-day courses, or several dedicated training weekends.

The disappointment was that when we did the next survey in 2017, very little had changed and we had a similar number of comments asking for the same things. That was the genesis of Soaring to the Future.

We learned that it was not enough to tell clubs that the members wanted standardisation, modernisation and a prioritisation of fun and flying. Instead, we had to provide each club with individualised assistance with detailed plans on how to change.

This was a big change for GFA as, historically, the Federation had not assisted, helped or interfered with clubs in any way, or tried to advise them on how they should conduct their affairs. There has always been an underlying tension in that members expect GFA to "do something" to improve membership and retention, yet we know that many of the reasons that members leave gliding relate to things over which GFA historically has had no input.

LAUNCHING S2F

It was this contradiction that led us to embark on Soaring to the Future. We formed a working relationship with Sports Community and launched the project with four trial clubs to see how things would go.

After the success of our trial Round 1, more funding was provided for Round 2 and a larger number of clubs were inducted. Following some disturbing statistics showing that New South Wales was suffering a significant decline in membership beyond that of other regions, Round 3 targeted clubs in New South Wales.

Then, of course, we had the bushfires and COVID, so the decision was made to go National. This has allowed us to roll out various initiatives based on the knowledge gained from the Round 1 and Round 2 clubs. We are now working to combine the Soaring to the Future experiences with the marketing and development work that Sarah is working on.

ADVERTISE AND DELIVER

Sarah is on the cusp of launching a lot of new materials that she has prepared to assist clubs in marketing gliding but this leads to another challenge. If we aggressively and successfully market gliding and attract a lot of new members but don't put measures in place to service these new members, we will not retain them.

It is important that when we advertise gliding, we have a product in place and that we are prepared to adjust our methods to satisfy the needs of our new members. For example, we might roster on extra instructors, allocate slots or times for students, organise intensive courses – or whatever it takes to get the students trained in a timely manner.

We need to run more Flying Further courses so that post solo students can get their GPCs and fly cross country independently – which, if you think about it, is what the sport is all about.

MEMBER FEEDBACK

It is important to remember that the mandate for the Soaring to the Future slogan of Standardise, Modernise, Prioritise comes entirely from the member feedback.

Members have clearly told us that they want us to standardise training, raising the quality and standardising the syllabus. There is a demand to modernise the facilities, delivery of training. booking and rostering systems, communications, payment systems and logging systems at the clubs. Members tell us they want to prioritise social activities and have more interactions with other clubs. Above all, they want to have fun and go flying!

Interestingly, through all of these surveys we had imagined that members would tell us that gliding was too expensive, but instead we had pages and pages of members telling us that they were short on time. Regardless of these difficult times when many are short of funds, most members told us that under normal circumstances their ability to participate in gliding was limited by lack free time. Clubs need to take this on board and modify the way they operate to improve retention and reduce churn.

INTENSIVE TRAINING

It is becoming clear that members who invest in an intensive course generally go on to become long-term members of the Gliding Association in much greater numbers than casual weekend members, who often just fade away over time.

Rather than attracting, training and losing 50 members a year, it would be much more efficient to ration the training and provide quality training at a time that suits the students, not on a time scale or timetable governed by history or the habits of gliding clubs, and retain more members.

We are finding that clubs that make the change to intensive courses, limit the number of students they allow to join the club and have an active social calendar are making great strides in increasing their membership, improving their retention, reducing churn and having fun in the process.

Being more economical and controlling training in this way results in a much better experience all around, better retention and lower impost on all of the club members who are required to assist students in their training.

MANDY TEMPLE
CHAIR S2F
s2f@glidingaustralia.org

ADVANCED SOARING MADE EASY

Seven years on, the latest Edition 4.1 is now out but the core messages remains the same, so no need to discard those earlier editions! But there are so many improvements throughout the book including new illustrations, improved wording and updated theory, it might just be tempting to re-purchase. It's clear the author is dedicated to honing this book as a labour of love: It's not just about re-stocking the warehouse!

The fact the warehouse was bare is testament to word-of-mouth recommendations and the uptake by so many different pilots around the world. There are even sections explaining how different countries and climate zones affect soaring conditions, which is really helpful when visiting new areas in different parts of Europe and beyond. For pilots lucky enough to have hills and mountains within reach, there are sections on ridge and mountain flying, and wave.

Amazingly, the book really does cater for pilots through the spectrum from novice to advanced. For those starting out on their gliding career, the book explains how to acquire soaring skills with a minimum of assumptions and in a form that is very readable.

For the intermediate pilot, a myriad of techniques to improve cross-country performance are explained together with the vital topic of making safe field landings.

For competition pilots, there is a wealth of detail on tactics, glider fine-tuning and sports psychology. There are tips equally for those aiming at club level comps and those growing into regionals or nationals.

It's evident that Bernard is a coach who has helped numerous generations of new pilots and he is willing to share everything he has found in his own extensive career.

Book review by Tony Cronshaw

Advanced Soaring Made Easy is available direct from the author

Edition 4.1
A$74.90 Hardcover
eckey@internode.on.net

GFA CALENDAR

Use the Contact GFA menu at www.glidingaustralia.org to send

F1GP
Leeton NSW
28 December 2020 - 5 January 2021
Club & Old Open Class
info@f1gp.com.au

JOEYGLIDE 2021
Leeton NSW
1 - 16 January 2021
Junior Nationals & Junior Coaching Program
Contact: admin@juniorsoaring.org
See: joeyglide.juniorsoaring.org for more information.

VGA BORDERTOWN RALLY
Bordertown SA
9 – 17 Jan 2021
Contact Dave and Jenne Goldsmith for further details.
daveandjenne@gmail.com or Mobile **0428 450 475**

HORSHAM WEEK
Horsham VIC
6 - 13 February 2021

2 SEATER NATIONALS 2021
Narromine NSW
20 - 27 February 2021
The competition is specified as a single class event for both 20m 2 Seat Class gliders and Open Class which is ANY 2 Seat Glider. The competition will be run in accordance with the GFA National Competition Rules with GFA National MultiClass Handicaps. Contact Beryl Hartley on email arnie.hartley@gmail.com for details.

LAKE KEEPIT REGATTA
Lake Keepit NSW
20 – 27 Feb 2021
Contact Contact Lake Keepit Soaring Club
https://keepitsoaring.com/KeepitRegatta/

COACH THE COACHES NSW SILVER COACHING COURSES
Course 1 March 2021 TBC
Course 2 March 2021 TBC

Bathurst Soaring Club
Invitation is for instructors at all levels (AEI to Level 3), as well as current or expired coaches. Participants should be enthusiastic current cross country pilots with an interest in training early soaring pilots.
It is anticipated that most participants will achieve accreditation as a Silver coach.
Registration is required.
For further details contact **Armin Kruger 0477 945 387** kruisa ozemail.com

THE AUSTRALIAN GLIDING MUSEUM ANNUAL GENERAL MEETING AND BARBEQUE
7th March 2021 at Bacchus Marsh Airfield, Victoria
There will be a Vintage Gliders Australia Rally over the long weekend 6th to 8th March. Contact Dave Goldsmith on daveandjenne@gmail.com

VINTAGE GLIDERS AUSTRALIA EASTER RALLY
2 - 5 April 2021
The Hunter Valley Gliding Club are planning to hold their Annual at Warkworth, Singleton, NSW f Informal vintage aircraft flying will also be available until the following weekend. For more information contact Rob Moffat at robsmoffat@hotmail.com

1312 KILOMETRES

Peter Temple flew 1,312km at 135.92 kph on 27 November 2020. Taking off from his home club at Gawler, he flew up and down a trough line extending towards Victoria. Pete wrote, 'Cloud was 15,000ft at base in a convergence running from Port Augusta to Horsham, although I wasn't game to stray far into Victoria. This was the view coming home.'

An amazing distance at a very high speed.

FAI GLIDING BADGES

TO 1 SEPTEMBER - 30 NOVEMBER

BERYL HARTLEY
FAI CERTIFICATES OFFICER
faicertificates@glidingaustralia.org

A CERTIFICATE
PHILIPPE LAMARQUE SUNSHINE COAST GLIDING CLUB
JOHN GALL GLIDING CLUB OF VICTORIA INC
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TOW BALLS AND TOW DOLLIES

Two seat tail draggers can have up to 50kg of weight on the tailwheel, presenting difficulties in fitting a saddle for towing purposes. Normally, two or more people are required to retrieve such gliders after landing. This can be tedious, slowing down operations. In addition, lifting the tail to fit a saddle poses health risks to operators. The saddle can be difficult to fit neatly and causes damage to the gel coat with time. **Fig 1** above

Common tow bars attached to the saddle, are very basic with no overload protection and very limited ability to accommodate disparate towing vehicle tow ball heights.

More than 20 years ago, a two wheel tow dolly was designed to tow IS28s. It had a leaf spring (Fig. 1) on which was located a spike which fitted into a vertical socket behind the tailwheel.

This system made the saddle unnecessary, but still required manual lifting of the heavy tail. Back injuries were common. The leaf spring made for a soft ride for the glider.

Around 2007, a system using a one-inch tow ball located permanently in the vertical socket of the glider, was introduced. The tow dolly was modified to have a cup or socket that engaged with the tow ball. The dolly was further modified to be articulated such that the dolly tow ball socket could be lowered to engage the tow ball and the dolly then used as a lever to lift the glider to the towing position. A latch in the dolly, fixed the dolly ready for towing.

This new system meant that manual lifting on the glider was obviated and gliders could be routinely retrieved by one person.

Turnaround time of glider retrievals was greatly reduced, improving operations, especially in training situations.

This system was used until the end of operations with IS28s.

The ease of use and marked efficiency of the system led to the consideration of a similar system for the ASK21s and Twin Astir.

Even though the weight on the tail of the ASK21 was only around 10Kg and therefore fairly easily lifted by hand, the disadvantages of the saddle and tow bar system were very evident. Over time the gel coatings of the gliders were getting severely damaged by the saddles and tow frames, which again, were difficult to fit and the coupling between the saddle via two pins and the towbar, resulted in frequent breakages. In addition, the home-made tow bars often broke or uncoupled from the saddle.

In short, over the years, this equipment required high maintenance.

Additional disadvantages were that the system was unwieldy, difficult to transport and had poor tolerance of variation in tow vehicle tow ball height resulting in one end or the other of the glider impacting the ground on an undulating surface.

On the other hand, the advantages of the tow ball system were well proven and a private glider, a Jantar 2B, had been fitted with a tow ball and used with a tailor-made snap together tow dolly, since 2009. This big wing glider has similar weight on the tail as the old IS28s.

Fig 2

Fig3

Two methods of fitting a small tow ball have been developed. The first uses an oval hoop that is attached to the glider via the tailwheel axle bolt. Apart from a longer bolt, no other modifications to the glider are necessary. The hoop, (Fig 2, 3) with tow ball weighs less than 600 gm and this system was used on the ASK21s.

With suitable Engineering Order approval and new weight and balance and spin tables, the system has been in routine use since 2017.

The shape of the hoop and the position of the tow ball behind the tailwheel, essentially mean the assembly cannot catch on ropes or wires.

However, the concomitant tow dolly development was not as straightforward. It was decided to incorporate an overload release and a shock absorber into the tow dolly. This would act to protect the glider in the event of it being towed into stationary objects as happens from time to time.

After several iterations, a final realization using a split tow ball cup at the vehicle-end, provided an elegant solution. A large tension spring can be adjusted to vary the release force. It is found that about 150kg provides a good level of protection whilst avoiding nuisance overload trips.

Fig 4

The tow dolly configuration used on the IS28s, had one large leaf spring to provide cushioning during travel. This spring had the spike at the end, coupled with a ball joint to the spring.

But with the spike replaced by a tow ball cup, this system was not satisfactory as the normal bouncing up and down of the tail of the glider, coupled with the short radius of the single leaf-spring, meant that the change in angle of the tow ball cup could exceed the swivelling range of the coupling.

The solution developed (Fig 4), was to make the tow cup radius arm attachment rigid and put a short leaf spring on each of the tow dolly wheels. This made the radius of movement up and down, the length of the tow dolly, pivoting around the tow vehicle tow ball. The change in angle of the tow ball cup at the glider end, was thus almost eliminated and the tow dolly itself benefited from being sprung, smoothing its ride.

Fig 5

A tow ball latch captures the glider tow ball preventing it from bouncing out during transit. The latch was not necessary with the IS28s because of the comparatively large weight pressing down on the tow ball. It is necessary with the much lower tail weight of the ASK21.

When hooking up, the tow ball latch is retracted by the operator to permit coupling.

There is a chance of large G forces being transmitted to the glider tow ball when the tow dolly, with glider attached, is manually moved to the tow vehicle and dropped on the vehicle tow ball whilst still moving, resulting in severe end-to-end shock through the tow dolly.

To mitigate this, a neoprene filled shock absorber is built into the dolly (Fig 5).

The tow ball tow dolly system has been in heavy use for three years and has greatly eased operations and improved efficiency.

Maintenance requirements have been minimal and damage to the glider empennage has been practically eliminated.

In addition, the tow dolly system provides very easy manual movement of the glider on the field by one person.

This also applies to manoeuvring in hangers.

The two seat Twin Astir, also has nearly 50 Kg bearing down on the tail, making on-field retrieval difficult and hazardous to the operator. In the past, a small lifting bar was used to lift the tail for fitting of a saddle. Overall, the system had all the disadvantages previously mentioned and it was decided to fit a tow ball to the glider so that it could be used with the tow dollys used for the ASK21s.

This time, instead of a hoop attaching to the tailwheel axle bolt, a glassed-in tow ball was designed and fitted just behind the tailwheel. This is a very strong area and the presence of a bulkhead augments this strength.

Fig 6

This fitting required some steel reinforcement (Fig 6, 7.) and compact design. The weight of the total assembly was around 0.5 kg. An Engineering Order was developed and the spin tables and weight and balance recalculated.

The system has worked flawlessly. The tow dolly wheel tracks had to be widened to guarantee clearance of the rudder in tight turns because

Flg 7

the bottom of the Twin Astir rudder has less ground clearance than the ASK21s. This low clearance meant there was the possibility of the rudder contacting the tow dolly wheels in a very tight turn.

The tow dolly system does not allow backing of the tow vehicle and glider as does a fixed towbar and saddle.

However, the great ease of manual manoeuvring of the glider more than makes up for this.

The system means almost any vehicle with a tow ball can be used for retrieves, irrespective of height of the vehicle tow ball, provided it is above a minimum to keep the tow dolly clear of the ground. The two wheels of the tow dolly are aligned laterally with the glider tow ball cup meaning higher tow vehicles only result in a small change in angle of the cup but the height of the glider during towing stays the same.

In the case of the Jantar 2B, a glassed-in design is used, but no hole for the tow ball had to be cut into the glider as suitable holes were already there.

The associated tow dolly is of a simpler design and has no overload or shock absorber function, since the glider is privately owned. The dolly pulls apart without any screws or pins and can easily be carried in a car boot. This was deemed essential as the glider was used for overland safaris.

The system has been in use for more than a decade.

SUMMARY

The glider tow ball system provides a simple and elegant means of towing gliders without the risk of damage to the glider presented by saddles and towbars. It greatly improves on-field operation and

Flg 8

efficiency, particularly important for training operations. No heavy lifting is required, this being important for Operational Health and Safety concerns. Manual ground manoeuvring by one person, even of heavy gliders, is routine with the system. The overload release system minimises potential damage caused by towing gliders into objects.

The optional fitting of a tow ball in new gliders, would be a relatively simple matter if done during manufacture.

TEAM

Robert W Brown: design and construction.

Graeme Greed (LAME): design checking, fitting of the tow ball systems and accreditation.

Mike Burns (Aeronautical Engineer): design validation and airworthiness accreditation.

(Several auxiliary contributors elected to remain incognito.)

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THE STORY OF A SLINGSBY DART 17R

BY PAUL DICKSON
HUNTER VALLEY GLIDING CLUB

Part of the fun of owning a vintage glider is the sense of history that comes with the aircraft. My brother Andrew and I certainly experienced that when we discovered a fascinating story about our Dart 17R and its original owner, Frederick Anthony Gaze DFC, OAM.

Andrew and I already share a LS3 but felt it would be good to have another glider so that we weren't fighting over the LS3 on those really great days when we both wanted to fly. When deciding on a new glider we thought it would be fun to own a vintage glider but one with enough performance to take on longer cross country flights. When VH-IZO, a Slingsby T51 Dart 17R, came up for sale in 2018 with only three previous owners and 316hrs total time, it seemed like the ideal glider. After an inspection, we snapped it up.

Manufactured in 1966, the Dart – Slingsby No. 1523 – was still in very good condition, but was overdue for a 50-year survey when we bought it. With the enthusiasm of new owners, we jumped into the survey to make sure that she was as in as good a condition as we thought.

THOROUGH INVESTIGATION

Although the Dart came with its original log book, we were a little suspicious of the low hours and thought that there may have been another log book issued when the glider was shipped to Australia in the 1970s. We began a thorough investigation. The two previous owners were still in Australia and involved in gliding and were able to confirm that there were no other log books.

One of these previous owners had undertaken the 20-year survey and re-fabric, sharing a wealth of knowledge about the condition of the Dart through his work. His work showed that the low number of hours recorded was genuine as he had owned the glider for 12 years and never flown it.

From here our attention turned to the original owner which is shown in the log book as T Gaze Esq. with an address in Ross-on-Wye, Herefordshire UK.

Not knowing where to begin, we started with a Google search for the address in the log book with the thought of investigating nearby gliding clubs. We were somewhat startled to see that Caradoc Court was a lavish country estate in Ross-on-Wye and not your average glider pilot's house. This led to the intriguing question, "Who was Tony Gaze and how did he end up with our Dart?"

