GLIDING AUSTRALIA

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TASMANIAN WAVE

MATTHER SCUTTER'S EUROPEAN ADVENTURES: WGC FRANCE 15M CLASS - E3GLIDE VARESE

GLIDING AUSTRALIA MAGAZINE

No. **57 SEPTEMBER - NOVEMBER 2021**

COVER: SIMON HACKETT FLYING WAVE IN TASMANIA IN HIS TAURUS ELECTRO G2

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WELCOME TO GA 57

The outlook for the soaring season looks difficult for those of us in the eastern states. With a persistent lockdown in NSW and Victoria, many of us cannot even get out to our gliders let alone go flying. However, the health measures in place will surely succeed in allowing a full return to our beloved sport.

This is the sixth 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.

Sean Young

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Before calling the GFA office, please check out our website www.glidingaustralia.org to buy items, find documents and other information, and renew your membership.

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FROM THE EO

It seems that Covid is once again severely impacting many of our clubs. We survived 2020 fairly well, and it looked like 2021 would be much better, but that is not to be. Country clubs are able to operate in most states, but given that most members are from the capital cities, many clubs are struggling to operate.

South Australia, Tasmania, Western Australia and Northern Territory have experienced little impact and are doing well, but all of the larger states are finding it very difficult. We are hopeful that increased vaccination and improving weather will enable clubs to return to normal operation in October.

GLIDING COMPETITIONS STRUGGLE WITH COVID

State Gliding Championships are likely to proceed as they don't rely on pilots travelling from interstate to attend, so the Queensland (October), NSW (November) and Victoria (December) State Comps look likely to go ahead, as do a number of regional events. Check out the GFA calendar, via the web page at www.glidingaustralia.org and then click on Calendar. This lists the events and provides details from the organisers.

National Championships are more difficult, as the Soaring Development Panel have determined that pilots from all states/territories must be able to attend should they wish to but, given the various lockdowns, this is not always possible. The Multiclass Championships were scheduled for October at Kingaroy in Queensland, however, with border restrictions in force this had to be cancelled. The Championships have now been added to the Club Class Nationals at Benalla in December, and we now wait to see what the situation will be close to the middle of November.

GFA BOARD MEETINGS

We have been trying to run a face to face Board meeting to enable valuable discussion on a number of key items, including proposed changes to the organisation structure and voting procedures for the Board and Executive. Unfortunately, this has not been achieved as a result of border closures, so we will have to rely on meetings by Zoom.

We will share proposals with members before seeking your support at meetings some time in 2022.

GFA ANNUAL GENERAL MEETING

The 2021 AGM will be held on Friday 24 September via Zoom. The success of last year's online AGM has encouraged the Board to use the same approach in 2021. Members from all states were able to join the meeting and participate in the decision making, resulting in the best attendance we've ever had. This year will be a much simpler event as there are no motions to change the constitution (GFA Articles), so the amount to voting will be significantly reduced. We are encouraging members to register and then login on Friday evening, 24 September.

One of the tasks of the AGM is to approve the appointment of Board members, who are nominated by the Regions, and Executive members, nominated by the various Departments.

All members will be invited to attend the meeting, and also to nominate for the positions of President, Vice President(s) and Treasurer. By 3 September, you will receive a notice giving details on how to participate in the activities.

IT ADMINISTRATION

After many years of running the GFA IT systems, Tim Shirley is stepping down from his various paid roles. A number of people are now taking over some of these tasks.

Sharon Brunton from Qld is now running Go Membership, and Ian Munro from NSW is looking after Salesforce. Various staff members have taken responsibility for handling various other products, such as Google Drive, Stripe payments and so on. If you have questions regarding any of our IT systems you can email returns@glidingaustralia.org.

INTEGRATED TRAINING PROGRAM

The Operations and the Soaring Development departments have been working for more than 18 months to upgrade the GPC training syllabus and resource material. This is a joint approach due to feedback from members indicating that training should be updated and should aim to ensure that a member with a GPC

- Can fly and soar the glider safely at the required standard
- Is aware of the threats and errors that may arise and has the ability to manage them
- Has the skills to soar the glider and competently and safely fly outside of gliding range of their take-off airfield, navigating to a selected site and complying with all aviation regulations within the limits of their authorisations
- Can fly independently subject to maintaining their competency

As you can see, this is well beyond just going solo, and requires development of some core soaring skills. Final steps are currently in progress, and we expect all the documentation to be available to members shortly. A few clubs have been trialling the resources and the changed approach. The management group will arrange for upskilling of instructors and coaches to assist them with implementing the new approach. They have already started working with Soaring Development Managers, CFIs and RMOs and getting a lot of positive feedback.

GO MEMBERSHIP

We have made a number of improvements to Go Membership in recent weeks, and hopefully you will find these changes make it easier to use.

Go Membership provides details of your membership of GFA and enables you to log a range of achievements and ratings. Your Credential and Qualifications show what you have achieved. I encourage you to login to Go Membership and look through the list of items available. Look for the credentials button to the right of your photo to see the credentials that you currently have.

Some are required so that you can show that you satisfy what is needed to fly a glider – things like your Medical, Flight Review, Radio Operator, C certificate, GPC, etc. You should be aware of the expiry date of these Credentials and ensure that you apply for a new version when you receive the reminder.

We are creating a few videos that will lead you though the process of adding Credentials to your record. The main points are:

- Credentials cannot be updated. You must add a new Credential of the same type. The previous one remains in your history)
- Click on the green 'add credential' button and search through the drop down list to find the one that you need.
- Look up the evidence required for the Credential, available via the green Documents tile

BADGE CLAIM

With the weather destined to improve shortly, it may be time to look at claiming some badges or records. In Go Membership, under the menu button you will see some new colourful tiles. One of these is 'Badge claim process'. This takes you to the application form where you will be asked to attach your igc. file for your flight, which comes from your flight recorder.

Ask your Instructor or Coach to explain how to use and download the file. An Official Observer (OO) needs to verify the flight, so ask at your club, or you can look at the green Reports tile under Menu, and click on customer reports to find the list of OOs.

SPORTING LICENCE

If you have ambition to fly a record, you will need an FAI Sporting Licence. The requirements are that you have a GPC and that you confirm that you have read the Sporting Code. Look for the FAI Sporting Licence Credential and apply.