RAF DAYS

Tony Gaze was born in Melbourne, Australia in 1920 and was studying at Cambridge University at the outbreak of WWII. Tony joined the RAF in 1940 and, after initial training, flew Spitfires in several squadrons for the remainder of the war. He flew a total of 488 missions and was awarded the Distinguished Flying Cross on three separate occasions, one of only 47 people during the war who were awarded the DFC three times.

Among Tony's exploits during the war are being shot down over France, managing to escape across the Pyrenees with the help of the French Resistance, and becoming the first Australian to shoot down a jet aircraft when he claimed a Messerschmitt Me 262 on 14 February 1945.

While posted at 610 Squadron, Tony and fellow pilots blew off steam by driving high speed laps of the perimeter road at RAF Westhampnett. Tony later suggested to the landowner, the Duke of Richmond and Gordon, better known as Freddie March, that the circuit would be a good racing track. Acting on this suggestion, March opened the Goodwood Circuit in 1948. To this day, the Tony Gaze Trophy for pre-1959 racing cars is held annually at held at Goodwood.

COMPETITIVE RACING

Tony's pre-war interest in racing cars took off in earnest at the conclusion of the war and after leaving the RAF, he returned to Australia, bringing his HWM-Alta racing car with him, and started racing on the Rob Roy Hillclimb outside Melbourne. Tony married Kay Wakefield in 1949 and moved back to the to the UK when Kay inherited Caradoc Court from her father.

Tony raced the Alta at multiple events across Europe and in 1952 became the first Australian to race in a F1 event, the Belgian Grand Prix. Tony later bought the

TOP LEFT: Dart VH-IZO in the air (Paul Dickson)

LEFT: Tony Gaze and his Spitfire (The Australian Spitfire Association)

TOP RIGHT: Tony Gaze preparing for launch, BGGC (Bristol and Gloucestershire Gliding Club)

MIDDLE: Caradoc Court, Ross-on-Wye, Herefordshire (Wye Valley News)

RIGHT: Tony Gaze (TonyGaze.com)

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ABOVE: Dart VH-IZO at its new home at the Hunter Valley GC (Paul Dickson)

BELOW: Paul Dickson flying the Dart (Paul Dickson)

ex Ascari Ferrari 500, which he raced in Australia, New Zealand and Europe. Tony's best racing performance was when he came second to Stirling Moss in the 1956 New Zealand Grand Prix. Tony was awarded the Order of Australia Medal in 2006 for his services to the sport of motor racing.

GLIDING FASCINATION

When Tony's competitive racing career was coming to a close, he had a chance conversation with Prince Bira of Thailand, who was also a racing driver and glider pilot, and he took up gliding in the late 1950s. Tony became a member of the Bristol and Gloucestershire Gliding Club (BGGC) at Nympsfield and was heavily involved with the club.

During his time at the BGGC Tony owned several gliders including a Slingsby Eagle 3 (BGA No. 863, Tail No. 97), a Ka6 (BGA No. 1027, Tail No. 210) and a Standard Austria (BGA No 1129, Tail No. 210) before be bought the Dart (BGA No. 1318, Tail No 210) in 1966. One notable item is that all of Tony's gliders had the same paint scheme, a blue fuselage with red wings.

The competitive spirit obviously never left Tony as, during his time in gliding, he set several UK national records in his Eagle and flew many competitions. Tony's UK two-seater gliding records include speed around a 200km triangle at 43.6kph in April 1960 and the goal and return distance of 277km in May 1961. Tony also won the BGGC Cyril Unwins Cup for Best Distance in 1959 and 1962. The highlight of Tony's gliding accomplishments was when he represented Australia at the 1960 World Competition in Cologne, flying a Skylark 3B and placed 14th overall in the Open Class.

After Kay died, Tony moved back to Australia in 1978 and brought the Dart with him. Tony settled at a farm that he named Goodwood in rural Victoria and continued to be involved in motor racing and gliding. Tony continued to fly the Dart from Tocumwal, including a 500km out and return.

Tony died on 29 July 2013 at the age of 93 and at his memorial service in Geelong, the Temora Aviation Museum paid a stunning tribute to Tony with the flypast of a Spitfire MkVIII.

GA

TOWING WITH THE SAVAGE CUB

BY SIDNEY DEKKER

For a number of years now, gliding clubs in various parts of the world have been testing their way into towing with Light Sport Aircraft (LSAs). It makes sense in places where Avgas is seriously expensive and where winching remains an ever popular and economic alternative. LSAs are sometimes compared with Formula 1 race cars – not because of their speed, but because both have to constantly push to innovate materials and construction methods so as to minimise weight while maximising performance.

LSAs like the Eurofox have also made their entry into Australia. In Europe, the Slovak-made Aerospool Dynamic WT9 is a popular tug choice. It is a very nice machine with great aerodynamics and solid towing performance – a Duo Discus is no problem, nor an ASK-21. I towed in the ASK-21 behind a Dynamic a number of times during an aerobatics week with German pilots in Bruchsal.

However, though well-equipped for towing with a Rotax 912S 100hp engine and adjustable prop, it won't get you any change out of a quarter of a million Australian dollars. Some would argue that if you find a Pawnee for a third of that, which you just might, then you've got a lot of cash left for Avgas.

MORE THAN FUEL

That said, the cost of a VH-registered aircraft doesn't flow through the fuel pipes alone. Other factors make them more expensive than LSAs registered through RAAus too, including parts, maintenance and the medical and licensing requirements for the tuggies who fly them. So, the search for possible towing options continues.

We were able to test a Zlin Savage Cub, factory-built in Italy and the Czech Republic. The Savage Cub is a Piper Supercub look-alike, built from lighter materials than the Piper original and. It is, like its original, a wonderful – and sometimes a bit challenging – little taildragger to fly, more jumpy in landing, for instance, than a Pawnee. Like the Dynamic, the Savage Cub is typically equipped with a dual-carburetted Rotax 912S 100hp engine. See insert for aircraft specs.

Rotax engines have a reduction gearbox to reduce the engine's relatively high shaft speeds to a more conventional propeller RPM. In the Savage Cub it is possible to mount a turbocharged Rotax 914, which yields some 115hp and can take a constant-speed propeller. But this means running a lot of systems in the nose that are competing for cooling air, which may not be practical in Australian summers. Savage Cub 23-2610, the one we tested, had a 100hp 912S. It drove a two-bladed fixed-pitch 2m wooden climb prop made by Aerobat in Spain. It is cleared for towing gliders up to a weight of 650kg.

ON THE STRIP

We started with some lighter gliders, testing a Ka-6, a Grunau Baby, a Kookaburra, an SZD-59, a V-tailed Salto and a couple of Libelle 201s over a number of days, and at several airfields in Queensland, on grass as well as paved strips. The elevation of the strips varied from 340ft to 1,500ft AMSL. Winds were relatively light on all the days we tested, with an average of about 5kts on the nose. The ambient temperature was between 20 and 27°C. Fuel load in the Cub was between 60 and 90 litres, with a single crew member on board.

Lining up with the glider behind you is conventional. The 23-2610 is equipped with a rearview mirror above the pilot like most Piper Cubs equipped for towing, so that you can see both glider and ground crew just by glancing up. The rearview mirror works because, like a Supercub, the Savage Cub typically has a see-through plexiglass roof, which is also of great help for lookout and traffic awareness, and even for seeing the runway when turning onto baseleg and final approach. This manoeuvre is often tricky in high-wing airplanes.

THE TAKE-OFF

Flaps 1 was selected for takeoff with the gliders that could or wanted to tow at a lower speed, like the Ka-6, Grunau Baby and the Kookaburra. Stage 1 gives about 15 degrees of flaps. According to the flight manual, this gives the Savage Cub the best climb gradient. Full power was given at the appropriate signal, and it was immediately apparent that acceleration is not an issue. The Savage Cub itself is so light that it doesn't take a lot to get it moving, and doesn't take a lot to get it flying either.

The take-off run was typically about 150m, both on short grass and on tarmac. On a number of take-offs, the Cub got airborne before the glider, which requires a careful check in the rearview mirror and a stick forward motion to keep the tug close to the ground to let the glider accelerate as well. Note, of course, that the stall speed of the Savage Cub is below that of many gliders it might tow, even with zero flaps.

At about 50kts for the Grunau Baby, and 60kts for the Libelles, the fence and trees at the end of the strips (between 1,000m and 1,700m long) were consistently cleared by several hundred feet. The Libelle, the Salto and other 'plastic' gliders were towed better with zero flaps, which gave an airspeed of around 65kts and a climb rate at around 300ft per minute.

CLIMB PERFORMANCE

With the engine delivering 5,250 RPM, tows to between 2,000 and 2,500ft AGL took between 3 to 6 minutes, depending on the glider and how much lift was found in the climb-out. We averaged the climb performance over the test flights, both with and without flaps, and concluded that the Savage Cub delivers a reliable 300 to 400ft/min climb rate (or a 3 to 4kt climb) in still air with gliders up to 350kg in all-up weight.

Oil temperature and cylinder coolant temperature stayed in the low reaches of their respective green arcs all the time. Oil burn in Rotax engines is negligible, so as to be unnoticeable. Higher temperatures in summer might change the engine operating temperatures somewhat, but the cowling of the Savage Cub, like that of the original Supercub, is designed to allow buckets of air to flow through.

The turnaround time for tows with the Savage Cub, or any Rotax-equipped aircraft for that matter, is helped significantly by the liquid-cooled engine, for cylinder heads in particular. This means you don't have to worry about shock cooling and can get down in a hurry. The Savage Cub adds the advantage of ridiculously short landing runs so, providing your rope clears the fence, you can pull up next to the glider you're going to tow next. There's no need for taxiing back. It's worth noting that with a lower approach speed than, say, a Pawnee, the tow rope hangs down at a more acute angle

DOLLARS AND SENSE

If the aircraft is registered with RAAus instead of getting a VH-registration, then tuggies will have to convert their licences to RAAus as well, including their tailwheel and towing rating. That is not much of a problem as RAAus is growing and, with a large number of schools around, the cost and effort of conversion is comparatively low.

But the kicker is possibly this – the average tow up to 2,000 – 2,500ft used about 2.5 litres of 95 Mogas. At Covid-reduced oil prices currently, that translated to about $3.50 in fuel costs per tow. Towing, or even winching or self-launching, completely electrically is probably the real innovation that our community is waiting for. But in the meantime, an LSA like the Savage Cub offers respectable performance for its 100hp liquid-cooled engine, and offers significant economies on maintenance, pilot qualification and fuel use.

ZLIN SAVAGE CUB SPECS

Length — 6.39m
Wingspan — 9.31m
Height — 2.03m
Empty weight — around 290 kg
Max takeoff weight — 600 kg
Fuel capacity — 91 liters
Range: 720 km
Takeoff distance (with glider) — around 150m
Landing distance — 90m
Cruise speed: 90 knots
Stall speed (zero flaps) — 38 knots; full flaps — 33 knots
Max flap extended speed — 60 knots
Max crosswind — 15 knots
Never exceed speed — 111 knots

Landed price in Australia (incl. shipping and GST), factory-built with fuselage welding for towing, and equipped with TOST hook, is around AU$150,000.

GA

NARROMINE CUP 23 YEARS YOUNG

BY SEAN YOUNG

The first Narromine Cup was held in 1998 by Beryl Hartley and Chris Stephens as a way of introducing pilots to competition flying in a friendly, low pressure environment. It is not actually a competition and no tasks are set. Pilots decide their own tasks each day. As Beryl said, 'We are our own task setters.' The winner of the Cup is the pilot with the top average OLC score from their best three flights of the week.

Over the years, many famous names in Australian gliding have won the Cup, including John Buchanan, James Cooper, Bill Hatfield, Gerrit Kurstjens and Terry Belair, who has won more times than any other pilot.

In a normal year, overseas tug pilots, coaches and helpers are available to help run Cup Week but, due to the COVID crisis, no overseas pilots are visiting Narromine this year. As a result, the event was run thanks to the enormous effort of Beryl and Arnie Hartley, various family members and Narromine club members pitching as much as they were able. The week was, as always, expertly organised and featured great facilities and catering.

MORNING PRESENTATIONS

A weather and operations briefing is held each morning. For the last few years Ed Marel, who also flies his ASH 31, has given comprehensive and excellent daily weather briefings. Fortunately, this year he had some terrific soaring weather to tell us about.

Before briefing, presentations are given on various aspects of gliding and safety. This year we had very interesting talks by Richard Frawley, Terry Cubley and Mick Webster from Hunter Valley GC.

Mick was very busy this year not only coaching but also helping out with tugging. Graham from Central Coast GC also generously donated his time, tugging all week.

Normally, pilots from Victoria and Queensland and other states have made the trip to fly at Cup Week. This year, due to travel restrictions, the only two interstate pilots were John Orton and Terry Cubley, who missed the first weekend and drove up from Benalla on Monday morning when the border between NSW and Victoria was opened for the first time in months.

BADGE FLIGHTS

Several pilots from Southern Cross, Bathurst, Hunter Valley and Central Coast gliding clubs attended. Cup

Week is always a great opportunity for coaching and for pilots to achieve badge flights, and this year was no exception.

Tim Duty from Bathurst SC had attended a coaching week that Armin Kruger held earlier in November at Narromine. During that week, Tim gained his Silver C and went on to earn his Gold 300km and Diamond 500km distances during Cup Week. Dominique Brassier, also from Bathurst, achieved her Gold Distance and Diamond Goal flying 365km. Justin Sinclair from Southern Cross also gained his 500km Diamond Distance.

Uday Singh from Southern Cross GC flew his first 5 hours to complete his Silver C. Shawn Armitage Hunter Valley GC and Melysha Turnbull Southern Cross flew their first cross country flights.

The weather during the week was dominated by a slow moving trough with a blocking high in the Tasman. There were three no fly days and four terrific cross country soaring days and one challenging day punctuated by a band of rain showers.

TOP PERFORMANCES

On Saturday, Ian de Ferranti from Bathurst flew 554km at 123 kph in his Ventus 2cM 18m. On Tuesday, the next flying day, Ian again led the field flying 561km at 105 kph. On Wednesday, Terry Cubley had the highest scoring flight, flying 698km at 133 kph in his Ventus 2cT 18m.

On Thursday Terry flew 829km at 122 kph, gaining the highest score for the day. John Orton flew 775km in his ASG 29 18m while Ian was pushed into 3rd position flying 702 km. Arie van Spronssen from Hunter Valley, who always flies well at the Cup, had another good day flying 549km in his DG 200/17. What a great gliding day it was.

On Friday Terry again earned the top score, flying 678km at 116 kph. Terry said, 'We went south to Lake Cargelligo where the forecast was blue to 7,500ft, which is alright. It was actually blue to 4,500ft. Turning north to Nymagee, conditions were quite good. When I got back to Narromine there was a magnificent street so I thought I'd have to take that, and added another 150km. It was wonderful.'

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TOP: Ranjit Phelan landing his Diana 2.
MIDDLE: Arie van Spronssen from Hunter Valley GC with Tim Duty who flew his first 300km and first 500km during the week.
ABOVE: Terry Cubley flew Narromine Cup for the first time and won the trophy.

ABOVE: Dominique Brassier also from Bathurst achieved her Gold Distance and Diamond Goal flying 365km. Photo Stuart Ferguson

With this flight, Terry secured the top OLC scoring position for the week and added his first Narromine Cup, which he gets to take home and keep, to his trophy collection.

BOUNTIFUL YEAR

I have been flying Cup Week since 2007. I missed last year due to the challenging smoke and dust caused by the terrible drought. This year it was an awe-inspiring sight to fly over the vast wheat belt covered in newly cropped paddocks, with many areas full of wheat still to be gathered in. All over the region, mountains of wheat are piled up outside full silos at the storage facilities in all the towns around Narromine.

Lines of roadtrains were waiting to offload their golden cargo and headers were working furiously to bring in the best crop for many years – and not just wheat, but also chick peas, lupins and other crops. The whole region was bustling with activity. It was wonderful to experience after several extremely dry years.

I can't wait for Narromine Cup 2021 which, as always, will take place the last week of November. GA

QLD CHAMPIONSHIPS DARLING DOWNS

BY SARAH THOMPSON

At the end of September, Darling Downs Soaring Club (DDSC) hosted the QLD State Championships. With a little uncertainty about the possibility of COVID preventing the event from being held, the date finally arrived and we could get in the air. There was a lot of anticipation, as the usual events throughout the year, including the popular Easter Regatta, had not been able to take place. But with our COVID-safe event plan in place, we were able to make it happen!

Although the Queensland borders remained mostly closed to the rest of the country, the Queenslanders took good advantage of the weather and participated enthusiastically. With many pilots a little rusty from a strange year, most treated this as an opportunity to have a fun, competitive week of flying without too much pressure.

This year, the State comps used live trackers supplied by the Formula 1.0 group, thanks to Nick and team. The live tracking was a big hit, with over 3,500 views over the course of the comp from 17 countries including Australia, New Zealand, Germany, United States and more. Grand Prix-style tasks allowed everyone who couldn't make it to tune in and keep up to date on all the action.

TWO CLASSES

Two classes were flown – Sports and Club. Although the Sports Class was quite small, only five, the pilots were of a high calibre and very competitive. All five have been World Comp entrants. Club Class had 13 entrants including four Juniors flying their first competition, and WWGC winner Jo Davis. Club Class also had three women pilots flying each day, plus another three in coaching flights. Sports Class had two 'girls' out of five entrants. #yesgirlsglide

DDSC also offered up two coaching aircraft with instructors and coaches that gave several post solo pilots their first taste of competition. Six pre-GPC pilots had the chance to fly in their first ever competition and open their eyes not only to cross country but also to how top competition pilots fly.

With several world class competition pilots competing, it was a great chance for the newer pilots to learn some hot tips. We had a number of State Competition first-time competitors participating and, in some cases, flying exceptionally well. Fifteen year old Peter Brunton pushed Jo Davis every day. They were both flying ASW20s and Peter managed to win one day and came second most of the others.