GFA AWARDS

The GFA awards officer Kerrie Claffey has invited members to nominate people for various national awards and also to apply for some national performance trophies. We have received a number of nominations and the GFA Board will make a final decision in time to announce the results at the AGM. The winners will also be announced via the GFA web page and magazine.

TERRY CUBLEY AM
EXECUTIVE OFFICER
eo@glidingaustralia.org

VALE MIKE BURNS

I worked with and was helped a lot by Mike. Mike passing is a great loss to GFA, he worked with and for GFA since about the 1980s. He wrote and developed most of the GFA system of airworthiness ie. Basic Sailplane Engineering, MOSP 3, the system of ADs and ANs, that we can service TOST releases, etc etc when he worked for GFA as the Chief Engineer.

He sorted out our early days of being somewhat less safe, worked with CASA to develop how we would operate and therefore also our current day freedoms and Form 2 system of maintenance. Mike stopped working for (being paid) by GFA decades ago, but he continued to assist with organising the Engineering side of GFA; the design approval procedures manual, and fighting this through CASA. As usual Mike just got it done in his own way on his own.

He had in recent years, now over 80, continued as the mainstay GFA engineer, assisting many with engineering approvals for their modification projects on their gliders. He was also trying to bring them all to closure but because he was so busy on many complicated projects I am sure it now worries him how his projects will be finished. Don't worry Mike, we will work it out.

Mike was not easy to work with and I am sure there are a few members out there that ran fowl of Mike. But if you worked with him, he was very helpful, and must have put in thousands of hours helping us all. I learned so much from Mike but possibly the main item was just to find a way and get it done, and properly.

Mike will be sorely missed by us in GFA airworthiness.

ROB HANBURY
DEPUTY CHAIR AIRWORTHINESS DEPARTMENT, GFA

AGM

FRIDAY 24TH SEPTEMBER 2021
7:00PM AEST

This year's annual general meeting will be held virtually using Zoom. You can participate online using your smartphone, tablet, or computer.

You will be able to view a live webcast of the meeting, ask the Board questions online and submit your votes in real time. As usual you may also provide voting instructions to your Proxy by completing the proxy form (See https://tinyurl.com/gfaproxy).

All attendees must register if you plan on joining the AGM:

HTTPS://BIT.LY/3ZMAD8Z

Once you register, you will be emailed a link to let you join the meeting

We look forward to you joining us!

FAI GLIDING BADGES

1 MARCH - 31 MAY 2021

BERYL HARTLEY
FAI CERTIFICATES OFFICER
faicertificates@gidingaustralia.org

A CERTIFICATE

NICOLE WILSON	WARWICK FLIGHT
STEPHEN JOHNSTON	BEVERLEY SOARING SOCIETY
STEPHEN MIRANDA	ADELAIDE SOARING CLUB
RICHARD GRAY	MURRAY BRIDGE GLIDING CLUB
PAVEL KALENOV	BOONAH GLIDING CLUB INC
JOHN HUTCHERSON	BEVERLEY SOARING SOCIETY
LACHLAN POND	SUNSHINE COAST GLIDING CLUB
NICHOLAS COOK	BEVERLEY SOARING SOCIETY
JEAN-YVES PROVOST	SOUTHERN CROSS GLIDING CLUB
ISAAC BROWNING	DARLING DOWNS SOARING CLUB
PETER UNDERHILL	SUNSINE COAST GLIDING CLUB
KARSTEN BOJESEN	BEVERLEY SOARING SOCIETY
RICHARD TOLLEY	BEVERLEY SOARING SOCIETY
KIRREN THOMPSON	NT SOARING
PAUL MILLACHIP	NT SOARING

B CERTIFICATE

STEPHEN JOHNSTON	BEVERLEY SOARING SOCIETY
RICHARD GRAY	MURRAY BRIDGE GLIDING CLUB
PAVEL KALENOV	BOONAH GLIDING CLUB
JOHN HUTCHERSON	BEVERLEY SOARING SOCIETY INC
LACHLAN POND	SUNSHINE COAST GLIDING CLUB
NICHOLAS COOK	BEVERLEY SOARING SOCIETY
PETER UNDERHILL	SUNSHINE COAST GLIDING CLUB
KARSTEN BOJESEN	BEVERLEY SOARING SOCIETY
RICHARD TOLLEY	BEVERLEY SOARING SOCIETY

C CERTIFICATE

DAVID GIBBS	MELBOURNE GLIDING CLUB/VMFG
SCOTT CREW	ADELAIDE SOARING CLUB
BEN JAMES	NORTH QUEENSLAND SC
GRANT NICAUD	CENTRAL COAST SOARING CLUB
ANDREW CHAPMAN	CENTRAL COAST SOARING CLUB
PETER UNDERHILL	SUNSHINE COAST GLIDING CLUB

GFA CALENDAR

Use the Contact GFA menu at **www.gidingaustralia.org** to send event details to the GFA Secretariat for publishing online and in GA.

QUEENSLAND STATE CHAMPIONSHIPS

25 September - 1 October 2021
Kingaroy Soaring Club

See **kingaroysoaring.com.au** for registration details.

MULTICLASS NATIONALS

4 - 11 October 2021
Kingaroy Soaring Club

See **kingaroysoaring.com.au** for registration details.

KHANCOBAN MOUNTAIN FLYING - BENALLA

29 Oct – 2 Nov 2021
Khancoban Mountain Flying Melbourne Cup Weekend
Hosted by G.C.V.
Contact - Mark Goodley
markgoodley@hotmail.com

CARTER CUP - GCWA

30 Oct – 7 Nov 2021
Gliding Club of WA, Cunderdin Airport, Cunderdin WA
Competition Organiser **Cameron McDonald 0400 581 132**

NSW COACHING WEEK - NARROMINE

14 – 20 November 2021
Narromine Gliding Club,
All suitably rated pilots are welcome to enter and improve their cross country skills.
Contact Armin Kruger – NSW SDM
0477 945 387

NARROMINE CUP

21 – 27 November 2021
Narromine Gliding Club
The Narromine Cup will be running this year. **Contact Beryl Hartley on email arnie.hartley@gmail.com** for futher details.

NSW STATE CHAMPIONSHIPS - NARROMINE

28 November – 4 December 2021
Narromine Gliding Club
Contact **Mick Webster**
mick260649@gmail.com f or further details

VICTORIAN STATE GLIDING CHAMPIONSHIPS - BENALLA

4 – 11 December 2021
Competition details will be published shortly at **glidingclub.org.au** and on the comp web site
glidingcomp.flights/vsa2022

CLUB AND MULTI CLASS NATIONAL CHAMPIONSHIPS BENALLA

12 - 19 December 2021
Sun 12th is a practice day, leaving 7 comp days. See
glidingcomp.flights/cs2021/

SKYRACE GP BENALLA

3 - 10 Jan 2022
Leeton, NSW
Practice Day - 3rd January 2022
Contest Days - 4th January - 10th January 2022
skyrace.com.au
info@skyrace.com.au

WORLD GLIDING CHAMPIONSHIPS NARROMINE

November - December 2023
Narromine Gliding Club is honoured to be selected by the IGC and we look forward to hosting an amazing gliding competition.

If you would like to be a part of the organisation and running of this World Championship Competition please go to the Contact Us page and tell us about yourself and how you can help.

AIRWORTHINESS AND AGING FIBREGLASS AIRCRAFT

Anthony Smith
Chair Airworthiness Department
cmd@glidingaustralia.org

All aircraft begin to deteriorate as soon as they are manufactured. Generally the rate of deterioration is very slow at first, but the resulting damage is cumulative and the deterioration accelerates with age. The term 'aging' is usually applied to aircraft as they near or exceed the original design life. For many general aviation aircraft, the design life was 20 years. That is, the designer only had to consider the effect of aging out to 20 years of life.

This concept also applied to a few sailplanes as well, like the IS-28B2 which had an original design life of 35 years. It may be a surprise to many that the average age of sailplanes with a current Form 2 (at the time of writing) is 36 years, and that many designers of fiberglass aircraft in the 1970s did not anticipate their aircraft to still be operating after such a long period of time.

See Figure 1: Sailplanes with a current Form 2 by build year. The spike at 1977 is due to the tremendous influx of first generation fibreglass types (eg Libelle, Std Cirrus, LS-1, DG-100) at that time.

In the world-wide aviation community, many significant issues arising from aircraft age have not been recognised and addressed until after accidents (sometimes fatal) had occurred. More recently though, the general principles of system deterioration, which affect all older aircraft, are receiving renewed attention. This results in pre-emptive inspections rather than reactive inspections. These pre-emptive inspections are intended to find the problem on the ground rather than in flight.

Discussions on aging aircraft often include fatigue, which is based on flying hours rather than calendar life. An aircraft with a high usage rate will consume its fatigue life in as little as 10 years. However, in Australia, the average sailplane flying rate is very low – just under 80 hours per year. Early fiberglass (FRP) sailplanes typically get surveyed at 3,000 hrs. It takes the average first generation FRP sailplane almost 38 years to get to the first survey. Just under half of the sailplanes built in 1977 (ie 44 years old) from Figure 1 have yet to reach 3,000 hrs and undergo a survey. Many of these sailplanes may have spent extended periods stored in trailers.

This problem will get worse as many of the later FRP sailplanes have surveys at around 6,000 hrs. Many of these aircraft will take 76 years to get there!

See Figure 2: Aircraft Hours versus Age. Many first generation FRP sailplanes have yet to undergo a survey due to the low flying rate.

THE ENVIRONMENT

One of the biggest factors in the rate of deterioration is the environment in which the sailplane is operated and stored. The environmental factors include: very high or very low temperatures, sunlight / UV, moisture, salt, the acidity / alkalinity of the soil / dust, atmospheric pollution (smog), and even rodents.

Large temperature swings can affect where different materials are bonded together. The different thermal expansion rates can cause disbonds. Extremely high temperatures encountered on hot days in trailers can soften resins and allow plastic deformation.

Exposure to moisture, particularly due to leaking trailers and hangars, is famous for causing corrosion problems.

Temperatures below freezing will cause moisture to turn to ice. Where this moisture is trapped between surfaces eg in crevices and cracks, the expansion of the ice will wedge the surfaces further apart. FRP sailplanes kept outside in rain or heavy dew that later freezes can be susceptible to widespread gelcoat damage if the water gets into pores and micro cracks and then expands into ice crystals.

The ultraviolet component of sunlight is well known to cause synthetic materials to break down, including cockpit harnesses and structural resins. UV light will also break down paint coatings and leave the metal underneath vulnerable to corrosion.

Figure 3

SALT, POLLUTION AND PESTS

Salt is not just a problem for coastal regions. Australian soils are well known to be affected by salt – notably in South Australia and Western Australia. This means that metal components exposed to dirt and dust from higher salinity soils are at greater risk of corrosion. Similarly, soil acidity / alkalinity in more extreme pH soils will deteriorate paint coatings and then cause metal corrosion.

Atmospheric pollution or smog will form weak acidic solutions when dissolved into water. Again, the acid solutions will attack paint coatings and cause metal corrosion. Several clubs that operate near major capital cities may have higher risks in this regard.

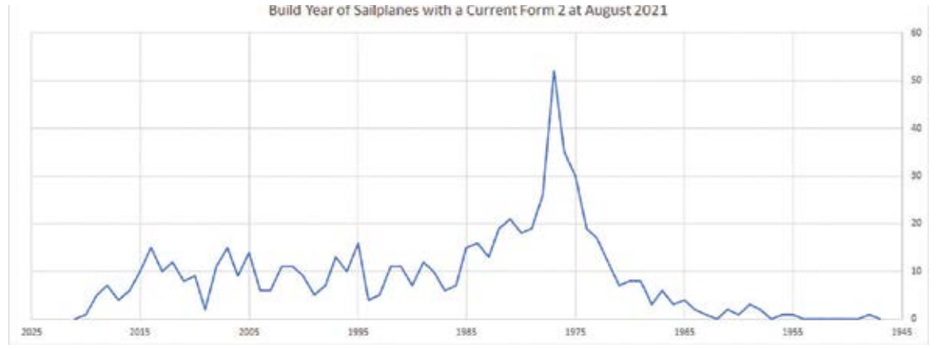


Figure 1

The recent mouse plague has highlighted a couple of airworthiness issues. Mouse plagues happen periodically in Australia. Mice love to gnaw on things. While they are less likely to gnaw on fiberglass than wood, for example, they have been known to cause physical damage to the aircraft structure. Possibly a greater concern is mice gnawing on pneumatic tubing, but the instrument failures are typically found during the daily inspection.