TESTIMONIALS

A testimonial from Dylan, who experienced his first competition day:

"The comp was a terrific initiative to give a low hours pilot the unique experience of competitive gliding, in the unusual environment where advice and knowledge were willingly shared in a friendly post competition atmosphere. My biggest regret is only flying the one competition day. But what a day it was!" - Dylan S

After a big effort, the hard work from our comp grounds manager was rewarded with a fun flight on the last day:

"Working as the Grounds Manager and taking on other tasks during the competition was much more rewarding than I could have anticipated. The competitors and other staff were wonderful, so appreciative of my efforts. Their respect and friendship added so much to my enjoyment of my task and made me feel that I had achieved something.

The flight I did with Mart was fantastic. It was a real eye opener to the reality of cross country and competition flying. I have never spent a better four and a half hours. At the end of a hard work week, I felt I was well rewarded." – Bob B

MIXED WEATHER

The weather was rather good with only one day lost due to a 20kt cross wind. The practice day was probably the most interesting with 30kt winds and the first leg into wind. It was a challenging start for those pilots who were feeling a little rusty.

Other days saw a mixture of blue, Cu and everything in between.

Overall, it was a great, fun and safe comp. As always, such events rely on our volunteers. A big thank you goes to Bob Flood for being the competition director extraordinaire, Paul Bart as safety officer, Di and Logan for catering, and to Jenny Thompson and Mike on task setting and weather. Many others were involved to make this a great success. The club looks forward to a good flying season. GA

QLD STATE CHAMPIONSHIPS
DARLING DOWNS
24 SEPTEMBER 2 OCTOBER 2020

CLUB

1 JO DAVIS	ASW 20	40
2 PETER BRUNTON	ASW 20	38
3 DAVID NASH	DISCUS B	33

SPORTS CLASS

1 ADAM WOOLLEY	VENTUS 2 15M	28
2 DAVID JANSEN	LS-8 15M	25
3 LISA TURNER	ASW-27 16	

Full results at iivegliding.com

NSW STATE CHAMPIONSHIPS LAKE KEEPIT

BY KIMBERLEY OLSEN

The NSW State Championships this year was my first experience at a state comp. My competition skills were pretty well non-existent, since my last competition had been at Easter in Queensland in 2012. Nonetheless, having bought a sailplane in 2018 after a prolonged break from gliding, I sent in my registration for the 2020 NSW State Championships with the blessing of my CFI. My goal for the competition was to get home everyday after completing each task, and to fly faster.

ABOVE: Jacques Graells in his JS1 over Lake Keepit. Jacques finished in 4th position in 18m / Open Class.
Photo by Jacques Graells

COVID 19 impacted the event, causing lower than expected numbers, so the fleet was divided into 'long wings' and 'short wings'. Final honours would be divided into 18m/Open, Standard/15m and Club Class. Short wings were to fly the competition dry and were weighed on Day 1. Practice day dawned bringing conditions that promised to be tricky. Racing tasks were set for both long and short wings. Short wings were to fly 230k and long wings 294.5k.

PROMISING PRACTICE DAY

My flight began with a good start at 8,000ft. I took a few turns in the first 30km before connecting with 8kts to just over 10,000ft. That left me with a 29km run in some softer energy to the top of Mount Kaputar, which I crossed at 7,100ft, where I topped up again in 8km. Running down the ridge to the second tum, I just missed the can so went on to the planned climb and returned, as the next leg took me back over the can without deviating too far. A good climb two-thirds of the way down the second leg left me with a 72km final glide via the last turnpoint.

Paul Dickson (109.2 kph) took line honours in the shortwings, closely followed by Kel Burgess (106.92 kph) 24 points behind. In the long wings, Brad Edwards (127.72) led Bruce Taylor (126.28) and Jacques Graells (119.83). I was astounded to see that I'd managed to take 3rd place in the short wings, second in Club Class with 99.70 kph -- a completely unexpected result on practice day. I was now keen to see how the rest of the comp would go.

BLUE START

At briefing on Day 1, the weatherman Mak Ichikawa promised a blue day for the first racing day, and that's exactly how it played out. Thermals were bubbly and broken with few visible indicators of lift but the fleet managed to achieve a high rate of task completion with only two outlandings.

Task setter Bruce Taylor advised us that the long wings had a racing task of 338.90km initially to the northwest to Gurley silo, east to Bingera and then south to Rangari and Lake Keepit. The short wings had an AAT of 184.78 km / 442.41 km.

I had a not so good start at 6,355ft. On the first leg to the northwest, I stayed north of the line, figuring I could use the range near Mt Kaputar for a considerable part of the flight. I'm not sure the hills were an advantage this day. On the second last leg, I found myself arriving early so I pushed into the final turnpoint at SplitRock Dam to manage delta T. I was soon in real need of a climb, which I managed to find over the top of Mt Bora hang gliding platform, giving me a final glide of 35km. It wasn't my best flight but certainly not my worst.

Bruce Taylor (QR) led the long wings home yet again with an even 900pts, closely followed by his usual sparring partner, Brad Edwards (1B) with 724. Among the short wings, Allan Barnes (S7) walked away with the even ton and Kel Burgess (XBY), showing great consistency, occupied 2nd place yet again with 880pts. I managed 5th in short wings with 78.2 kph

LOCAL KNOWLEDGE

Day 2 promised 10 to 20kt northwesterly winds, the very direction of the strongest conditions. High level cloud threatened to the southwest. Tasks were set at 3.5 hours for the short wings and four hours for the long wings.

My assessment of the weather was that I'd need to stay a little south of the track to make the best use of the lift on leg one, which would place me in the best spot to connect with the forecast front, arriving from the west. This turned out to be a good decision, since I found myself able to connect with decent climbs, while others to the east were reporting weak conditions.

Dave Pickles called that he was outlanding at Narrabri as I began to climb under one of the first Cu's in 7kts. From that point it became a high speed run north to Moree, staying just a little west of track to make the best use of the pre-frontal conditions. Watching the approaching front, it soon became clear that it would then be necessary to stay east of the road from Narrabri to Moree and to overfly Mt Kaputar, so as to avoid the growing shadows and approaching rain showers. I did just that, and finished with a 77km final glide.

Mak Ichikawa had this to say about the day, "Matthew (Scutter) would have said, 'The forecast was perfect.' The day developed as advertised except the start was slower, but that is the nature of this year. The crucial decision was where to turn in the top sector. Bruce showed us another good decision, coming back from the direction of Castletop and planning to turn more east than where I turned. Hard to beat this local guy here at Keepit!"

Some reported climbs to FL125 and maximum task speeds of 135 kph. In the words of Justin Smith (CHA), "Turned out a cracker after poor lift pre-start. Eventually 12 knots through 12,000ft out west." In Sports, Allan Barnes (S7) took out line honours at over 102 kph and David Turner (RT) rose four places overall with a 2nd place at 101 kph. I placed 4th with a speed of 89.3 kph. In 18m/Open, Bruce Taylor (QR) preserved his overall lead, topping the leaderboard with 135 kph. He was closely followed by Mak Ichikawa (1M), 0.5 kph behind.

LOST TIME

Competitors woke to 8/8ths overcast skies on Day 3, as a cold front had passed the airfield overnight. The cold front and associated cloud continued its passage to the northeast as temperatures continued to rise. In the direction of the first turnpoint, some charitable Cu started to pop on this otherwise blue day.

Mak Ichikawa (1M) advised soarable heights approaching 6,000ft with 10kt westerlies, resulting in potential flight distances of 330-440km. He continued, "The day should start with 4 to 5kts to 4,500ft AGL at 12.30, reaching 6kts in the blue to 6,500ft AGL at 3pm, and die by 16.30 to 17.00 with the chance of a lift-destroying southerly." Racing tasks were given to both fleets, 235km for short wings and 250km for long wings.

I felt it important to get an early start if possible, to make best use of the improving conditions near the Pilliga but unfortunately, that proved to be a bad decision. Although I had a good start, the thermals were few and far between for the first third of Leg 1 at that time. I deviated too far south to

ABOVE: David Turner from Lake Keepit SC came 3rd overall in Sports Club/ Std/15 in his ASW 27.

BELOW: Bruce Taylor in his ASG 29 added another championship 1st place to his impressive collection in 18m/Open Class.
Photos by Val Phillps

continued over page

ABOVE: Kimberley Olsen flying a Pegasse in Sports/Club/Std/15 class. Photo By Val Phillips

BELOW: Tom Jamieson-and Delilah Scott both came to gliding through the Australian Air Force Cadets. Tom flew an LS7 and finished in 8th place in Sports/Club/Std/15 class. Tom also plays a mean guitar.

the hills and paid a high price in lost time, not to mention that the hills were not working as expected.

A good downwind run up the Piliga didn't make up for it, as the time lost meant I was dealing with weaker conditions on the final leg. I was saved only by a thermal kicked off by mining activity. I climbed from 3,000ft to 5,000ft in the dustiest 5kt thermal I'd ever encountered, it smelled of Cordite.

POPPING

Day 4 promised Cu and they started to pop as we began gridding. Oxygen systems were checked, as it also promised to be a high day. As it turned out the first leg proved difficult and very soft, at least as far as Barraba. From Barraba onwards, many of us in the short wings were able to connect with streets along the ridges towards Warialda where conditions got stronger and climbs over 10,000ft were possible. The radio was buzzing with comments from the long wings about soft conditions.

I had a great run to Warialda and Moree but was astounded when I returned to find a couple of gliders ahead of me. Clearly, my efforts closer to Moree were not as good as some. Conditions contributed to a wide spread of finish times with a stream of landings that started at 1648hrs and didn't end until 1826!

In 18m/Open, Mak Ichikawa (1M) showed he wasn't willing to relinquish his place, chalking up a blistering 142.3 kph. Taylor and Edwards rounded out the top three with 139.3 and 135.8 kph respectively. An honourable mention must go to Kerrie Claffey (T1) with 122.3 kph, nipping at the heels of the top three.

In Club/Standard/15m, Paul Dickson (UKC) reclaimed first place with 108 kph, closely followed by Hunter Valley's David Pickles (AY) and Keepit's own David Turner (RT) with 102.8 and 107.3 kph respectively. Allan Barnes (S7) held a commanding lead, but only 22 points separated David Turner and Paul Dickson at the end of Day 4.

Making his debut in competition flying was Keepit's Tom Jamieson (XJY). Day 4's task was Tom's longest to date and he had this to say about the day, "I had the most appalling start ever imaginable. On my first glide through the line I flew down to the first area of Cu on track but found absolutely nothing. Before I knew it I was down to 1,800ft AGL.

"After scratching around for too long, I headed off under the Cu with a ruined 44 kph task speed. Over Barraba and Bingara I thundered along at a cloud base which aligned perfectly to turn at Warialda. It was much the same to Moree, by which time my task speed had risen to 95kph. Turning for Kaputar, things appeared to soften out, and lack of planning ahead caused a poor decision to disconnect with cloud base and slowed my leg down to 80kph. A solid final glide brought it back to 90. A very tiring and demanding day!"

CAUTIOUS

On Day 5, our weatherman promised another day of Cu in a weather briefing that reported the glancing influence of a trough with a cold front to follow in the coming days. Light and variable winds and 4-5kts to 4,500ft AGL at 12pm were to kick off a day capable of 575-805km flights. By 3pm, he was expecting 5-7kt Cu-marked climbs to 9,500ft AGL and perhaps 1,000ft higher in the north. Conditions were forecast to weaken considerably by 5pm. The shortwings were tasked a 314km racing task, Keepit - Tambar Springs - Edgeroi Silo - Keepit. The longwings were assigned a 387km racing task.

The start of my flight was cautious. I snuck out, on task with a lower than expected start height, only to decide to return for a restart as I could see a huge Cu developing in the start sector. This gave me a much better start over some soft conditions. I found thermals hard to work until Tambar Springs, where I saw several gliders that were low. I took a good climb just after the turn and had a fantastic run up the Pilliga.

Things started to go soft again around Narrabri, so I went to the house thermal at the top of the Pilliga, west of town. I worked some wisps to Edgeroi but there were no great climbs anywhere. I deviated east and found a good climb over the trees, and climbed away from 3,000ft AGL. This allowed me to connect with the lift over Mt Kaputar, where I topped up for a 60km final glide. I heard a number of the long wings calling about difficult conditions as I topped up. It was good enough for 3rd place in the short wings.

CAT'S CRADLE AAT

Mak Ichikawa's weather report started with, "Another Cu day, with Ci". Skysight gave potential flight distances of 575 to 805km, with 4-5kts to 5,000ft AGL by 12:30. By 3pm 5-7kts to 10,500ft AMSL was forecast, with the day weakening at 17:00. That was the forecast, so what really happened? Actual temperature rise at Tamworth stalled at 11:30 and was sitting 1.5 degrees below forecast. As the temperature plateau continued into midday, both classes were set C tasks, a cat's cradle AAT at 2.5hrs for the short wings and 3hrs for the long wings.

I had a shocker of a day. I just never got the feel for the day and as a consequence, failed to trust the blue conditions out on the plains. I wasted time diverting to wisps that did not work. I finished 9th, which is about where I expected to be when I registered for the event.

Daid Pickles took 1st place in the short wings and Club Class, with Allan Barnes 2nd and leading Standard Class. In the big wings, Bruce Taylor won the day with 125 kph. That really shows how badly I flew.

COSTLY DISTRACTION

I started Day 7 with the goal of flying better than the previous day and holding on to the place that I occupied. The AAT task was very similar to Day 6 with a start point north of Lake Keepit to Pineview to Terry Hi Hi, then to Wee Waa to Pine View to home. I edited the task from the day before while sitting at terminal 32 in a crowd of other pilots. That was my first mistake -- I normally enter my tasks alone at my computer, and recall feeling quite distracted.

I should have taken that as a warning sign. Fatigue levels were high on the last day. I launched and had a great start at 8,000ft. I set off for the first turnpoint expecting a gaggle of gliders to be following but none did. I wondered why, but continued and had a great run at high speed up over Mt Kaputar, clipping the Pineview circle and going a little way into the Terry Hi Hi circle before setting off across the plains, topping up anytime I hit 5kts or so.

The clouds were lining up perfectly for a return run but the overdevelopment at Mt Kaputar had resulted in downpours and lightning. The outflow from that was probably going to kill lift, so I turned at Wee Waa as late as I was game. This was a mistake. My delta T ended up being 15 minutes early, leaving me no choice but to fly close to the showers and lightning using the lift ahead of the showers to max out my distance in the last circle.

ABOVE: David Pickles (Club), Mak Ichikawa (18m/Open) and Allan Barnes (Standard).

Unfortunately, all lift on track had gone, so I had to backtrack to my last climb to get final glide. I could hear from the radio calls that others had similar problems, so I thought was in with a chance. However, the final results showed I had actually missed the start my metres, flying parallel to it because I had an extra turnpoint from the day prior in my task. No wonder nobody had followed me.

HAPPY ENDING

In the long wings Bruce Talylor took 1st place, Mak 2nd and Jaques Graells 3rd. Short wings were led by Allan Barnes, Paul Dickson in 2nd and Kel Burgess in 3rd. I finished 9th.

Throughout the event, the camaraderie was fabulous. It would have been great to see more women competing, but COVID obviously played a part in keeping some of our interstate sisters away. The final night dinner at Carol Gap is a tradition at Lake Keepit and the food was fabulous as ever. Errors notwithstanding, I was very happy with the results and enjoyed the event immensely. I may even continue with this gliding caper.

GA

NSW STATE CHAMPIONSHIPS
LAKE KEEPIT
14 - 21 NOVEMBER 2020

SPORTS (CLUB/STD/15)

1	ALLAN BARNES	LKSC	LS 8	6,062
2	PAUL DICKSON	HVGC	LS 3	4,939
3	DAVID TURNER	LKSC	ASW 27	4,695

18M / OPEN

1	QR	BRUCE TAYLOR	LKSC	ASG 29/18M	6,182
2	1M	MAK ICHIKAWA	HVGC	JS 3 RAPTURE	5,915
3	1B	BRAD EDWARDS	LKSC	JS 3 RAPTURE	5,812

soaringspot.com or bit.ly/2JnvXmG

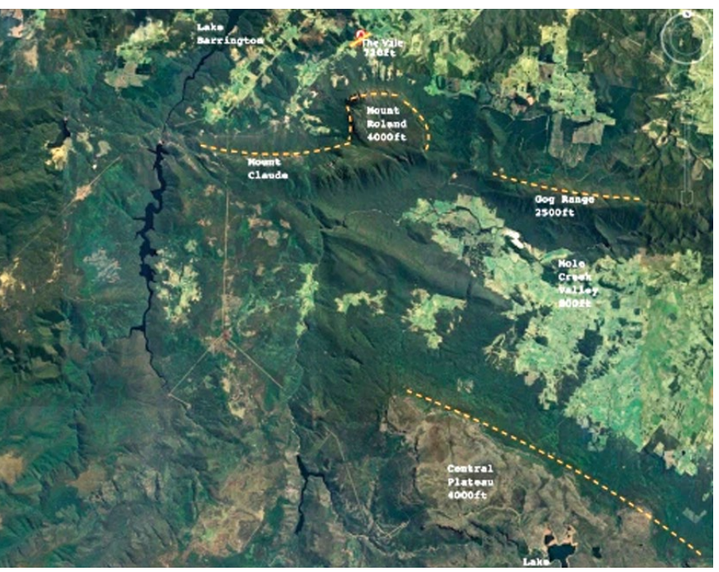
WAVE - RIDGE - THERMALS AT THE VALE

BY SIMON HACKETT
PHOTOS BY GABE HACKETT

Simon flies a Pipistrel Taurus G2 electric self-launch motor glider from his farm in northwest Tasmania.

He has been using his glider to study the principle techniques pilots use to sustain soaring flight in October 2020 in three distinct weather systems.