There is even a story of a mouse gnawing the bottom corner of the plastic casing of a lead acid battery till it broke through and the acid drained out – the acid damage was considerable, but the fate of the rodent was undetermined. A rodent nest in the aircraft can lead to other problems, as the urine is quite acidic and will cause corrosion damage to metal components.

THINGS TO LOOK FOR AT THE FORM 2

Because of the low flying hours, fatigue cracking can be ignored and corrosion of metal components becomes the most serious risk. Corrosion is calendar-based and not flight time-based like fatigue. Corrosion happens around the clock, independent of whether the aircraft is flying or not. The highest risk in aging aircraft are components in areas that are not easy to get to – hence, they are not usually inspected. Corrosion of pushrods was highlighted in AD 688. While this was an extreme case due to the highly acidic nature of the contaminant, similar problems can occur in other out of the way places like bell cranks and mechanisms inside the wing and the vertical fin. See EASA AD 2020-0138 for Grob Astir and Twin Astir aircraft.

Figure 3: Deteriorated paint and corrosion on the elevator torque tube in the fin of a Standard Libelle.

Inspecting out of the way corners is often achieved using an inspection camera. These are frequently taped to a long rod in order to inspect the length of the fuselage or inside the length of a wing. The most common inspection cameras are 1080P or 2 MP in resolution. These often do not give a clear picture of what is going on. The most recent generation of inspection cameras are 8 MP and even 12 MP. These high resolution cameras give a much more detailed view and corrosion and cracks are far easier to see on the screen.

SOME EXAMPLES OF THESE NEW GENERATION INSPECTION CAMERAS ARE:

Depstech WF060 8MP endoscope

OiiWAK 12 MP wireless endoscope

Figure 2

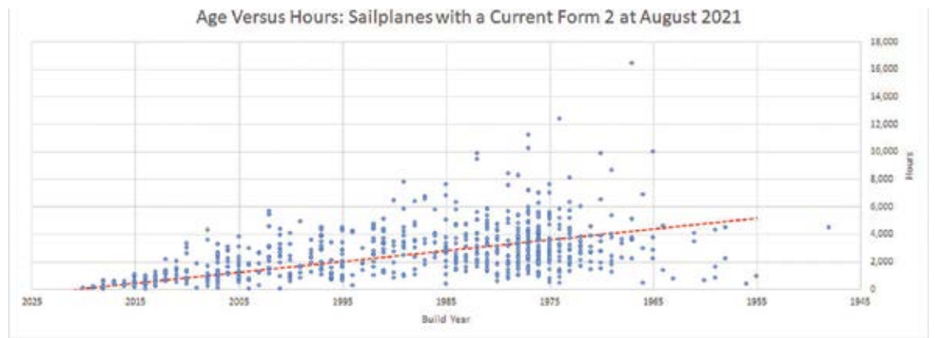
Deterioration of exterior coatings, like gelcoat, will result in damage to the underlying structure. Ultraviolet light will penetrate the cracks and will damage the resin underneath. If left unchecked, this will result in significant repair work being needed.

Delamination can be caused by simple knocks to the structure during flying, ground handling, or hangar and trailer rash will gradually grow in size. In general, the larger the delaminated area, the faster it will grow, either in a similar way to metal fatigue with cycles of applied stress, or the same thing happening in the same place repeatedly, such as in the hangar or trailer. Delaminated areas may become critical as delamination allows the skin to buckle at much lower stresses. Delaminations around the cockpit can have a significant effect on the protection of the pilot(s) in the event of a crash.

MANAGEMENT

One of the key components to managing aging aircraft is the annual inspector's diligence and willingness to explore further. Older aircraft require a greater degree of thoroughness. Just performing the basic inspection is liable to repeatedly miss potential problem areas. Be pre-emptive and look a little further or in different areas that aren't usually inspected.

Report any defect to the CTO-A. This may result in airworthiness advice being passed on to other owners / operators of the type, as well as the manufacturer / type certificate holder. Reporting the defect before it becomes a problem in flight may well save someone's life. ***GA***



A RESTORATIVE JUST CULTURE

PROFESSOR SIDNEY DEKKER

In the previous issue of this magazine, we looked at the typical way of thinking about a 'just culture', one where the line between what is acceptable and not acceptable is clear – which turned out to be anything but clear. Such a just culture is essentially retributive.

It asks:

- which rules are broken?
- how bad is the breach?
- what should the consequences be?

Such a 'just culture' is organized to focus on the single 'offender', and asks what they have done and what they deserve. But many have found that simplistic guidance about pigeonholing human acts does not take them very far. In fact, it leaves all the hard work of deciding what is just, of what is the right thing to do, to them.

Research shows that it tends to favor those who already have power. Because of the inevitable problems that answering these questions can create, which we discussed at greater length in the last issue, an increasing shift – in healthcare, policing, schooling, even some oil and gas companies – to a different model of justice has resulted. You can see a documentary about one of these under 'Just Culture – the Movie' on YouTube.

In contrast, restorative justice holds great promise, even for us as a gliding community. Restorative justice asks very different questions in the wake of an incident:

- Who is impacted?
- What are their needs?
- Whose obligation is it to meet those needs?

Such an approach to justice and accountability is more inclusive than a retributive one. An incident may impact a variety of people – fellow pilots, students, the training panel, bystanders, onlookers, the club, the GFA, the surrounding community. The logic of restorative justice is really quite simple. Impacts create needs, and needs create obligations. Restorative justice is achieved by systematically considering those needs, and working out collaboratively what and whose obligation it is to meet them.

- Retribution imposes a deserved and proportional punishment.
- Restoration repairs the trust and relationships that were impacted.

Restorative justice is as old as humanity. Property disputes, and also more violent crimes, have been addressed using restorative principles for millennia and many non-Western and First-Nation societies apply them to this day. The aim was always to not only do justice, but to preserve and strengthen the relationships of trust that held a community together.

In a restorative just culture, the impacts and obligations are acknowledged and articulated. They are met by different stakeholders, preferably in collaboration.

A pilot involved in an incident can, for example be obliged to:

- Acknowledge errors and honestly disclose his or her role in the incident, giving an account to the others involved or affected.
- Recognise the needs of others, such as their club, their training panel, the GFA bystanders and community.
- Show remorse and be open to various ways to put things right.
- Be part of identifying pathways to prevention in collaboration with others.

A training panel and club can embrace the obligation to:

- Offer support to members by supporting open disclosure and by not jumping to (retributive) conclusions;
- Not sanction people just because they were involved in an incident;
- Ask itself honestly what was responsible for the incident, not who;
- Perform an investigation on the premise that people did not come to fly to do a bad job, and asking why it made sense for people to do what they did;
- Identify pathways to prevention, in collaboration with the people involved in the incident.

Identifying and meeting obligations is ultimately about putting right what went wrong. It is about making amends. In restorative practices, this means promoting reparation and healing for all affected by the incident. This notion of reparation, of restitution or 'paying back,' is central to retributive justice too, of course. In restorative practices, however, everything possible is done to reintegrate the person into the community, and the 'payment' is typically made in a different currency.

For restorative practices to be meaningful and seen as just by all involved, you have to be collaborative and inclusive. Effective restoration relies on this engagement. It will likely involve the following steps and people:

- Encounters between stakeholders. The first one is likely to be between your club's training panel or CFI and the person(s) involved in the incident
- Encouraging all those involved to give their accounts, ask questions, express feelings and work toward a mutually acceptable solution.
- Acknowledge the impacts, restore the balance and address future intentions. This may involve all club members.

Retributive	Restorative
Which rule has been broken?	Who has been hurt?
Who did it?	What are their needs?
How bad is the infraction, and so what do they deserve?	Whose obligation is it to meet those needs?

Table: contrasting retributive and restorative questions to ask

Retributive	Restorative
Wrongdoing creates guilt, and demands punishment that compensates it	Wrongdoing creates needs, and obligations to meet those needs
Account is something the offender *pays* or *settles*	Account is something the offender *tells* and listens to
Asks *who* is responsible for the incident	Asks *what* is responsible for the incident
Learns and prevents by setting an example	Learns and prevents by asking why it made sense for people to do what they did
Focusses on what people involved in the incident deserve	Focusses on what people involved in, and affected by, the incident need
Creates justice by imposing proportional and deserved punishment	Creates justice by deciding who meets the needs arising from the incident
Meets hurt with more hurt	Meets hurt with healing
Looks back on harm done, and assigns consequences	Looks ahead at trust to repair, and invests in relationships
Builds trust by reinforcing rules and the authority to impose and enforce them	Builds trust by repairing relationships between people whose safety depends on each other

Table: the different ways in which retributive and restorative processes try to create justice.

The two forms of just culture also approach trust differently. Retribution builds trust by reinforcing rules and the authority of certain parties or persons to enforce them. It says that where people work to get things done, there are lines that should not be crossed and, if they are, consequences will follow.

Think about it this way: if you find that people 'get away' with breaking rules or doing sloppy work, you won't have much trust in the system or in your community's ability to demand accountability. Your trust can be restored if you see an appropriate and assertive response to such behaviour. You can once again rest assured that the system, or your community, does not accept such behaviour and responds in ways that make that clear – to everyone.

Restoration, on the other hand, builds trust by repairing fiduciary relationships. Fiduciary relationships are relationships of trust between people who depend on each other to make something work. Consider the work done in your own club. People depend on each other. Every day, perhaps every minute, they have to trust each other that certain things will get done, and get done in a timely, appropriate, safe manner.

They might not do these things themselves because they are not in the right place, or because they lack the expertise or authority to do them. So they depend on others. This creates a fiduciary relationship, a relationship of trust. It is this relationship that is hurt or broken when things go wrong. It is this relationship that needs restoring.

Both kinds of trust can be important for your club or community, but it's good to know when you are investing in which – and how.

In both retributive and restorative approaches, people are held accountable for their actions. Nobody gets off the hook. Retributive justice asks what a person must do to compensate for their action and its consequences: the account is something they have to settle. Restorative justice achieves accountability by listening to multiple accounts and looking ahead at what must be done to repair the trust and relationships that were harmed.

This point of difference makes it important for others to understand why it made sense for the person to do what they did. Their account is something they tell. It also offers an opportunity to express remorse.

Restorative approaches are open to multiple voices, and are willing to see practitioners not as offenders or causes of an incident, but as recipients or inheritors of organisational, operational or design issues that could set up others for failure too. Restorative approaches are therefore more likely to identify the deeper conditions that allowed an incident to happen. They are better at combining accountability and learning, at making them work in each other's favour. Where retributive approaches to a just culture meet hurt with more hurt, restorative approaches meet hurt with healing, and with learning.

GA

EXPLORING THE WAVE IN NORTHWEST TASMANIA

BY SIMON HACKETT

Our farm in Northwest Tasmania at The Vale (http://www.thevale.com.au) includes a remarkable asset in the form of a 1,300m grass runway. We are at the foot of a magnificent 4,000ft mountain called Mount Roland, part of a very scenic and, for glider pilots, very interesting system of ridges and valleys.

Mole Creek, the valley on the immediate south of the Mount Roland ridge system, gives way in turn to the northern end of the Tasmanian Central Plateau. This plateau, including the world famous Cradle Mountain, is a magnificent alpine zone. When the wind streams across the plateau from the southwest, as it frequently does in winter, it creates a magnificent wave system that sets itself up right beside our airfield!

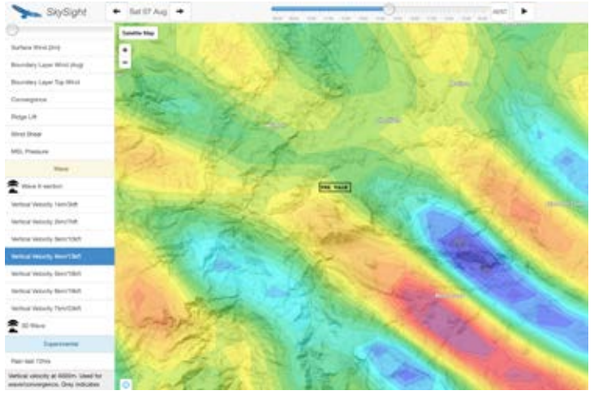
WINTER WAVE

I had been looking at the SkySight wave predictions for this area for some time, along with the associated lenticular clouds, and I have long appreciated the remarkably fortunate location of our airstrip. Indeed, on many days in winter, the SkySight forecasts show strong wave lift in this area up to more than 25,000ft. Even with the need to start at around 5,500ft to get above the local terrain, Diamond Height potential is clearly present.