This is a good introduction to the three main types of soaring you will encounter – thermal, ridge and wave soaring – and how to utilise weather forecasting and instruments to make the most of the weather on any particular day.



THREE DAYS SOARING AT THE VALE

The Vale Airfield is a 1,300m grass runway running parallel to the Dasher River in northwest Tasmania. It is situated only a couple of nautical miles from a beautiful mountain, Mount Roland.

This 4,000ft granite beast dominates the local view all the way to the nearby town of Sheffield. It is part of a system of ridge systems that give way to the Tasmanian Central Plateau. The Plateau is a large, gorgeous, pristine alpine lake region that includes the world famous Cradle Mountain National Park.

Over the last several months, I've been gradually and carefully exploring this complex, fascinating and beautiful area from the air, through a variety of weather conditions.

The conclusion I've reached is that we are fortunate indeed to have an airfield that is surely one of the best places in Tasmania to fly gliders. There are many opportunities to go soaring here, using a wide variety of 'lift' mechanisms enabled by this fascinating and complex terrain – and to do it all year round!

Let's start with an annotated Google Earth image of the local area from the point of view of a soaring pilot. The orange dotted lines are some of the local area ridge lines. Many opportunities for soaring flight are driven by this complex geology

DAY ONE - MOUNTAIN LEE WAVE

One of the most wonderful ways to go soaring in a glider is the use of mountain lee waves.

Wave in this context refers to a large standing wave that forms in the atmosphere downstream (to the lee) of a large physical feature such as a mountain in the presence of a strong and consistent wind that increases in strength with increasing height.

Mountain waves can extend into the sky to heights that are multiples of the height of the ground feature that triggers them. What forms in the air is an 'echo' of the shape of the ground feature, high up in the sky, with the into-wind side being a tide of rising air that can be surfed in a glider to gain height.

Even better, if the wind keeps getting stronger with height, the primary wave system can act like another mountain. One wave can trigger another wave system, located further downwind and higher than the primary wave. This can keep happening, with multiple wave systems capable of 'stacking up' in a rising sequence.

Clouds can form in the middle of a wave system, appearing in a classic lenticular shape, being quite literally polished by the air rotating around the wave core. In the presence of multiple secondary waves, there can be a stack of these lenticular clouds.

On the day we flew, no lenticular clouds had formed to indicate the presence of the wave system. It was still there, but it was invisible.

However, I had another way to find the wave. I used a fabulous soaring pilots' weather prediction application called Skysight.

Skysight has access to global, highly accurate weather forecasting data that it uses, with a great deal of smart number-crunching, to generate predictive visual forecasts for glider pilots. These forecasts help them to predict, with a high degree of accuracy in both space and time, the presence of various distinct types of weather systems that can be used to sustain soaring flight.

As per the image [right] the Skysight model showed the presence of a substantial primary wave system above 5,000ft, then extending through multiple secondary wave systems all the way up to over 20,000ft. It turns out that this wave system sets up quite frequently in Tasmania in the cooler months.

An impressive example of such a system happened back on 12 April 2020. This was not a day that I could fly, unfortunately, but have a look at just how impressive the wave system was, right across Tasmania. To go with it, lennies were very much in evidence in the sky. A soaring pilot could have hopped from wave to wave, literally across the entire state.

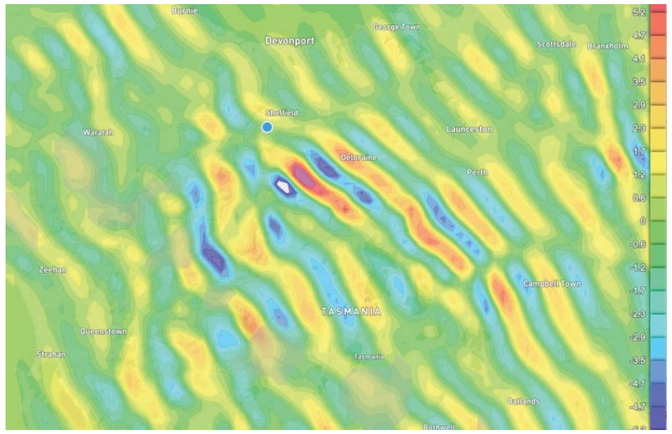
Back to the present, with my son Gabe as our photographer and co-pilot, it was time to see if the computer model was accurate in telling us that the wave was there, even though the indicator clouds were not.

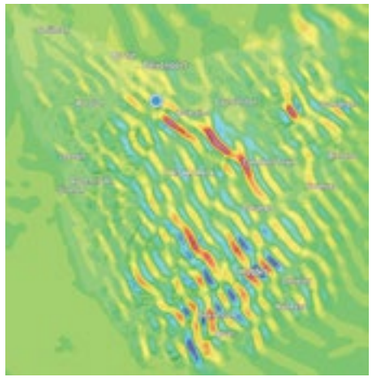
To help us find this quite invisible lift system, it was time to engage another piece of equipment, the LX9000 soaring glass-cockpit system in my glider. The LX9000 is an incredible instrument. One of its plethora of features is the ability to import Skysight predictive map overlays directly onto the device for display in flight.

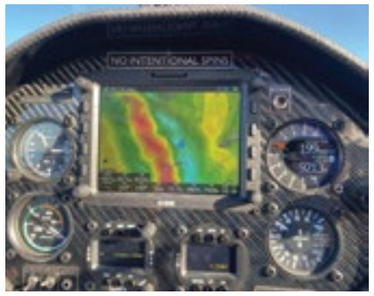
This means that, with the wave predictive model on screen, we could fly the glider under power up to the height and position needed to contact the wave system, and then shut down the motor and start playing.

We did precisely this. We climbed to about 5,000ft and flew to the edge of the predicted lift zone, and shut down the engine. As if by magic – there it was. We just starting going up.

See what the Skysight wave overlay looks like in the LX, in flight, in the aircraft. [Right] On the image, the lift zone is the yellow/orange/red zone on the map.







This photo was taken at a later point, when we had already climbed in wave up to over 9,000ft, successfully working the primary wave system with the Skysight predictive model overlaid on the LX9000.

Wave lift is wonderful – a smooth, quiet journey of exploration, quietly working your way back and forth along the lift band.

Being a system driven entirely by wind, wave conditions can be, and mostly are, present in the depths of winter, when flat-land glider pilots have given up gliding for the season due to the lack of any useable thermals.

We flew the glider up and down the Mole Creek Valley on our climb, and wound up high over the edge of the Central Plateau. The Plateau was covered in a layer of snow from the previous night, and it looked rugged and wonderful.

DAY TWO – SOARING USING THERMALS

Thermals are columns of rising hot air, driven by the sun differentially heating the ground. When there is sufficient moisture in the atmosphere, that rising air condenses at the top of the thermal to form a cumulous cloud, or 'Cu'. Thermals can exist whether the Cu clouds are there as indicators of it or not.

Covering ground on a thermal day involves circling slowly and tightly in the core of the rising air, gaining height, until the thermal starts to weaken. Then it is time to set sail for your intended destination, optimising your cruising performance by slowing down in lift and speeding up in sink, a technique called 'dolphin soaring'. If you get low again, it is time to find another thermal.

Back in Tasmania on Day Two, the wind had moderated and the day was several degrees warmer. The Skysight weather model indicated that thermals would occur in the middle of the day rising to 5,500ft or so, which is easily high enough to have a very fine flight.

continued over page

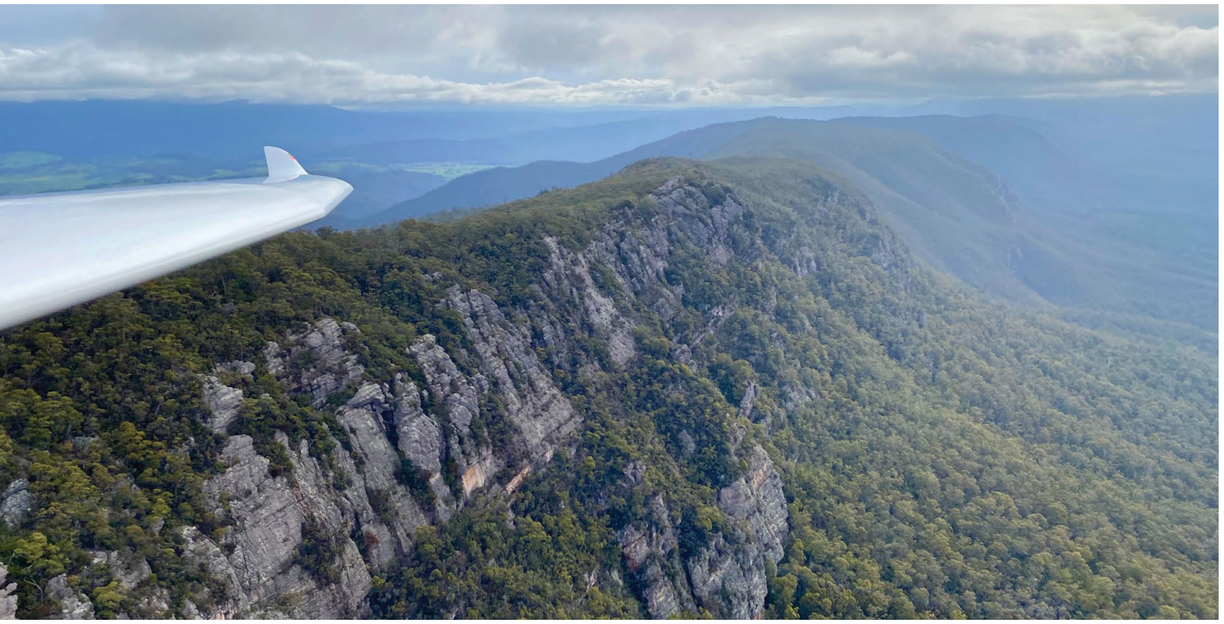
TOP: Flying in wave above Central Plateau Cliffs in Tasmania.

LEFT: Many opportunities for soaring flight are driven by this complex geology.

ABOVE TOP: Close up view of wave prediction in Skysight.

CENTRE: Wave as shone in Skysight for the whole of Tasmania.

BOTTOM: Skysight overlaid on the LK9000 for use in flight.



ABOVE: First visit to the Gog Range in ridge conditions.

BELOW: Skysight Ridge Lift Forecast.

We set off to explore those thermals and found that they were big, wide and gentle, which isn't always the case, and that the intermediate sink zones were also quite moderate. Gabe and I wound up reaching around 6,000ft, much in accordance with the prediction, over the very same valley that we had wave soared across the day before. The snow on the Central Plateau from the previous day had already started to melt.

DAY THREE – RIDGE SOARING

Ridge soaring is perhaps the simplest soaring lift method to understand. If the ambient wind strikes a perpendicular obstacle like a ridge line, the air has no choice but to go up.

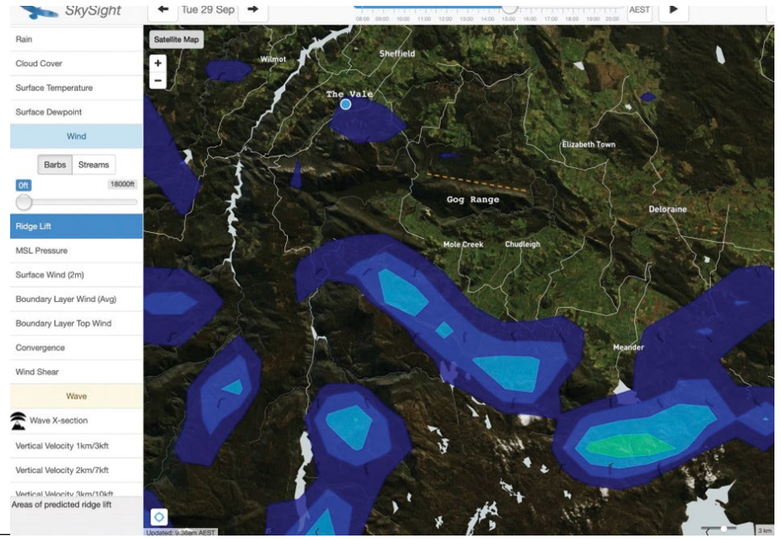
The 4,000ft Mount Roland, right beside the airfield, works really well for ridge soaring. The mountain is almost square, with sheer faces on the west, north and east sides. You can see this shape clearly on this Google Earth image of the local area. Orange dotted lines show soarable ridge faces.

I've done a lot of ridge soaring on Mount Roland and on the ridge line extending immediately to the west, toward Mount Claude. However, until Day Three, I had never been over to the eastern ridge line – the Gog Ranges.

I took off and motored up above the Gog Ranges, shut down the engine, and wafted down to the ridge line to give it a shot. The wind was in the right direction but wasn't very strong, so I couldn't get much above ridge-top height. But I had no problems in maintaining that height, while flying end to end along the Gog Ranges at will with an armchair view, watching the world go by.

After a few passes back and forth along the full length of the ridge, I recorded a short video of the experience. You can view the video here bit.ly/3eoJfKM

The Gog Range is around 2,500ft high, and the terrain and the forest are really quite pretty. Ridge soaring allows you the opportunity to see it all up close and personal.



SKYSIGHT RIDGE LIFT PREDICTION

Interestingly, the Skysight ridge lift prediction didn't highlight the Gog Range, but it did show good ridge conditions on the edge of the Central Plateau itself, parallel and to the south of the Gog Range. It was that prediction that gave me the impetus to try the nearer, smaller Gog Range line.

The Central Plateau is a much higher, much sheerer face, but it is also somewhat further away with a long motor run back into wind to get home. That is something to try on another day.

Here is how the ridge looked, from the far eastern end, looking back toward Mount Roland in the distance. First visit to the Gog Range in ridge conditions [top left]

This ridge flight in the Taurus Electro capped off three excellent days, experiencing three different weather systems and three different sorts of soaring technique, all in the same place. What a wonderful spot to go gliding!

GA

VINTAGE LOCKDOWN

BY PETER RAPHAEL
BENDIGO GLIDING CLUB
PHOTOS FRANK VAN DER HOEVEN

2020 probably hasn't been a great year for anyone, anywhere, but for a gliding enthusiast residing in Victoria and in particular Melbourne, the situation has brought its own challenges. This whole saga probably became a little more disappointing when we realised that our gliding club was on the other side of the 'ring of steel', a euphemism given to the police blockade put in place to inhibit unnecessary travel.

When the Victorian State Premier announced a full lockdown on 2 August, it meant that no one could travel from metro into regional areas without a valid permit. In fact, in the first instance and for some time, we could not even travel more than 5km from home, let alone associate with anyone else.

As an active member of the Bendigo Gliding Club and the Australian Gliding Museum, both located outside the Melbourne urban area, it was frustrating to accept that I would be unable either to continue with the restoration of the museum's K8 VH-GMA, or travel to Raywood and fly my Hall Cherokee VH-GPR, until restrictions were lifted. To make matters worse, an early easing of restrictions in the rural communities meant that limited operations at the club were possible – but without me!

August, September and October floated by like 'Groundhog Day' and it wasn't until 8 November that the wall came down and we could venture out of the city – but cautiously, as most of us hadn't driven for a while. With time off for good behaviour, late on a Friday night I was able to sneak out of Melbourne to beat the inevitable Saturday morning mass exodus to places remote or, in my case, the Bendigo Gliding Club.

There, I found the little Cherokee still waiting patiently under her covers. After a thorough clean and inspection she was ready to share the sky for a few hours of soaring in the company of Dave and Jenne Goldsmith's Ka6e, the BGC PW-6 and a smattering of other white gliders. Thanks for the photos, Frank!

While the spectre of future lockdowns does exist, we are determined to make the most of the rest of the season. Hopefully, our Annual Vintage rally can still happen at Bordertown on 9 to 16 January, as planned. Now where did I leave that Bocian?

Oh, and the Australian Gliding Museum? Well, things are again on the move there, too, with the K8 now in the process of receiving its new coat of colours. But that's a story for another time.

DEVELOPMENT AT JS

BY JONKER SAILPLANES

JONKER JS2 - SELF-LAUNCHER

Many pilots have been patiently waiting for a high-performance, versatile, easy-to-fly self-launcher. Finally, JS is wrapping up the development of this cutting-edge sailplane - the JS2 Revenant.

The JS design team aimed to meet most pilots' desires in a self launcher – great handling, good reliability, a powerful engine to take-off from short grass strips and with the endurance to travel under power to nearby mountains. These wishes are captured by the team in a slender airframe, providing that ultimate gliding performance required to challenge world records and win contests.

ABOVE: Attie Jonker and AP Kotze verifying the position of parts from the CAD models.

BELOW: First prototype JS2 fuselage out of the moulds.

DESIGN PHILOSOPHY

The JS design philosophy is based on finding the right compromises, taking into account all of the aspects required for a superior product and balancing the compromises to achieve the most sought after glider in the world.

The plan was to release the JS2 self launcher in 2017 and we were well on track with our plan. However, we re-evaluated our strategic plan based on market research and our risk assessment indicated a larger long term market share if we restructured our product range carefully. As a result, we fast-tracked the JS3 and defined and scheduled the development of our future product range.

This decision was, in a way, a hidden blessing – our design team gained invaluable experience, and more formal design processes were introduced based on Aerospace Standard AS9145 for the Product Development Process (PDP) through the use of Production Part Approval Process (PPAP) methodologies.

Every part, every fastener, every wire, every fitting and attachment was designed and imported to the final assembly model to check for possible integration oversights. DFMEAs (Design Failure Mode and Effects Analysis) were performed on most critical components and various design change iterations were conducted to lower the risk probability numbers before moving to the prototyping phase.

"Following a formal design process is time consuming but the advantage is that industrialization and certification is much faster," JS engineering manager AP Kotze explained.

PERFORMANCE IS NOT OPTIONAL

The JS2 may be regarded as a product aimed for the larger recreational market. Nevertheless, Jonker Sailplanes' unwavering dedication to the ultimate performance and aerodynamic excellence resulted in the creation of the Revenant.