On 7 August, I observed the prediction shown by SkySight. (see image) Having organised a local oxygen supplier so I could charge up my recently acquired Mountain High Oxygen system, it was time to start my first real exploration of this wave system.

I fired up the battery electric launch system in the Taurus to take off and motor over to the middle of the Mole Creek valley, and shut down at around 6,000ft.

I was almost immediately rewarded with the wonderful, smooth, sensation of wave lift. While slowly climbing, I pointed into wind and crabbed over to the east toward the area that SkySight predicted to hold the best wave lift. During this initial climb, no clouds could be seen in the valley at all. As I climbed up toward 10,000ft and continued to track east, a cloud band set up behind me, giving me a good visual indication that I was in the right place.



CLIMB RATE

The closer I got to the best part of the wave system, the better the climb rate was, with the best climb rate being around 4 to 5kts. I wound up in that wonderful situation that happens in wave systems where I was pointed into a 40+ knot wind with essentially zero ground speed, sitting hands-off and just watching the world as the aircraft climbed all by itself in the silky smooth air.

Gradually I worked my way up to almost 16,000ft, for a height gain of about 10,000ft. The cloud systems built up down below me on each side of the valley, but the Mole Creek valley itself – in the lift zone – remained clear. I was rewarded with a really magnificent view of the central alpine plateau to the south, the valleys stretching out to the east and west, and a view to the north all the way to Devonport on the coast, and well into Bass Straight.

SENSATION

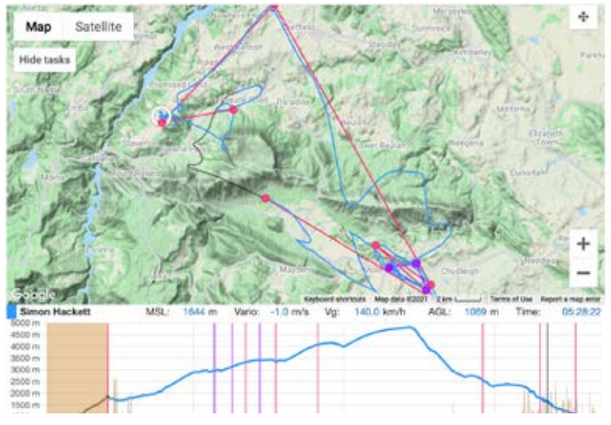
The sensation of flying in wave is really quite wonderful. It has a peaceful aspect to it that is quite unlike the effort and motion involved in thermal or ridge soaring. The process is one of gently feeling out the lift system, aligning to it, and then just letting it generate a quiet, smooth, magic carpet ride up into the heavens.

The OLC trace of the flight, with some annotated pictures along the way, is at **bit.ly/3l2suIW**

On some days, the SkySight prediction shows wave systems that not only run to more than 25,000ft, but that sometimes can extend in large northwest-to-southeast bands from our airfield all the way to Hobart. Beyond the obvious potential for height gain, this creates the possibility of interesting wave-driven cross country flying as well.

I look forward to continuing my flying exploration of this remarkable place in future months and years.

GA



LEFT: View of wave prediction in Skysight.

RIGHT: The trace on the OLC showing the details of the flight.

EGLIDE MATTHEW WINS AGAIN

BY MATTHEW SCUTTER

After finishing third in the World Gliding Championships 15m Class, Matthew Scutter continued his European adventure into Italy to defend the eGlide championship title that he won last year. Here is Matthew's story.

HOW TO FOLLOW UP 21 DAYS OF GRUELLING FLYING? ANOTHER 10 DAYS OF FLYING!

After flying at the WGC Montluçon-Guéret I continued into Bruschal in Germany where, thanks to the very generous Holger Back of DG, I have an immaculate LS8 Neo-FES to defend my title with at the e3Glide contest [*the third eGlide competition*] in Varese, north of Milan in Italy.

Varese has a really nice vibe to it, a beautiful lake and town with spectacular vistas of the Alps to the north.

I've only done limited flying in the mountains, enough that I feel safe flying cross country among them, but I've never raced in them, so I feel a little on the backfoot again. The possibility of using the FES during the race adds a lot of comfort as, instead of waiting until you get into a bad situation and relying on the engine to get you out of it, you can use it earlier on to prevent a bad situation developing.

The tactics for optimal energy usage will certainly be totally different in the mountains compared to the flatlands last year, and that's exactly what makes eGlide interesting - it's like flying before MacCready theory, where no one really knows what's optimal and it's as much a race of figuring out the optimal overarching strategy as it is of day-to-day gliding.

GOOD START

The first day was a good start for me. If the scoring looks confusing, it's because it's elapsed time showing minutes behind the leader. In the next days, the slower pilots need to catch up by that many minutes.

The task was along the route I'd flown on the three practice days, while most of the competitors had arrived just for the last practice day. So, unusually, I had a bit of local knowledge about where to stay high. I selected what I thought was the best glider to play the handicap game, and used that to full advantage, hanging back going into turns and staying high coming out of them. Unfortunately, they are planning to change the handicap system tomorrow to also include energy relative to weight, which will make things a bit harder for me in days going forward.

MIXED BAG

We had a complete mixed bag today, with blue and weak conditions at the start, blundering into rough and broken rotor, even a little bit of wave, into regular cumulus and eventually into weak blue again.

I thought the majority of the gaggle was going to outland or flatten their batteries at the first turn while Luka and I climbed high in the rotor behind, but they seem to have actually got away and climbed into the wave, getting the jump ahead. I almost caught them before getting my own wave climb behind them, but I finally got caught by the variable turnpoint system - usually, I turn shorter being in a lower performance glider, but the only climbs were deeper inside the sector so I was forced to go in with them and almost fell off the bottom. It can go the other way too, though, and so far I've been luckier than not.

I dropped all my water so that I'd be able to engine more efficiently to catch onto the back of them again, even though it would make for a slower final glide and commit to finishing behind. Pilots ahead were pushing much too aggressively and I was able to get a bit of a jump on all but a lucky couple of them.

The maximum time of 20 minutes behind the leader really minimises the penalty for errors (too much?) so everyone is still in the game.