Using the proven high performance JS1-C airfoil sections, combined with a new optimised fuselage design, the JS2 is not only expected to be highly competitive in the 18m configuration but should also be a serious contender in Open Class.

"The JS2 has a slight performance advantage on the JS1-C, which was already a great performing glider with a best L/D confirmed by the Idaflieg of 63:1," said Dr Johan Bosman.

PILOT COMFORT IS CRUCIAL

Easy handling and comfort is becoming a critical customer requirement.

The cockpit architecture is based on the JS3 cockpit with increased width in the shoulder area. Pilots up to two meters tall should not have any comfort issues.

The instrument panel size has been increased and moved closer to the pilot to improve the ergonomics. A wide lip on the combing improves instrument readability in bright conditions.

Rudder pedals are adjusted electronically, and the seatback is adjustable in flight with the aid of a lockable gas strut.

JS gliders are renowned for their great handling qualities, but feedback from customers suggested that increased rudder authority in the 21m wingspan should be considered. The design team accepted the challenge and designed an improved rudder system with 40% higher efficiency and a significant reduction in pedal forces.

Control forces were modelled and are expected to be light and balanced, giving the typical pleasant JS handling. "Female pilots won't struggle to lock the air brakes or retract the landing gear, and will definitely not get tired with high control forces, even when flying out of trim," Uys promised.

Water filling is done through holes on the upper skin, and one-way valves prevent water from syphoning when one wing is on the ground. The left and right main tanks are mechanically connected to prevent asymmetrical dumping with electrical activation.

RELIABLE PROPULSION IS A MUST

A self-launch system was developed around customers' non-negotiable requirements – reliability, performance and ease of use.

The engine selection process was no trivial task. As only EASA certified engines were considered. Just two engines made the primary specification, the Astro rotary 50hP EA50 and the 68hP 2-stroke Solo 2625 02i Neo.

Although the rotary engine is compact and runs with very low vibration levels, the more powerful Solo engine was selected to guarantee safe take-offs from the typical European grass strips.

The design team was faced with the major challenge of managing the vibrations generated by the engine. After vibration modes were modelled, four shock mounts instead of the normal three were designed to optimise protection to the fuselage and surrounding components in the extended position. The V-belts concept instead of a tooth belt was selected to damp the engine/propeller vibration modes.

Fuel injection was selected to enhance reliability and performance in various atmospheric conditions. SOLO developed a new fuel injection system with significant improvements in redundancy. Their latest design, the 2625 02i Neo, resulted in a very elegant, reliable system, ideal for the JS2.

JS designed a purpose-built propeller with a slightly reduced diameter and lower aspect ratio. Power curves were selected with sufficient static thrust but still able to prevent the engine from overspeeding at airspeeds up to 120km/h. The ground static tests suggest that the climb rates at maximum weight will be very impressive – a major safety requirement

The fuel system consists of a 12-litre main tank in the fuselage, and 2x12 litre integral wing tanks. To reduce the probability of fuel leaks, JS selected modern automotive industry standards by incorporating submersible fuel pumps for the fuel supply.

LEFT: JS2 propulsion system in the extended position.

BELOW: South African Oscar Goudriaan is always happy to provide feedback on cockpit size and the ergonomic layout with New Zealander John Coutts awaiting his turn.

A venturi pump, as used in large airliners, is used to transfer fuel from the wing tanks to the main tank. This venturi pump is a mechanical pump with no moving parts and an extremely low probability of failure.

The Engine management system, developed by LXNAV, is designed for minimum pilot workload. A 57mm colour display unit has a three-position switch to control the pylon position and enables the ignition. A start button on the stick can only

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ABOVE: JS3 visualisation with electric sustainer engine.

be activated when the engine is fully extended. Throttle control is provided by a mechanical lever positioned on the left hand side of the cockpit console.

Retraction happens automatically. A mechanical prop brake handle is provided to stop the propeller and a mechanical activated finger-type prop-stop advances in the propeller's path before retracting to a low-drag cooling position.

Provision is made for an emergency mode to enable the pilot to retract /extend the propeller in case of system failures or if logical conditions cannot be met.

SHORT FINALS

BELOW: JS4 Standard Class glider visualisation.

The completion date of JS's most modern sailplane is approaching fast.

JS2 development challenges have been overcome – consequently the JS2 prototypes are progressing at an increasing pace. The fuselage was demoulded in August, the engine system and doors are installed and all mechanical systems function according to design. Final design inspections are also completed on the fuel system and the electrical installation is expected to follow shortly.

The team is confident that the maiden flight will be conducted in the next couple of months.

This highly desirable recreational self launcher will definitely experience increased demand for the planned JS-5, a new Open Class glider based on the JS2. We have no doubt the time invested to amend the JS2 fuselage design to accommodate the big open class wings was time very well spent – more information on the JS5 will be released in 2021.

JS3 ELECTRICAL PROPULSION

JS silently engaged in the electrical propulsion area. The first JS3 with FES is currently in construction in Slovenia by Luka Znidarsic from LZ Design, who did ground-breaking work with front electrical sustainers. Luka has just tested his first retractable electrical system.

But JS not only invested in the FES system. Well-known aircraft engine producer, SOLO Aircraft Engines, was the major inspiration behind the retractable electrical propulsion system. SOLO used the JS3 fuselage to model their sustainer design in the "smallest possible modern fuselage".

JS and SOLO studied the maximum performance of the system and realised self-launching may just be possible. The concept of having not only a sustainer, but also a limited self-launcher with removable batteries, is very exciting. To enable this performance need, the battery capacity was increased to 9.4 kWh running at 400V and a larger, more efficient propeller was matched with the motor torque curves to minimise losses.

"The prototype is currently in the final stages of production. We have tested the pylon retraction system with the aid of rapid prototyping, and we are busy producing the E-system parts. We plan to start test flights in the very near future," Uys Jonker said.

JS4 - THE NEW STANDARD

The most recent developments in Standard Class design are most probably the Advantage and Streifeneder's Albatross, designed by Loek Boermans in the early part of the century.

JS was still unsure if a market really exists for Standard Class. Their concerns were put to rest by a customer survey launched on their marketing platforms. As Uys explained, "It is important to have the voice of the customer early in the design phase, to ensure we specify a product meeting our customers' needs. We need to understand who has an interest in Standard Class, what configurations are important and what power plants must be designed in the structure."

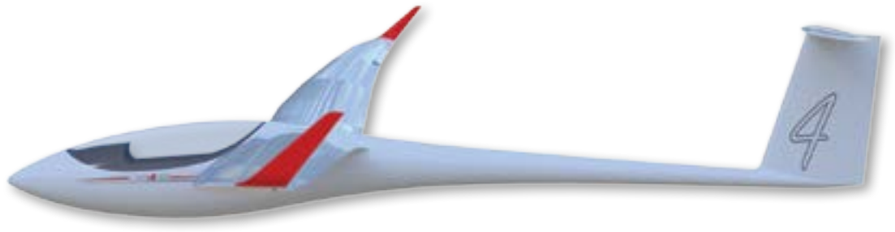
Although any new glider is expensive to develop and certify, the JS team is planning to price the basic JS4 more attractively with reduced options.

PRODUCT SUPPORT

JS's vision is to produce and sell the most sought after sailplanes in the world. Not only does our design team continuously improve in order to design world leading products, but we have established partnerships with our agents and support centres to support our brand globally.

After Sales Service is one of the critical components to meet customers' expectations. JS's product support plan is aimed to improve service and to address identified deficiencies.

Commonly needed spares have been identified and stored at various centres around the globe. A Service Level Agreement is being rolled out increasing the priority of spare parts delivery. Parts more likely to be damaged – like canopies, flaps, doors, hinges, plugs and springs – are planned to be dispatched within 24hrs from the spares stores. Replaceable items normally needed during competitions will also be kept at our distributors and agents. GA



ELECTRIC LAUNCH OF AS 34 ME

BY BERNARD ECKEY

It may have taken a little longer than expected but, on a perfect late summer's day in Germany, the Schleicher development team assembled their latest creation on the tarmac next to the short airstrip behind the factory.

While Paul Anklam, the main designer of this exciting project, conducted the preflight inspection, he received a reassuring pat on the shoulder from his boss, Uli Kremer. Then everything happened rather quickly.

Paul made himself comfortable in the cockpit before taking a launch behind the company-owned tug for an intensive check flight of the airframe. When everything was working as expected, Paul landed, lined up again, raised the motor and just a few moments later, surprised the spectators as the new glider rolled onto the bitumen runway with only a slight buzzing sound.

The initial buzzing soon increased when full electrical power was applied but the unusually low noise level pleasantly surprised the bystanders. Initially, the new bird advanced a little hesitantly but then accelerated quite rapidly along the runway. After only 220 metres it had clear air under its main wheel for the second time, but what the spectators saw next was quite surprising. The glider climbed away very steeply until it was neither audible nor visible.

LONG OVERDUE

While waiting for the aircraft to return, the Schleicher MD let bystanders in on his thoughts behind this project. Uli Kremer remarked, "The introduction of an aircraft like this has long been overdue. Our aim was to produce an electrically powered self-launching glider that allows totally independent operations and take offs without any helpers.

"Right from the start, we dismissed an FES (Front Electric Sustainer) system, as the limited ground clearance of the propeller makes it unsuitable on anything other than perfectly smooth bitumen runways. Fortunately we can now revert to mature battery technologies, which our engineers have successfully combined with modern electronics and a proven Battery Management System (BMS), in very close cooperation with specialized external companies.

"Luckily, some of the basic research had already been conducted during the development of the two-seater ASG 32 El. The trouble-free operation of that glilder in the hands of clubs has given us the confidence to adapt this technology for a self-launching single-seater."

However, the ASG 32 El is a much larger glider with a maximum all-up weight of 850kg. Therefore, it is not certified as a self-launcher, but even at this weight this glider achieves a climb rate of almost 1.5 m/s (2.5 - 3kts).

BATTERY DESIGN

The size of the ASG 32 made it possible to put the batteries in the engine bay but this proved impossible with the more slender AS 34 Me fuselage. Therefore the 8.6 kWh battery pack consists of two 'sticks' that slide into a rectangular enclosure within the inner wing panels. Both sticks consist of individual cells, which are all wrapped in a sheet metal cage for safety reasons.

The connectors between the individual cells act as fuses, just in case a short circuit occurs as a result of mechanical damage. This limits battery damage to only a few cells and

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ABOVE: The simple electric motor control unit.

BELOW: The electric propeller extended.

enhances safety even further. For inspection purposes both battery sticks can be easily removed and reinserted.

"Initially, we were looking at integrating the battery charger into the airframe but in the end a fully automatic external charger was decided on," Uli said. "It is plugged into the charging socket located in the aircraft's luggage compartment, right behind the pilot's headrest. For battery charging in a trailer, a corresponding wiring harness is available on request.

"The charger is designed for a standard 220 - 240 Volt power outlet and can recharge a totally flat battery pack within 4½ hours. While doing so, it also tops up the 12 Volt battery for the power plant electronics. However, we believe that only a fraction of the available battery power will be used on any given day and therefore we opted for a selectable charging current via the panel mounted motor instrument.

CHARGING UP

This was done for two reasons. First, it ensures trouble-free charging when less than 15 Ampere of electrical power is available and second, it allows for a more gentle battery top-up by selecting a lower charging current."

The battery manufacturer believes that the nominal battery capacity is fully maintained for at least 300 charging cycles (defined as battery empty to battery full). This corresponds to approximately 100 hours of engine running time and even at an above average motor usage of 10 hours per year, a reduction in battery capacity would hardly occur for at least 10 years. The company needs to gain a lot more practical field experience before they can provide more definite data but even if the batteries gradually lose some of their storage capacity after 10 years it doesn't mean that they need replacing.

"I think the biggest advantage of this new technology is the vast reduction in maintenance requirements," said Uli. "The EMRAX motor has no prescribed overhaul requirements other than a mandatory replacement of the main bearing after 500 operating hours. The propeller was especially developed for this aircraft/power plant combination and comes with a TBO of 1,000 hours. It means that a few drops of oil on the retraction linkages is the only maintenance required at annual inspections.

"Compared to conventional combustion engines this is quite a step forward and, if you ask me, it can also be safely assumed that the long term total operating costs will be roughly on par with conventional petrol engines."

CLIMB RATE

Uli Kremer's question and answer session was interrupted when the new bird was spotted again over the circuit area. As expected the pilot was bombarded with questions after his landing. "I wanted to demonstrate that the performance data is not just based on theoretical figures but is quite achievable in practical applications," he said. "My take-off weight was almost exactly 500kg and I only turned the motor off at 3000m (10,000 ft) although there was quite a bit of power left in the batteries.

"I still need to evaluate all the data but I think we can safely assume an average climb rate of more than 3.5m/s (7kt) at take-off power. For the rest of the climb I went back to the max. continuous power setting of 25 kW but the climb rate was still 2.7m/s (5kt) on average. Our predictions in terms of range under power can also be regarded as rather conservative. Even after a normal self-launch, a range of 130 km should still be possible. If you have a place in a hangar, you can mothball your trailer with an aircraft like this."

ENGINE AND POWER MANAGEMENT

"We are especially proud of the simple engine management," Paul elaborated further. "Moving the power lever is just about the only thing the pilot needs to do. Lifting it up one notch extends the propeller in just 12 seconds and only then can the starter button be activated. The remaining travel on the throttle lever is reserved for power selection. On take off it can be as high as 35 kW (47 hp) but it should be reduced to 25 kW (34 hp) for the rest of the climb.

"After moving the power lever into the bottom position, the motor stops instantly and the propeller automatically rotates into a vertical position before it retracts. All of this happens in just 15 seconds and without any further pilot input. In short, the handling of the motor could not be simpler and the inbuilt digital display of the power plant instrument provides a constant readout of all relevant data."

The BMS (battery management system) forms the kingpin of the safety system and ensures that the permissible battery temperatures remain between -20°C and + 60°C and that motor temperatures and charging currents always stay within safe limits.

Paul said, "Should a low battery situation arise, a warning occurs well before the BMS automatically begins to reduce power and hence prevents premature battery aging. Put differently, the BMS completely eliminates any concerns over an incorrect in-flight handling of the power plant."

AIRFRAME DEVELOPMENT

"Please let me add to that by giving you some information on the airframe," said Uli Kremer. "We developed the AS 34 Me and the AS 33 simultaneously as a long-term investment into the company's future. Both fuselages are largely identical and both aircraft feature further refinements to Gerhard Waibel's award winning safety cockpit.

This includes modified rudder controls for pilots with extra large feet, a modified instrument panel, in-flight adjustable backrest and further crashworthiness advances. The permissible cockpit load is between 70 and 115 kg and the generous size of the cockpit allows even tall pilots comfortable long to very long flights."

"What about the weight of the batteries?" one of the observers asked. "That's a valid question," Uli Kremer replied and remarked, "The empty mass of a fully equipped AS 34 is largely dictated by the weight of the batteries. In 15m configuration it is 390kg and 405kg when 18m wing extensions are fitted. In both cases the wing area is slightly larger compared to other Standard Class models but this is definitely an advantage given the heavier power source.

For this reason we have also improved the effectiveness of the airbrakes. The maximum all-up weight with 18m wingtips is 575kg resulting in a wing loading of 48.4 kg/m2. In 15m configuration the maximum wing loading is 50 kg/m2. Finally, new CFD (Computational Fluid Dynamics) designed winglets were integrated, which look very similar to the ones fitted on our latest AS 33 flapped glider."

WING PANELS

Because each battery stick weighs about 33kg, the inner wing panels tip the scales at almost 98kg, which makes the use of a rigging aid advisable. In comparison, the outer wing panels are very lightweight and weigh only 12kg and 19.5kg respectively. After their removal, the wingspan comes down to only 10.5 metre – perhaps small enough for a corner hangar spot.

The prime objective behind the AS 34 development is to provide maximum simplicity for club pilots and aviators looking for relaxed cross-country flying. Therefore they have integrated wingtip wheels for unassisted take offs but refrained from including a water ballast system in the standard package. It is, however, available as an optional extra, and the same applies to a tail tank.

Bug wiper garages are not on the option list either but a bug wiper system can still be factory fitted. Solar cells on the engine bay doors are also not found on the option list as the standard 10 Ah battery for the avionics is constantly topped up by the main engine battery - another task the owner doesn't need to worry about.

SIMPLE INDEPENDENCE

Uli said, "In summary, we have now added a electrically powered self-launching Standard Class aircraft to our product range, which is primarily designed for pilots who prefer a simple to fly, simple to maintain and simple to operate aircraft on the ground and in the air. As long as they can find a power outlet at the end of the day, they can expect a fully operational aircraft when next they arrive at the airfield.

"Our early customers regularly confirm that totally independent operations, even in remote locations and away from any gliding infrastructure, rank high among the AS 34 Me's attractions, apart from its excellent performance. Therefore, it's no wonder that the initial response to this new glider is very encouraging indeed.

"In the past, many gliding clubs have stayed clear of gliders with sensitive combustion engines for fear of engine management issues and the threat of high maintenance costs. Fortunately such concerns no longer exist with electrically powered gliders and therefore we have already received firm orders from quite a number of clubs. We are in no doubt that the new AS 34 Me will help greatly to increase the attractiveness of our beloved sport in all corners of the globe. Two of these gliders are already on order by customers from Australia."

GA

WINNING THE MENTAL BATTLE PART 3

BY BERNARD ECKEY

In part 2 of this series of articles we not only considered the advantages of thinking ahead but also put mistakes and setbacks under the microscope. Today we will learn how we can polish our skills without being anywhere near an airfield or a glider. If by now you are already thinking of turning the page I strongly encourage you to reconsider. Please read on – you might get a few useful hints or run into some food for thought.

Men or women in the top rank of their sports are usually quite certain that having success and winning happens almost exclusively in the head. Most of us might interpret this as a reflection on their intelligence and think that one's own intellect is not up to par with these celebrated athletes. However, intelligence plays only a minor role. What really matters is that, in parallel with the necessary practical skills, athletes have improved the processing capabilities of their brain.

MENTAL REHEARSALS

The scientific definition of mental rehearsal is "building successful repetitions of a performance segment by constructive use of our imagination". Sometimes it is also referred to as 'guided imagery' but, regardless of its name, we are talking about exercises of the mind aimed at training the brain to adopt better patterns of activity.

The theory behind it is simple. Whether we experience something or whether we just imagine it – every event leaves a significant imprint in our brain that governs future behaviour or actions. It is almost like downloading an improved software package into our computer.

Even while playing as children, we 'downloaded' countless such programs into our brain. It has established neurological pathways that we are regularly using when certain actions are required. These reactions now occur automatically and without conscious input on our part. Put differently, we don't have to actively think any longer when confronted with certain problems because the brain automatically implements appropriate responses dictated by previously established neuromuscular pathways. This knowledge can be applied to almost all activities and learning new soaring skills is no exception.

LIMITING THE WORKLOAD

Another advantage of mental visualisation is that it helps to limit the workload in demanding situations. Daily winners of competitions often speak about an effortless flight that turned out, for them, to be surprisingly easy and straightforward. Why is it easy for some competitors and very difficult for others? Primarily, the reason lies in repeated visualisations of the flight with all its challenges and opportunities. More often than not, winning pilots have mentally performed the task well before they climbed into their gliders.

What works well for top competition pilots will work for each and every one of us. Enhancing our soaring skills can continue between flights and doesn't need to come to an end when we climb out of the cockpit. Most of us have a few idle periods every day, which provide excellent opportunities for practising mental rehearsals. It follows that it can be squeezed into the busiest daily schedule more often than we think.

EYES, HANDS, FEET

So, how do we go about it? The first step is to eliminate distractions. Make yourself as comfortable as possible in a quiet place and take time to wind down, as total relaxation is the gateway to the exercise. Now visualise an inflight situation you have trouble with. Think about the underlying reasons for your difficulties and carefully work out a better way of doing things. This might be the hardest part, but after this has been accomplished you have a blueprint for an improved course of action. Bravo, the first step of your mental training has already been successfully completed.

The second step is to close your eyes and imagine a particular scenario as seen through your eyes, as felt through your limbs, and as heard through your ears. Be fully immersed. Feel the emotions, hear the audio vario and feel the feedback from the aircraft. Don't laugh – it can be done! Take your time and focus on nothing but that troublesome flight segment.

Now the time has come to implement the new, enhanced and perfected course of action. Repeat it frequently and, for maximum benefit, use your hands and feet to simulate moving the stick and rudder. During the first few attempts this requires your full and undivided concentration but, as with everything else, it gradually becomes easier.

Of course, such exercises must be repeated many times and over an extended period of time. It is better to practise five minutes twice a day than to practise thirty minutes once a week. Keep doing it whenever an opportunity presents itself, and it will pay dividends.

The third step is the easiest. Go gliding and let the new 'software program' work for you. When it is fully absorbed you can immediately take advantage of it and it can never be erased again. Let that inspire you!

ACQUIRING NEW SILLS

Mental rehearsals are not only useful for eliminating weaknesses but can also be used for an easier and quicker learning of new skills. Personally, I used mental rehearsals for the first time during basic training in order to quickly come to grips with winch launching. Ever since, I have used it for polishing other flying skills and one of many examples is the quick location of thermals and the efficient positioning within its strongest core.

However, mental rehearsals can lead to problems if the particular training routine contains flaws and if this is the case it will only bolster wrong practices or bad habits. Therefore it is advisable to consult a recognised coach to ensure that you are doing it right. Otherwise

mental rehearsals internalise wrong procedures and become highly counterproductive.

Now we can see that mental rehearsals have a number of significant advantages simply because they synchronize and automate mental processes and actions. This statement is underpinned by research that identifies enthusiasm and motivation as strong contributors to rapid formation of new neuromuscular pathways.

It is therefore no surprise that highly motivated cross-country pilots use mental rehearsals with great success. They know that the difference between a good and an even better pilot is their mental flight preparation. It minimises time for decision-making in the air and allows an undivided focus on feeling the air and efficient flying.

What holds true for record or competition pilots holds equally true for each of us. Some pilots use mental rehearsals to train for possible emergency situations such as cable breaks during a winch launch or aerotow. Safety is greatly enhanced when the prompt implementation of all necessary action happens almost automatically.

PRACTISE MAKES PERFECT

If you have ever been to a skydiving event, you will have seen a team performing a 'dance' that replicates moves they intend to do in the air. Called dirt diving, it is a very visible exercise of a mental as well as a physical rehearsal. Downhill skiers do the same thing, imagining the turns in the upcoming course. The world's best musicians also practice intensely without touching their instruments at all.

Most of us have a tendency to refine skills that we are already good at and dislike practising something we have trouble with. It stems from the fact that we all know how hard it is to tackle underdeveloped skills or eliminate bad habits. Do you prefer thermalling right rather than left or vice versa? Don't worry, you are not alone, but while airborne it is very difficult to overcome such deeply ingrained habits. It requires a lot of persistence and willpower just when we need to pay full attention to a lot of other things.

No wonder that we tend to postpone such practise, but the good news is that it can be done on the ground by using the power of our imagination. As long as mental rehearsals are done correctly they help greatly to eliminate long held bad habits. The more positive mental repetitions you have completed, the easier it is to implement them when it really matters and the better you will cope with difficult situations when they next arise.

Let's get back to cross-country flying now. Written notes taken during mental preparation are most useful as they help to absorb the key points and provide a kind of checklist. Memorising navigational features, likely convergence lines or thermal hotspots, for example, greatly reduces the mental workload while on task. This often results in an effortless flight and is followed by pilots reporting that "everything went according to plan". Of course, their plan was established during flight preparations and during mental rehearsals.

FLYING BREAKS

In summary, our training doesn't have to end the moment we step out of the glider. Mental rehearsals are a very effective way of learning new skills and upgrade existing ones. If we are honest, we have numerous daily breaks that can be utilised to polish our skills by the constructive use of our imagination.

Soaring is our passion, isn't it? If you are like me, you won't mind closing your eyes and spending a few minutes every day to think about your favourite pastime. Trust me, it helps greatly in becoming a better pilot!

That's all for today. The article for the next issue is directed towards stepping outside of our comfort zone. Experiencing butterflies prior to 'leaving the nest' and venturing beyond the gliding range of their home airfield is not uncommon. As it seems to be especially prevalent among newcomers, we will investigate what can be done to help pilots who lack the confidence to explore the full spectrum of our beloved sport.

GA

GLIDING – THREAT AND ERROR MANAGEMENT

OR HOW TO REDUCE MISTAKES AND FLY SAFELY PART 2

BY ARTHUR GATLAND

This three part series of articles was first published in Soaring NZ and is reproduced here with their kind permission.

In the last issue, I introduced Threat and Error Management (TEM) as a simple yet powerful technique for assessing threats affecting any and every glider flight. Recognising threats allows pilots to predict situations where they might make errors or forget something, which increases the possibility of accidents.

As I said in the last issue, our accident rate in NZ is high and yet none of our spate of accidents has been the result of structural or mechanical defects – all have resulted from pilots unnecessarily putting themselves in a situation that for various reasons have resulted in a crash. Ridges, rocks and trees do not suddenly leap out and hit gliders – yet we manage to collide with them on a regular basis.

This series of articles applies to every glider pilot in New Zealand, regardless of experience.

In this article I will continue the theme of TEM as it applies to cross-country flying, an area in which we suffer a disproportionate number of accidents, many involving injury or death. Remember that to assess what constitutes a threat, we use the concept of a Pristine Flight and look for anything that introduces a variation to this theoretical flight. Let's look at a Pristine Flight in the cross-country context.

PRISTINE FLIGHT (CROSS-COUNTRY)

This is a 'straightforward' cross-country soaring flight where everything goes exactly to plan. You are a current, relatively experienced cross-country pilot who has completed a number of good flights, and also have completed several successful outlandings. You arrive at the airfield and your private or club glider is available. The battery is fully charged, and other pilots are readily available to help you rig the glider and complete the duplicate check. You are prepared with drink, food, hat, sunglasses, maps etc, and you have a retrieve crew available if required. At the launch point, helpers are readily available to help you line up and a towplane is waiting. You are current on type and have flown cross-country recently. On your last flight you practised a short landing. There is light wind and it looks like a great soaring day. The weather is pleasant, not too hot. You aerotow to 2000 feet and easily find good lift. You have set yourself a relatively short task for the great conditions and your route will not go through any controlled airspace. There are many wide flat paddocks available en-route and with very light winds you have a choice of landing directions if required. During your three-hour thermal flight there is good lift everywhere and you never get so low that an outlanding is a real possibility. On return you decide not to do a 'final glide' and rejoin the circuit area at 1,500ft, followed by an uneventful circuit and landing. This is a Pristine Cross-country Flight – good fun with no real challenges for an experienced pilot and there are no real interruptions to your simple plan.

THREATS

Now let's talk about likely threats or variations to your planned flight with a hypothetical example. You are running late and rushing because you are concerned that the best thermals may die out within a few hours. You need to rig your glider, but no-one is around to help, so frustratingly you have to muster a few helpers. During your daily inspection and rigging check, another pilot interrupts to ask you where you are planning to go. You had forgotten to check your battery charge level, but you think it will be okay for a three hour flight. Because you are short of time, you must hurry to get ready and you are annoyed there is a queue for takeoff. While strapping in, the duty instructor asks if you have a retrieve crew organised and criticises you when you admit you haven't. You are annoyed that he has questioned you in front of other people as you don't like criticism from anybody. You also realise you have left your cellphone in the car, but don't ask someone to get it because you will look even more foolish. You forget to do your pre-takeoff checks as a result of this incident. The flight proceeds satisfactorily for the first hour, but then a moderate wind develops. You hadn't checked the weather forecast so this is unexpected). There is some over-development with a few light rain showers, resulting in some water on your wings. You decide to try to head back towards home base, cursing your glider's deteriorated performance and annoyed that your late departure has spoiled the day a bit. You think you might have to land out so try calling home base by radio to organise a retrieve crew, but your battery is low and you have trouble contacting anyone. Distracted by this, you suddenly realise you are at 1,000ft and haven't even started looking at possible paddocks. However, the sun is shining on the ground a few kilometres ahead and you are sure that if you can just sneak over a ridge ahead, you should find lift. You take a chance and luckily it works out and you find weak but consistent lift and climb away. After a slow climb you make it back to home base, where you do your usual landing, halfway down the strip so you can stop by the trailer.

This hypothetical example illustrates a number of Threats, some external and some self-inflicted – and there are potentially many more. All of these variations to the Pristine Flight (threats) will increase the likelihood of you making a small slip, or an error in judgement, or forgetting something – regardless of your experience. Let's review what these Threats might include:

Cross-country flying by its very nature has a significant number of threats, including continual possibility of landout, weather changes, unpredictable lift, different terrain with changes in height above sea level, often areas of partly unlandable country, or flat but very small paddocks, use of unfamiliar hills to find ridge lift, navigation challenges, and so on. As flights are often of longer duration, dehydration and hunger are always present to some extent, and have an insidious effect on your decision-making. Wave flights introduce a specialised range of threats that require careful management. It is the presence of these threats that form part of the challenge and satisfaction of cross-country flying. However, you must not underestimate the risks that these challenges present.

Time pressure	Frustration	Impatience	Procedural uncertainty
Heat discomfort	Interruptions	Weather changes	Poor preparation
Overconfidence	Outside interference	Inexperience	Lack of currency
Fatigue	Other traffic	Poor training	Poor health
Inexperienced crew	Launch delay	Turbulence	Unfamiliar airfield
ATC / airspace	Technical issue	Dehydration	Hunger
Difficult terrain	Rising ground	Few landing areas	Risk of landout
Navigation	Water ballast	Ridge flying	Cloud flying
High altitude	Use of oxygen	Cold temperature	Icing
Motor gliders	Pressure to get home	No retrieve crew	Overdevelopment
Sea breeze	Wind changes	Rain	Blue thermals

Ironically, carrying food/drink to mitigate dehydration and hunger introduces another threat: managing these items in the cockpit.

MANAGING THREATS

All these threats increase your likelihood of making an error. In this context we are not talking about errors in speed-flying, like not picking the strongest thermal, or incorrect speed-to-fly technique. We are discussing errors that result in reduced safety margins, or ultimately could contribute to an incident or accident. Most pilots can very easily recognise all threats if they think about it, but a superior pilot will implement a strategy to prevent an error resulting from any of these threats. In Part One of these TEM discussions, I discussed threats occurring on local flights. Cross-country flights have all of these, plus the additional considerations discussed above. Some examples of how to manage the threats might include the following.

SOME SPECIFIC THREATS AND ERRORS

There are two particular threats that I will concentrate on briefly, since New Zealand glider pilots have suffered more than their fair share of injuries and death in these situations.

1. Ridge Soaring; particularly in high country. A number of very experienced cross-country pilots have crashed while ridge soaring. Why? By

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definition, if you are ridge soaring there will be wind, and ridges are never totally symmetrical, which means there will be areas of stronger lift, turbulence, and sink. And hills do not move – we effectively fly into them by getting too close and/or failing to allow for wind effects. Let's dig a bit deeper into this area of gliding.

2. Outlandings: Fact - All cross-country pilots are quite capable of landing their glider in a paddock. Fact - As a generalisation, there are sufficient landing spots anywhere we fly, although in some areas extra height and gliding distance might need to be maintained to reach them. Fact - In the 11 years prior to writing this we have had 33 major outlanding accidents with 4 fatalities and 1 serious injury. Many of these were unnecessary and were caused by pilots leaving their decision to land too late, or failing to select landing spots until too late, or pushing on hoping things would work out. Contributing factors may have been dehydration causing poor decision-making. Let's discuss some of threats around outlandings.

Threats	Strategies
There are many common cross-country threats as listed above that can be mitigated by one thing – Good Preparation.	Good preparation: • Glider – careful rig, DI/duplicate check, batteries charged, clean canopy, clean wings, no dirt/grass in cockpit, etc. • Personal – rested, healthy, fed and watered, correct clothing, sun protection, warm clothing if required, take drink/snacks. • Flying readiness – current on type, current on short landings, BFR current, complete routine skills training, appropriate confidence in ability for the elected task. • Obtain a reliable weather forecast, but regardless of the forecast, be alert for weather changes at all times.
Time pressure	*Any time* you feel pressure to hurry – for whatever reason – you should be aware that this is a major cause of errors, particularly by upsetting the important preparations discussed above, or missing procedures (takeoff checklist) etc. Always give yourself plenty of time when preparing for cross-country flights. If you *have* hurried to rig and get your glider to the launch point, ask another pilot to double-check everything for you – the 2 minutes could save you from embarrassment and potentially save your life. If it is *essential* that you get home after your planned cross-country flight, stay local, give yourself a 3 x 40km triangle task within range of the airfield.
Procedural uncertainty, e.g. ATC, airspace heights, procedure for transit of controlled airspace, unfamiliar airfield, any operational procedures.	Ask for advice from instructors or experienced pilots. Pilots respect other pilots who make sure they know what they need to know and are not afraid to ask.
Wave flying – threats include terrain, use of oxygen, cold, higher winds, glider limitations including IAS to TAS relationship, icing.	Good training and preparation is essential to mitigate these threats. Decompression training is *extremely* beneficial – if you use oxygen at all you should make an effort to experience this training.
Example:	*My parents (Frank and Anne Gatland) used to crew for Ray Lynskey at several World Champs. They were always first to have the glider on the launch grid, fully prepared and ready to go, and then go back and have breakfast or early lunch, which not only beat the rush but also removed all the time pressure, and ensured Ray was relaxed.*

THREATS	POSSIBLE STRATEGIES
Outlandings in themselves are a threat, since they involve landing on unseen paddocks that can usually only be assessed from the air.	Nevertheless, it is *easily possible* to adequately assess paddocks, including approach obstacles, slope, surface etc. – **IF** this is done diligently. Unfortunately often it is not until too late, when alternatives may be few.
Circuit planning for unfamiliar paddocks.	This should be easy, **IF** you have practised at home base. The skill is to *not* use your altimeter, but assess angle to the landing strip, and *do not* use ground features for base turn and finals, but always make your turns by reference to the landing point. Thus you are continually practising for a paddock landing. **Instructors –** take this important point on board when teaching!
Requirement to carry out a short landing.	The strategy is to ensure that this is normal. Every landing you do should be the same type of approach and short landing, especially if you only fly once a month. If you are one of those pilots who *always* lands halfway down the airfield near the hangar or trailer, then quite frankly you are an idiot!

INEXPERIENCE AND RESPONSIBILITY

Once again, instructors and experienced cross-country pilots must help us lift our game. They should be aware that inexperienced cross-country pilots may not recognise all threats existing on any particular day. Even if a pilot is fully trained and cleared to fly cross-country without supervision, he/she can still learn from discussions with more experienced pilots. A short helpful chat to ensure they are fully prepared, and have a plan, and are mentally prepared to land out if necessary, may save their life.

As I said previously, the main ways that new pilots can gain experience and knowledge is by instructors or experienced pilots passing on these thoughts, OR learning by making mistakes! Which method is better??!!

CONSEQUENCES OF ERRORS

In Part One, I said that an important part of Threat and Error Management (TEM) is to understand the consequences of possible errors, and to make doubly sure the most consequential errors do not occur. Forgetting your map or not having the correct map loaded on a local flight may not be important at all, but doing the same on a cross-country flight could lead to navigation uncertainty, infringing controlled airspace etc. Stalling while pulling up into a thermal might be slightly annoying, but stalling on base turn or while trying to thermal from very low altitude will be the last mistake you ever make.