MOUNTAIN FLYING

I may not know a lot about mountain flying, but I have up until now at least had the edge of having flown eGlide before and knowing what strategies work for using energy and which don't. My competitors have been learning quickly though and it's been getting much harder every day to keep up!

Today I was pipped on the finish line by a few seconds by a local pilot, Alberto Sironi, but I'm not too concerned as winning days is not the goal anymore. Instead, it's just a mtter of keeping headroom on the two Slovenian pilots close behind me who are experts in both mountain flying and engine management.

In my opinion, the most naive strategies are either holding onto the energy until it's needed to save you

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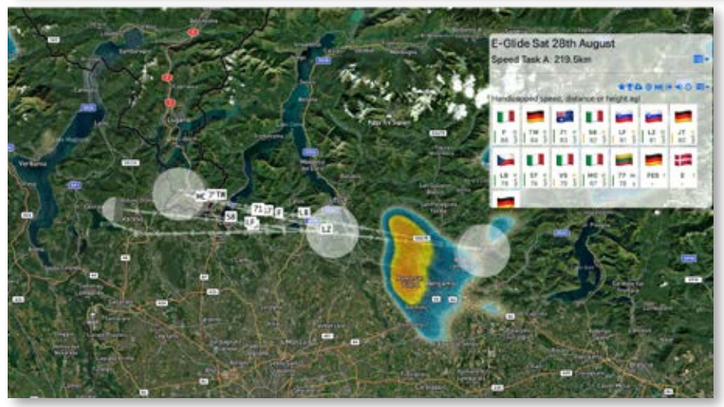

ABOVE CENTRE: LS8 NEO FES, THE TYPE OF GLIDER MATTHEW FLEW AT E3GLIDE.

from a low point, or to hold onto it right until the end of the flight and use it to get a jump on the gliders around you. My strategy last year was to instead use the FES on low power all through the flight whenever I was climbing, basically standard Macready theory with boosted climbs. But due to both the mountains and also to learning from watching the new strategies my opponents are coming up with, I've come to the conclusion that this may not be the right strategy after all, and I'm coming up with a new theory of engine management.

This is exactly what makes this contest so interesting – there is no textbook that tells you how to make optimal use of your energy. We're really working together to discover between us what the equivalent of 'Macready theory' in e-gliding is.

THE GOOD AND THE BAD

After winning the next day, I went from hero to zero. It was a tricky day with a lot going against me. The variable-sized turnpoint handicapping all fell in awkward locations for my handicap today, with the safest choice being to continue into the turn past my radius to the same place as where the higher performance gliders would turn so as to better align with the terrain and cumulus.

I thought I'd be able to get away with turning short and using a little bit of engine instead, but it ended up consuming a very large amount of energy and I actually ran out of my allocation less than halfway around the task. I then arrived very low on a difficult ridge and had a real scramble to get back up again, losing 40km on the leaders.

The cloud bases were just above the tops of the ridges, which made several of the glides from one ridge to another a real test of best glide performance. Since I was flying in the second-lowest performance glider here, that made for quite a struggle to reconnect each time.

I almost just went directly home when I ran out of my energy allotment - the rules say you won't be scored as slower than 20 minutes behind the leaders, but that doesn't include penalties for a low finish or excess energy consumption with the engine, which creates a whole set of perverse considerations.

If I continued with the task and needed to use the engine to return home, I would instead either need to actually outland, or break airspace to virtually outland before using the engine, in order to not accrue penalty time for engine overuse.

I wanted to keep going with the task though, in case I was lucky and was able to pull myself less than 20 minutes behind the leaders.

Ultimately, I decided I would try my luck pushing on with the task. I hope the IGC gives the rules some more thought and closer attention for next year.

Going into today, I had a significant lead that has been whittled down to a razor-thin margin. I hope to try and defend that tomorrow on what could be the last flying day, as Friday looks uncertain.

MOST CONSISTENT WEATHER DAY

The next day was the strongest, most consistent day of the contest, which gave the little LS8 a bit of a challenge with the V3s comfortably out-gliding me at the 180kph+ cruise speeds. I quickly fell behind but made some better routing decisions and was able to pickup stronger climbs behind to stay attached without using too much energy, then instead use it where it counted most to top up a few weaker climbs.

It was the first day of the new handicapping today, which now gives the double seaters 50% more energy, so I expected strong competition from Luka and he did not disappoint, with a close race to the finish.

LAST DAY

We had yet another flying day yesterday, making 10/10 flying days in a row for me and permitting me to defend my title.

Varese is an extraordinarily diverse and challenging site to fly, but the eGlide concept makes it possible for even beginner mountain pilots to compete effectively as most mistakes can be papered over with a bit of engine time.

The dynamics of the event were totally different to last year, when we needed our engines just to stay airborne. Here, however, we were using them for strategic and speed advancement and never actually needed them. The ability to use them proactively greatly increases the safety in the mountains with much less time spend grovelling below the tops or squeaking over passes, and it becomes a good concept to teach mountain flying.

The contest becomes more about medium- to long-term strategy rather than sequences of perfect short-term decision making that normally dominates flying in the mountains. I think the key decisions for me were coming four days early to familiarise myself with the task area, and bringing such a viceless and forgiving glider that gave me versatility in all the types of weather we had. I was really happy with how I was flying, with only one major error through the week that the scoring system let me get away with.

Thanks to the organizers for running a great contest, to Holger at DG Group for lending me his beautiful LS8e Neo, and everyone else who supported me to get there. **GA**

E3GLIDE
VARESE ITALY

28 AUGUST - 4 SEPTEMBER

1 MATTHEW SCUTTER	**KINGAROY SOARING CLUB**	**LS 8 ENEO 15M**
2 STEFANO GHIORZO	**ACAO – VARESE**	**DIANA 2**
3 JERNEJ LOKOVŠEK	**ALC LESCE**	**VENTUS-3F 18M**

Full results at soaringspot.com/en_gb/e3glide-calcinate-del-pesce-2021/

RELEASING/REALISING THE POTENTIALS OF GLIDING

BY EMILIS PRELGAUSKAS

The existing traditions within gliding that have impacted our ability to remain viable are well known, within and beyond our own ecosystem. Commentators within and external to the gliding community describe us as imbued with an interlinked cascade of barriers to releasing or realising the potentials of gliding in today's world.

Current participants are principally male, predominantly Caucasian, now mostly in our 50s or well beyond, some insular as individuals, as is noted more broadly below, and also as pilots, administrators, volunteers and supporters of our activities.