When flying cross-country, the most common safety-related errors – that of late paddock selection and/or pushing on below a safe height to join circuit to land in a paddock, and speed maintenance when ridge flying – have consistently proven to have serious implications including major damage, injury or death. Yet collectively we persist in committing these errors. To be blunt – why are we that dumb? I don't know … but I suspect it's gross over-confidence, or ignorance, or denial – "It'll never happen to me."

All I can say is that if this applies to you, then YOU need to wake up and realise how illogical your attitude is. Just ask your wife/husband what they think about your attitude to survival.

A number of years ago, a top overseas competition pilot who was well-known for pushing on at low altitude, was heard to say, "I'm a lucky pilot, I've damaged 13 gliders and never been hurt." That was not too long before his fatal accident.

SUMMARY

Every flight involves some threats, and all pilots must ensure they recognise these and have a strategy to manage the threats and prevent errors, and/or have a process to catch errors or slips that may have occurred. Remember we ALL make some mistakes on every flight – the important thing is to ensure they are not critical ones, or that they are captured before they lead to an undesirable position.

Motor gliders – attempts to extend the motor to avoid an outlanding.	There is a serious skill required to extend and start the motor, with all the extra drag, ***while also*** flying a circuit and approach into a paddock. You *must assume* that the motor will not start – and on several occasions this is indeed what happened, resulting in accidents, some fatal. You must practise this skill at home base, with engine starting and simulating failure to start. Priority is **always** to fly the glider first.
Error in judgement, or wind shear, or sink leading to loss of height or speed.	This is unfortunately a common outcome in outlandings for a number of reasons – late decision, lack of awareness of wind, misjudging altitude above high terrain etc. The ***most important strategy*** is maintaining flying speed at all costs. It is infinitely better to land short, or land somewhere unplanned, with safe approach speed, than to try and stretch the glide, or to try to thermal at low altitude, which has led to stall/spin accidents which are often fatal. However these can normally be avoided by ***making the landing decision in good time.***
Push-on-itis, or "must get home at all costs". This is very common with glider pilots – it is not uncommon for a number of pilots to head off on a cross-country and *not one* has organised a retrieve crew. Additionally pilots often have evening commitments (family, dinner engagements) with all the pressure to get home that this provides. A resulting error from this threat is making the decision to land far too late.	Your thinking should be as follows – every time I fly cross-country I <u>am</u> prepared to land out. I warn my wife/husband of the possibility, arrange a crew, ensure my car is full of petrol, take warm clothing for the cooler evening drive home – and if I have an important dinner engagement, I don't go cross-country! Being mentally prepared to land out is 90% of the strategy to achieve a safe outlanding. To avoid making a late decision, you ***must have*** decision heights set in your mind. As an example, you might have the following Rules: "Above 2,000 ft AGL I am always aware of general landable terrain, and I know the wind direction. Below 2,000 ft AGL I have specific landing areas in sight. Below 1,500 ft AGL I select a specific paddock and decide landing direction. At 1,000 ft I have a circuit planned, while continuing to try to search for lift. At 600 ft AGL I make the irreversible decision to land and join circuit, lower the landing gear and turn the audio vario off so I am not tempted to try to climb away." A surprisingly powerful strategy is to say out loud, "I am now going to land."
Outlanding nervousness or under-confidence, leading to stress and often poor judgement.	Maintain flying currency and make all landings practices for paddock landing. If unsure do a quick circuit and landing before starting cross-country flight (as Ray Lynskey used to do). The less confidence or experience in outlandings, the earlier you should make the decision and commit to carrying out a safe landing.

WHAT ARE THREATS?

Any variation to our straightforward Pristine Flight is a Threat. Every Threat increases the likelihood of an Error being committed Every Threat requires a positive strategy to manage it and prevent errors

Useful Strategies: A reminder that the following are just a few examples of TEM strategies that should become automatic to be a skilled and safe pilot.

TEM STRATEGIES

Use SOPs / Procedures diligently
Don't succumb to time pressure
Always fly the glider first
When fatigued be more careful and conscientious
After interruptions, say "Where was I?"
Always carry out a Situation Awareness review after a period of high workload
Set limits and stick to them – particularly with respect to landout decision making
Don't "see what you expect to see" – look for errors
Listen to "that little voice" that questions what you are doing
Take advice from other pilots, especially experienced glider pilots

TO EVERY GLIDER PILOT

Acknowledging your vulnerability to mistakes is actually a sign of strength. In flying, you never stop learning. Every flight, whether you have 50 hours, 500 hours, or 15,000 hours, presents us with the same threats that must be recognised and managed. On every single flight you need to ask:

What are my threats today?

How will I manage and mitigate these?

In the next article I will continue the theme of Threat and Error Management into competition and other specialist flying – which is an area that has resulted in a large number of serious accidents.

GA

OPERATIONS

REGULATORY STRUCTURE

The GFA Operations Team is frequently contacted by members seeking information about flight rules and procedures, and it is evident that some members are unaware of the Regulatory structure under which we fly.

Gliding in Australia is subject to the Civil Aviation Act 1988, Civil Aviation Regulations 1988 (CARs) and Civil Aviation Safety Regulations 1998 (CASRs). Certain exemptions from the provisions of the Civil Aviation Regulations 1988 have been granted to members of the GFA by way of Civil Aviation Orders (CAO) 95.4 and 95.4.1. Where exemptions exist, the practices adopted by GFA are outlined in the GFA Operational Regulations approved by Civil Aviation Safety Authority (CASA). Certain other CAOs also apply to gliders, such as CAO 20.18 (Aircraft equipment — basic operational requirements) that provides a general transponder exemption for certain classes of aircraft (including gliders). This regulation suite sets the minimum requirements to be met by pilots.

In addition to the above, GFA has a Manual of Standard Procedures (MOSP), which outlines certain rules and recommendations unique to gliding that enhance safety and reduce risks. MOSP Part 2 deals with glider flying operations, and MOSP Part 3 outlines the GFA's Airworthiness requirements. Organisations affiliated with the GFA and individual members must also operate within these rules and recommendations.

Where the requirements of the MOSP are in conflict with those contained in the Regulatory documents, the Regulations shall take precedence. An exception to this is where the MOSP sets a higher standard than required by the Regulations, in which case the higher standard must be met.

The GFA operational Regulations, Manual of Standard Procedures (Part 2), and the Civil Aviation Orders have been combined into the GFA Operations Manual that can be downloaded at this link: https://tinyurl.com/yywfztzn

GOMEMBERSHIP SYSTEM - ACHIEVEMENTS AND AUTHORISATIONS

The various operational Achievements, such as 'A', 'B' and 'C' Certificates, and authorisations like the Flight Radiotelephone Operator Authority are to be evidenced by logbook endorsement. Sticker templates for the various endorsements can be downloaded from the GFA Forms Library at this link: https://tinyurl.com/y3hov9f5

In the membership database, operational achievements are called Qualifications and authorisations are called Credentials. The achieve a Qualification, the member must hold the underlying credentials. For example, to achieve the 'A' Certificate Qualification, the member must hold the following Credentials:

- Radiotelephone Operators Endorsement (required before first solo) – evidenced by either a copy of a licence issued by CASA, or a GFA logbook endorsement in the format described in MOSP2, Section 19.1;
- 'A' Certificate Exam – evidenced by a copy of the 'A' Certificate Exam Certificate awarded upon successful completion; and
- 'A' Certificate Flights – evidence by a copy of the 'A' Certificate logbook endorsement.

For every credential added to a member's profile, the member must upload a copy of the relevant evidentiary document. A list of required evidentiary material is in the document titled 'Qualification and Credential application and evidence', accessed via the Documents tile in the GoMembership database.

CHRISTOPHER THORPE
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NEW FLIGHT REVIEW PROCESS

The new flight review process has been widely accepted and many pilots have now completed their Flight Review under the new system. While most pilots have been granted a 24-month review period, some pilots with low currency have been granted a one-year review, which is how the system is intended to operate. Feedback from pilots and instructors has enabled us to improve the online examination question-and-answer bank.

SUBMITTING SOAR REPORTS

The introduction of safety management systems in gliding is in line with a global move to put ongoing safety measures in place to prevent aviation accidents and place the responsibility of this on aircraft owners and operators. Safety management systems cover safe operating parameters, the qualifications and training of the flight crew, sailplane maintenance, emergency procedures, health and safety considerations and continuous improvement.

A critical element of our safety management system is the reporting, investigation and analysis of Incidents and Accidents. The overriding purpose for any organisation in carrying out incident investigation is prevention of similar incidents as well as seeking a general improvement in the management of health and safety.

Experience has shown that accidents are often preceded by safety-related incidents and deficiencies thereby revealing the existence of safety hazards. Therefore, safety data is an important resource for the detection of potential safety hazards. In addition, while the ability to learn from an accident is crucial, purely reactive systems have been found to be of limited use in continuing to bring forward improvements. Reactive systems should be complemented by proactive systems, which use other types of safety data, to make effective improvements in aviation safety. Relevant gliding occurrences must be reported so that the information can be analysed, thus allowing appropriate safety actions to be taken on the basis of the information collected.

An occurrence report must be submitted by either the owner, operator or crew of an aircraft as soon as practicable and by the quickest means possible. While both the crew and the owner must report the occurrence immediately, it is understood that the owner may not learn of the accident until sometime after the event, and that the crew may be unable to make a report due to personal injuries. A report can also be made confidentially by anyone else who observes or has information about an occurrence.

The best way to report safety issues about gliding activities is by using the GFA's online SOAR system. This system is accessed via the My GFA tile in GoMembership. Clicking on this tile will take you to the MyGFA Services webpage where you can click on the SOAR (Ops) Report button to commence your report. To make this task easier, write and save your report in a word processing file first, and then cut and paste the information into the relevant fields in the SOAR Report.

You will receive an email confirmation upon successfully lodging the report. Alternatively, you can use the paper-based 'GFA Occurrence Report' form that can be downloaded from the GFA Forms Library via this link: https://tinyurl.com/y673t263

The SOAR system is a confidential reporting system and personal details will not be released to anyone without appropriate authority. GFA does not accept anonymous reports for the very reason that authorised persons cannot contact an anonymous reporter to verify the report or to seek additional information. Further, GFA personnel must be satisfied that the reporter's motivation for reporting is aviation safety promotion, and that the reporter is not attempting to damage a rival or pursue a personal agenda.

For further information on accident and incident reporting, investigation and analysis, please check the 'Accident & Incident Guidance for CFIs' folder in the GFA Documents Library at this link: https://tinyurl.com/yy36s756

De-identified annual summary reports of all accidents and incidents reported under the SOAR system can be accessed from the GFA Documents Library at this link: https://tinyurl.com/y3x9njzg

HEAVY LANDING ACCIDENT

At the time of writing this article in mid-November, I was informed of an occurrence that had the potential to end badly. During a flight review of a solo pilot, the instructor was too late to take control and prevent a heavy landing. The instructor conducted an inspection of the tail for damage and found none. The glider was then re-launched by aerotow and, during the ground roll, the pilot under check dropped the right wing and took a while to get the wings level.

At about 200ft AGL, the flight crew identified they had no left aileron control. The command pilot informed the tow pilot of their difficulties and requested they be towed into position to conduct a right-hand circuit to the operational runway. The landing was completed without further incident and a post-flight inspection revealed nosewheel damage, a cracked front bulkhead with delamination from the skin, and interference with and possible bending of the aileron control circuit.

This incident highlights the importance of always having an authorised inspector, who is familiar with the loads that the sailplane is likely to have been subjected to during a heavy landing, conduct a thorough inspection of all the likely damage points. For specific guidance on heavy landing inspections, refer to GFA Basic Sailplane Engineering, Chapter 25 https://tinyurl.com/yytzwo3d or .https://bit.ly/2JrfhdE

GA

ANTHONY SMITH
Chair Airworthiness Department

It is well known that people who are well connected in society end up being successful in life. Something similar can be said for connections in aircraft. Those with good connections between their structural elements and well connected controls are going to be more successful in flight.

Unfortunately, the statistics show that in Australia at least one sailplane each year attempts to go flying either with something disconnected, or something that becomes disconnected in flight. The figures are based on the formally reported incidents, and it is quite possible that many more incidents remain unreported. To put this situation in perspective, the British Gliding Association reports around three flights with disconnections each year. While there are a number of reasons behind this, one of the reasons is that the BGA do not perform independent control connection checks after rigging.

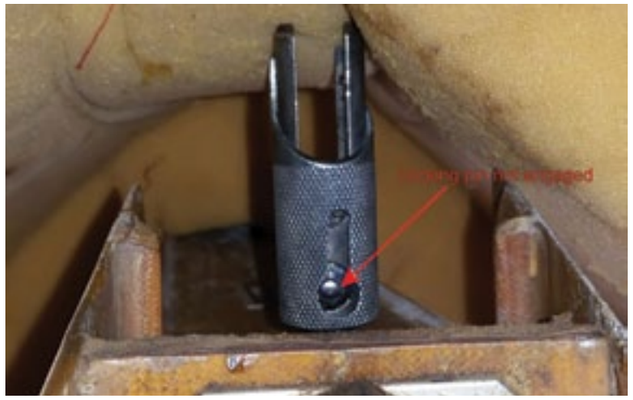
It is no surprise that the majority of the reported disconnections are for flaps, airbrakes and ailerons. After all, these controls make up the majority of the aircraft controls that are routinely disconnected and connected during derigging and rigging and there is typically a connection each per wing. Adding to the difficulty is that most fibreglass sailplanes have limited access to these connections, which often makes visual checking and verification very difficult.

DISCONNECTED ELEVATOR

A well known event occurred in 2017 in which an elevator became disconnected in flight:

A post annual inspection evaluation flight was being carried out in a Jantar 3. The aircraft was rigged and a dual check carried out. An aerotow was carried out normally, followed by a straight ahead stall. The pilot then chose to head under a cloud to find a thermal. After flying under the cloud, the nose suddenly dropped and the aircraft accelerated to 65kts. When the control column was pulled back, the aircraft did not respond and it was obvious that there was no elevator authority.

After flying straight and level, the pilot noticed the nose attitude was periodically nodding up and down and the speed cycling between 55 and 65kts. At 1,600ft AGL, the pilot decided not to bail out and chose to attempt a landing. After a wide circuit and long final, the pilot used a



small amount of airbrake over the runway threshold. At the touchdown phase, the aircraft entered a nose down phase of the nodding cycle and the aircraft contacted the runway in a nose down attitude at 60kts. The main wheel collapsed and the tail wheel was pushed up into the tail boom.

The pilot reported that they had attempted to damp out some of the pitch oscillation by shifting their weight fore and aft in the cockpit.

It was subsequently considered that that the sleeve on the elevator connection had not been secured properly and that the spring loaded safety pin had not fully engaged through the slot on the sleeve. This had allowed the sleeve to move down during the flight and the pushrod had disconnected. It is likely that the position of the spring loaded safety pin had not been visually checked.

FLAPS AND AILERONS

Some flight manuals of flapped sailplanes mention that it is possible to control the aircraft nose attitude by using the flaps in the event of an elevator becoming disconnected. Lowering the flaps moves the centre of lift of the wing aft and will lower the nose. Moving the flaps up into negative will move the centre of lift of the wing forward and will raise the nose. The nose however is still likely to cycle up and down, called phugoid motion, causing speed variations.

One of the lesser known problems caused by a disconnected aileron is that it will have the same effect as the flaps. At low airspeeds the free aileron has more movement, as there is less airflow holding it in position. If the disconnected aileron moves downwards, the aircraft will roll. By trying to counter the roll with opposite stick input, the aircraft will have both ailerons down. This will move the centre of lift aft and the nose will drop. If the free aileron moves up, the opposite will happen. The end result is very confusing for the pilot as they try to keep the wings level while the nose pitches up and down.

STRUCTURAL CONNECTIONS

There are also reports of structural connections not being secured properly and starting to come undone. In the last month the airworthiness team received two reports from separate clubs for nearly identical problems – the bolt securing the tailplane coming loose. The following is from the more dramatic of the two incidents:

For the third flight of the day a flight review was being carried out on an Air Experience Instructor. The flight was to include spins and both pilots were wearing parachutes. During the aerotow, the reviewing instructor heard a knocking noise from the rear of the aircraft and considered it was from the spin kit. The noise was heard again after release.

The pilot thermalled the aircraft to 3,000 ft AGL and a control assessment was carried out. At the completion of the check, the knocking problem was thought to be with the rudder and a gentle descent with minimum control inputs was carried out. On touch down there was a loud bang from the rear of the aircraft.

GAP SEALING TAPE

On inspection afterwards, it was found that the leading edge of the tailplane could move freely up and down by approximately 8mm. At the time, the tailplane securing bolt had probably only had the barest minimum amount of thread remaining engaged. It is believed the tailplane was held in place by the gap sealing tape until the adhesive became soft and the tape gave way. The aircraft had been rigged after its annual inspection several weeks before.

While it is not clear exactly how the tailplane bolt ended up this way, it is possible that:

- The tailplane bolt was not fully tightened during rigging.
- The spring loaded safety pin for the tailplane bolt may have become deformed over time and was not supplying sufficient pressure to lock the bolt.
- Tape had been placed over the bolt that may have applied pressure to the spring loaded safety pin away from the bolt and, again, the pin was not supplying sufficient pressure to lock the bolt.
- A combination of the above.

Although several Daily Inspections had been conducted, the problems were not found, most likely because the gap sealing tape was effectively holding the tailplane down. Needless to say, if the tailplane had departed the aircraft during the initial climb out behind the towplane, it would have resulted in a triple fatality caused by the glider suddenly diving into the ground and dragging the tail of the tow plane down with it.

When you do your next Daily Inspection, ask yourself the question, "How well connected is the aircraft?"

GA

BLUE ON BLUE

PROFESSOR SIDNEY DEKKER
National Safety Advisor

When you've been involved in an activity like gliding for a long time, certain incidents seem to form a pattern – they happen over and over. Wheels-up landings are frequent, stall-and-spin accident less so. Each individual incident by itself is, however devastating and uniquely terrible for those involved, not hugely informative over the previous one.

But then, occasionally, an event happens that somehow challenges assumptions that previously held true. Let's take midair collisions, for example. We know that they happen in gaggles and in competitions, and that risk exists in certain places that they might happen between you and something really big (like a cargo Boeing 777 bound for Hong Kong climbing out of CTAF at Wellcamp Airport west of Toowoomba in Queensland).

But to be in a glider and fly into your own tug, or be flown into by your own tug, about half a minute after releasing – that one might be new to some of us. It's like a blue on blue incident, where the two parties involved in an operation end up shooting each other.

INSTRUCTIONAL FLIGHT

It happened in Alberta, Canada last year, during the northern summer. Such events have much to say about us, too – about the kind of tug you use and what you see and don't see from it, about FLARM and about what you do when on tow. Such an incident reveals whether or not you release in a particular situation – say, when a strong thermal gives both the glider and the tug a kick up, and the tuggie may not feel you release at all, or whether and when you say anything on the radio after releasing, like 'rope clear' or 'thanks', or where you write up aircraft defects.

The Transportation Safety Bureau of Canada, whose chairperson was once a Masters student of mine, investigated this accident. My story here borrows a lot from what they have to say about it.

On a day in July 2019, the tuggie had completed two aerotow operations with the club's Cessna 182 tug. The first tow had departed at 1510 (3.10 pm). The occurrence glider flight, on an ASK-21, was the second flight of the day for the student and flight instructor. The first instructional flight had been completed at approximately 1030. At 1549, the tow plane departed Runway 07 with the glider in tow and turned to the south while climbing to the intended release altitude of 5,700ft above sea level (ASL) or 2,000ft above ground. As in Australia, gliders turn right after releasing. Canada operates with high-tow procedures, like almost all countries except Australia.

TOWING EXERCISE

Around the time the aircraft crossed the extended centreline of Runway 07, the glider flight crew radioed the tuggie and requested that he carry out some medium bank turns as part of the glider towing exercise. This had not been briefed prior to departure. At this point, the tow plane was at approximately 5,900ft ASL. The tow plane completed a medium (approximately 30° bank) left turn of about 145°, which brought both aircraft over approximately midfield, followed by a medium (approximately 30° bank) right turn of about 90°, which brought the aircraft to a track of 305° near the western edge of the field, at approximately 6,100ft ASL. The glider released halfway through this turn.

Typically, a glider pilot will release from the towline when the two aircraft are in straight and level flight. When the tow plane reached the anticipated release point, the glider had already released. But the tuggie was not aware of that. Shortly after, the glider flight crew called the tuggie on the radio to thank him for the tow. The tuggie could not see the glider but executed a left clearing turn of approximately 80°, as is standard procedure upon glider release. He did not initiate a descent at this point, but did begin preparing the aircraft for the approach and landing at CEH2.

Because the pilot of the tug could not see the glider, he entered a slight right turn in an effort to find the glider. This brought the tow plane to a track of 270°T. Still unable to see the glider, the tuggie then proceeded to complete a 90° left turn, heading almost directly south. There was no attempt to communicate with the glider to determine its position.

When the glider released from the tow plane halfway through the second medium turn at an altitude of approximately 6,100ft ASL, the glider flight crew proceeded to fly more or less on a track of 270. By releasing in a right turn, the glider was not in a position where the tuggie would normally expect to see it, in other words, behind and to the right of the tow plane.

IMPACT

At 1555, when the aircraft were 0.5 nautical miles (NM) southwest of the threshold of Runway 07 and at an altitude of approximately 6,075ft ASL, the tow plane's propeller struck the glider's empennage. The time between the glider release and the collision was 34 seconds.

When the tow plane struck the glider, the vertical and horizontal stabilizers separated from the glider. The glider entered a dive from which it was unable to recover and struck terrain in a near-vertical attitude. The student pilot and instructor were fatally injured. Both were wearing parachutes.

The tug was equipped with a PowerFLARM Core airborne collision avoidance system (ACAS). On the day of the occurrence, the PowerFLARM Core installed on the aircraft was not working. In addition, throughout the 2019 flying season, the following issues with the PowerFLARM had been recorded in the club's unofficial daily log for the aircraft:

- Power Flarm intermittant [sic]
  (22 March 2019)
- POWER FLARM DISPLAY NOT WORKING (31 March 2019)
- Flarm intermittent => keeps resetting (19 July 2019)

These defects were not recorded in the aircraft's log.

To avoid judgmental language and oversimplification, as well as the usual bromides of 'try a little harder out

there, people' or 'just follow the rules' or 'let's write another rule,' the Canadian TSB is usually careful when declaring 'probable causes' or issuing recommendations. Instead, the story itself carries a lot of that load, and raises some really interesting questions for us.

IMPORTANT QUESTIONS

In Canada, at this club, there was no procedure to follow if visual contact was lost after the tow was released. While there is a procedure for what to do after release, what do you do when you do lose sight of each other? Or, for that matter, what more can we do to prevent that from happening? We are taught to each turn in opposite directions. In Australia, the glider turns right, the tug turns left, although in many countries, this is actually reversed.

But what do you do after that? As a glider pilot, you might persuade yourself to look at the tug for a bit longer, but then again, you may be in a thermal at that point, perhaps even with other gliders. You'd rather be watching those. As a tuggie, you might make the turn after glider release, stop after 90 degrees and then try to get the heck out of the area where the glider might still be. But perhaps this doesn't work all the time – there may be other traffic, for example.

The tug itself should be considered. Does your club tow with a Cessna? For some pilots, looking out the windshield of Cessnas is like looking through the slit of a letterbox. Others pilots don't see it as so limiting or troublesome. Of course, each aircraft has blind spots and blind angles. It has to have wings, after all, and whether you put them on top or on the bottom, there's going to be stuff you don't see.

THE ISSUE OF FLARM

Then there's the issue of FLARM. Lots has been written about the 'cry wolf' syndrome of some warning systems, and thus our growing distrust (and disregard) of them. Lots, on the other hand, has also been written about our overreliance on computer- and warning systems, to the point that some are concerned that we don't look out or up enough anymore.

This discussion is amplified when the device that is supposed to warn you only works intermittently. Intermittent electronic gadgets are perhaps even worse than electronic gadgets that have failed altogether. Because if they are intermittent, when can you trust them, when not? How and where do you write up this problem? The tug itself is airworthy without FLARM working, so your club may discourage you from writing it in a place that may cause the tug to be grounded before it is fixed.

Note that in this case, it was recorded – in the club's own daily log for the tug, which is not a regulator maintenance release, which may well have been the type of document that guides people in the club to necessary repair and maintenance tasks. Where would you find this if it were your club?

Such questions in themselves, rather than oversimplified causal statements or recommendations, can actually push us into thinking differently about how we run our operations.

GA

Occurrences & Incidents

From 1/8/2020 to 31/10/2020

Damag

	VSA	GQ	SAGA	NSWGA	WAGA	Total
Nil	1	12	3	4	2	22
Minor	1	6		1	1	9
Substantial		1		2	1	4
Total	**2**	**19**	**3**	**7**	**4**	**35**

Injury

	VSA	GQ	SAGA	NSWGA	WAGA	Total
Nil	2	19	3	7	4	35
Total	**2**	**19**	**3**	**7**	**4**	**35**

Phases

	VSA	GQ	SAGA	NSWGA	WAGA	Total
h	1	3	1	2		7
g	1	9		2	2	14
nding		4				4
Flight		3	1	2	2	8
N/A			1	1		2
Total	**2**	**19**	**3**	**7**	**4**	**35**

Type o

	VSA	GQ	SAGA	NSWGA	WAGA	Total
Local	1	5	2	3	2	13
Cross-Countr		5		2	2	9
AEF		2				2
Trainin	1	4	1	2		8
Competition		3				3
Total	**2**	**19**	**3**	**7**	**4**	**35**

Level 1

	WAGA	VSA	SAGA	NSWGA	GQ	Total
			1			1
Airspace				3	2	5
Consequential Events					1	1
Environment					1	1
Operati	4	1	2	3	14	24
Technical		1		1	1	3
Total	**4**	**2**	**3**	**7**	**19**	**35**

16-AUG-2020 GQ
TWIN ASTIR
FLIGHT CONTROLS

What Happened

During an Air Experience Flight, the Instructor noticed the rear control stick was progressively developing a loose feeling as though it was not properly connected to the control surfaces. The Instructor abandoned the flight and made a safe landing back on the aerodrome.

Analysis

The rear control column in the Twin Astir is detachable and held in place by a retaining nut. Inspection revealed the retaining nut had come loose. The glider had been returned to service two days previously having had an extensive refurbishment and Form 2 carried out at an approved maintenance facility.

All clubs and GFA members are urged to report all occurrences and incidents promptly, as and when they occur, using the GFA's occurrence reporting portal at glidingaustralia.org/Log-In/log-in-soar.html. This is always best done while all details are fresh in everyone's mind.

You can read the full SOAR report at tinyurl.com/ltmko56

Reports noted 'Under investigation' are based on preliminary information received and may contain errors. Any errors in this summary will be corrected when the final report has been completed.

4-SEP-2020 GQ
NEAR COLLISION
DG-1000S - PIPER PA-25

What Happened

While on the downwind leg and Just prior to turning onto the base leg, the instructor in a DG1000 sailplane observed a Pawnee tow plane in a 45 degree right-hand bank and steep descent, approaching head on slightly below. The tow plane passed rapidly under the left-wing mid span. Vertical separation was estimated at less than 100ft when first sighted.

Analysis

Both aircraft carried data loggers and the data files were analysed. The flight traces disclosed the tow pilot joined a long descending non-standard right base for runway 05 immediately after the glider being towed released at 2000ft AGL south of the field. The DG-1000 sailplane was mid-downwind on a standard left-hand circuit for the operational runway 34. This placed the tow plane and sailplane on reciprocal headings with high closing speeds. As the sailplane passed abeam the landing area the tug descended below and between the airplane and runway with approximately 200m horizontal separation in a right-hand turn onto final for runway 05.

Findings

The tow pilot was unaware of this conflict, which was not brought to his attention until the incident was reported some 28 days after the incident. Therefore, his recollection of the actual sequence of events was not clear. The tow pilot could not recall if there was a particular reason for making a non-standard right-hand circuit onto runway 05 at the time and stated that his normal recovery preferences were to conform to the runway in use by the gliders; or to use the cross strip in the normal circuit direction where the wind favoured this runway. The tow pilot could not recall hearing a downwind call from the glider, nor did he recall seeing the sailplane in close proximity during the base to final turn; although he stated that his focus at that time would have been on his landing area. Both aircraft were fitted with flarm, but neither pilot can recall a collision alert at the time of the incident.

Causal Factors

- The tow pilot conducted a non-standard circuit onto the cross strip causing a conflict with traffic on downwind for the operational runway.
- The launch prior to the incident was number 3 for a total of 27 launches all conducted by the same tow pilot, there may have been some perceived pressure on the tow pilot to expedite the recovery for the next launch
- The gliding instructor was distracted by managing the student radio calls and monitoring the student's handling of the glider in the circuit. This may have contributed to missing the tow pilot's circuit call and reducing the time spent visually scanning for other traffic.

Corrective action

The CFI and deputy CFI discussed with the tow pilot the importance of being predictable in the circuit and to use standard approaches unless there is an operational safety requirement to do otherwise, regardless of the workload pressures presented on the day. To reduce the workload on the tow pilot the Club has added to the morning briefing an assessment of the expected workload and where necessary a second tow pilot/tow plane is to be requested. Where a second pilot/tow plane is not available, delays in launching are to be expected.

Safety Advice

By itself, the concept of 'see-and-avoid' is far from reliable. It is important that pilots apply the principles of 'see-and-avoid' in conjunction with an active listening watch, and that pilots act predictably in the circuit. The following publications provide some useful information on the see-and-avoid principles and guidnace for pilots operating in the vicinity of non-controlled aerodromes:

- Limitations of the see-and-avoid principle (1991), available from the ATSB's website at:
- Safety in the vicinity of non-towered aerodromes (2010) AR-2008-044(2), available from the ATSB website.
- Operations in the vicinity of non-towered aerodromes (Civil Aviation Advisory Publication CAAP 166-1) available from the Civil Aviation Safety Authority website.
- Pilots responsibility for collision avoidance in the vicinity of non-towered (non-controlled) aerodromes using the 'see-and-avoid' (Civil Aviation Advisory Publication CAAP 166-2), available from the Civil Aviation Safety Authority website.

DATE
7-OCT-2020 GQ
TERRAIN COLLISIONS
DISCUS B

What Happened

While outlanding in a paddock near a farmhouse and at a height of about 30 ft, the starboard wing of the glider struck a power line that was strung between two poles over the fence-line of the paddock. The aircraft yawed to the right and descended quickly, touching down while skidding sideways. The aircraft came to rest facing approximately 70 degrees to the right of its original track. The pilot was uninjured, but the aircraft

suffered damage to the leading edge of the right wing.

Analysis

The pilot was competing in a Grand Prix event organised by the local club. On the final leg of the task and about 45kms from home, the pilot found himself below final glide and struggling to find lift. The pilot flew into an area of landable terrain with which he was familiar and arrived at about 1300ft AGL. The pilot identified a suitable outlanding paddock running north-south next to a farmhouse, and then used the available height to search for lift while remaining within reach of the identified paddock. The pilot spent the next 5 minutes maintaining or slowly losing height in weak lift to the West (downwind) of the paddock before breaking-off the flight for landing. The pilot descended upwind of the paddock and joined circuit on a left-hand base leg at about 500ft AGL (refer graphic 1). The pilot joined final at about 400ft AGL and set an aiming point about one-third the way into the paddock, where the plough furrows were better aligned for landing.

As the glider crossed the boundary fence, and at a height of about 30ft AGL, the pilot noticed a wire pass over the canopy. The starboard wing then struck the wire, identified as a 'Single Wire Earth Return' powerline, that was strung between two poles about 40 metres inside and parallel to the paddock fence line (refer graphic 2 and photograph 1). Witness marks identify the wire struck the starboard wing about mid-span and slid down the leading edge until it cleared the wingtip. The impact caused the glider to yaw severely to the right and skid partially sideways onto the ground. Upon touchdown, the aircraft skidded sideways in the paddock and came to rest approximately 70 degrees to the right of its flight path. The pilot reported: "As to why it (the powerline) caught one wing, I can't say with certainty. I was toward the left-hand side of the paddock, as I'd assessed that had a better landing surface; the paddock was ploughed in a race-track pattern and that side seemed to have smoother furrows in the correct direction, which would mean that the bow of the wire would be higher to my left and lower to my right. But I may have had some small angle of bank on making a last second correction." The glider was subsequently inspected for structural damage at an Approved Maintenance Organization and found to have only minor abrasions to the starboard wing leading edge and a cracked winglet.

Causal Factors

- The pilot did not identify the single wire crossing the paddock during the initial overflight or during the final approach.
- The single power cable was difficult to see and the supporting posts were obscured by trees or blended with the background.
- The pilot did not conduct a downwind leg that may have provided an opportunity to identify the posts and wire.
- The pilot's workload while landing in an unfamiliar place was high and likely increased stress levels.

Safety Advice

Wire strikes are associated with low-level flight, and usually occur to gliders during landing. Operating in the low-level environment is inherently dangerous. There are a greater number of obstacles to avoid, significantly less time to regain control of an emergency situation, and a higher workload as pilots must negotiate the hazardous environment in addition to their normal workload.

In some cases the consequences of a wire-strike will be minor, as in the case of this accident. In less forgiving circumstances the wire may snare the aircraft, resulting in an accident that could destroy the aircraft and cause injury or death of the occupants. It is therefore vital that pilots who are operating into an unfamiliar landing area remain vigilant and ensure that all necessary precautions, such as flying a proper circuit while maintaining a good lookout for obstacles, are taken to reduce risk associated with operating within the low level environment.

However, despite reconnaissance of the proposed landing area and a constant lookout during flight, wires are often difficult to detect. The likelihood of a pilot seeing wires is determined by a number of factors including the number of wires, type of support structure, length of wire span, the environment and the background against which the pilot is viewing the wires.

SWER lines do not necessarily follow fence lines. They may cut the corners off paddocks, stretch across at some intermediate distance into the paddock or wander off completely at random. The best guidance is that, if you can see a homestead, assume that there will be a SWER line leading to it. You MUST find it before you attempt a landing.

To identify powerline locations, visit the lookupandlive.com.au website. This site provides an interactive geospatial map that has been developed to display the Energex, Ergon Energy, Endeavour Energy, Essential Energy and Powerlink electricity networks, including sourced third-party information.

GA

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SINGLE SEAT

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VH-GDS, ASW 20F 560 hours total time, completely refurbished 2007, panel includes LX S100 flight director, Borgelt backup vario and XCom radio, PA parachute, Mtn High O2, Thompson trailer and full tow out kit. $45,000. Contact **Paul Wiggins 0422 138891** or libelle@internode.on.net

continued over page

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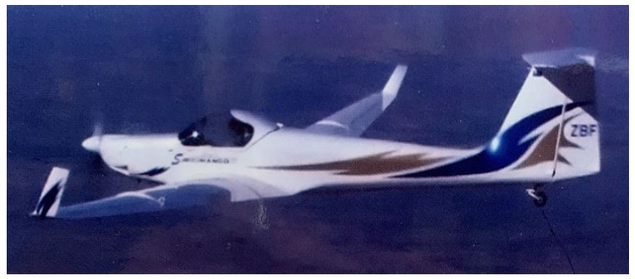

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- 18 metre tips with Neo winglets.
- 17.2 metre tips for the full range of aerobatics.

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