COMMUNITY BARRIERS AND CONNECTIONS

This narrowly defined, existing and visible cohort forms an inherent barrier to other segments of society feeling comfortable within our existing arrangements. It explains why more diverse but interested people will stay away – unless we actively work at broadening our attributes to be welcoming.

It is also known that gliding clubs themselves are individually insular – happy with the current arrangements as these have evolved in the past to suit those 'members of the time being', and do so now. This trait is exacerbated by the fact that clubs are often positioned on gliding sites well away from the rest of society. We know why this happens – the need to locate somewhere with large land areas at affordable prices, takes us to the point where gliding becomes insular from club to club.

In terms of community connections, these conditions form a further, inherent barrier well beyond those described above. It means we are pretty much unseen and thus unknown in the wider community, and often even among our neighbouring aviators involved in other forms of flight on their separate aerodromes. This note is based on regular interaction with gliding people on their own development journeys, as well as sitting in on events such as the June 2021 S2F webinars.

SEEING OURSELVES

A lesser appreciated, broader barrier in that pack of issues is the fact that we have come to describe ourselves federally to everyone else in just one principal way – as aviators of relatively exotic equipment, where the induction, training, fleet composition and end goal is racing.

That description does not help us to connect with the community. Lots of sports achieve column inches in the media via their prowess and exploits but gliding, among many other minor sports, secures none of this.

One reason this description is a barrier to the wider community is that this vision of performance isn't reflected in what people find on their first approach to a gliding club. Instead, they find the reality of hard-worked, somewhat worn, older generations of equipment doggedly flying shorter local sorties so that ab-initios can take their first steps on that aspirational ladder.

The racing-centric description also comes across to society as snobbish, elitist and insular, implying clearly that gliding has rich benefactors and therefore will not be needing community connection or support.

That single, aspirational, national-centric vision can be seen in at least at one major gliding site in each region. That is good and relevant as far as it goes, but in a broader sense, gliding is much more diverse than that. It can be argued that about 40 gliding clubs have succumbed since 1984 in their inability to match that high order vision, leaving only a handful of the of the 60 remaining gliding clubs today to carry the load of relevance to today's society.

CLUB DIVERSITY

Citizens are diverse in their own preferences. Thankfully, gliding has many diverse clubs, each with its own particular expression of what it is to glide, to suit that diversity and each attracts a segment of those diverse aspirations. That diversity of clubs also harnesses the ability of existing pilots to move within the sport between clubs, as their own preferences and demands change during their lifetime of involvement.

That dominant racing description is not always helpful, and not just because only 7% of pilots race despite an environment where more and more classes, venues and opportunities are emerging to race both head-to-head and virtually. It is just the same names and faces who turn up to each format.

The real impact of that limited description is that it doesn't give equal time and space beyond the sporting aspect to all the other recreational and social aspects that exist under the gliding banner.

SOCIAL AND RECREATION

The social aspect is where new opportunities reside to engage a wider part of the community, strengthen the volunteering that underpins a reinvigorated recreational gliding, and build a positive recognition across wider society for gliding. It follows that, by making gliding feel connected and visible, potential access from community, business and governments to support it, including grants, becomes more likely.

The recreational side is what most citizens aspire to in terms of operating expense and demands on their time, while allowing that top level racing vision to dominate throws up further barriers that impact both gliding clubs and participants.

In the 1980s the concept of the 'minimum 12 active member' gliding club was identified, based on the history of clubs that formed, stagnated and failed, through knowledge drawn from the three decades of data then available. In any club of lesser numbers, too few people were available to do all the required volunteering jobs – President, Secretary, Treasurer, committee, ops panel, airworthiness cadre and so on.

Since that time, more jobs have arisen – development officer, SMS manager, child protection, disputes arbiter and others – to further swamp those minimum volunteer numbers and drive gliding clubs into extinction.

SINKING THE SHIP

That federation-driven obligatory method – encapsulated in that single aspirational vision – has itself left damage behind with a monstrous load of manuals and rules and expectations – now literally able to sink whole local and regional gliding organisations. Just observe the number of 'unfilled' positions at each level in the hierarchy of gliding from pilot upward step by step to federation. Each in turn hides larger numbers of job descriptions that are no longer carried out diligently or at all despite having a titular incumbent. The primacy of going flying has been squashed by these other layers.

In essence, gliding today is still described in visionary terms as it was in the 1950s, just with lots more baggage. In reality, with modern systems and opportunities, much more can be done with less. However, contrary to the existing national overriding philosophy, not every gliding club needs to do everything – that is, not every gliding club needs to be a training organisation.

USING OUR RESOURCES

There is already a small nascent culture of sharing between gliding clubs that can be built upon. Those with the appropriate equipment can specialise in an appropriate segment of the whole for themselves – ab initio training, BFR checks, outlanding training, independent operator rating, performance flying training, for example – and offer it beyond their own pilots to those at neighbouring clubs as mutual outreach. This model of going where the advantageous resources already exist is found in other aviation forms and in gliding as practiced overseas.

Individual clubs can then choose to focus on being social entities relevant to their user segment and on attracting their segment of like minded people suiting their place, interests and capabilities. In the same way, pilots with their own motorgliders might choose to operate independently with access to clubs only for BFR, maintenance help and proficiency as well as social contact as they need it. Experience over six decades tells us that most pilots fly in a club environment for the enjoyment of the interaction with peers.

STAYING RELEVANT

Each club secures those things its peer group needs – dispensing with the other layers that aren't relevant to them and freeing resources including people to go to where they are needed. That prevents devoting headspace to those things that aren't pertinent, for example, building OGN repeaters in regions never crossed by racing sailplanes. In contrast, the 'everyone in' presumption of the federal description of gliding assumes that this is the only path to success. The 'old men in terry towelling hats' is no longer a single path to diverse gliding succeeding into the future.

This comment draws on what we already know from previous analyses about the demonstrated willingness of gliding clubs to adapt and evolve. Despite years of internal development committees and external consultant suggestions, it is GFA federally that has chosen not to diversify, adapt and evolve. *GA*

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AVIATION COMPOSITE ENGI	TOCUMWAL	PETER CORKERY	0439 842 255	corkerys@bigpond.com.au
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GCV WORKSHOP	BENALLA	GRAEME GREED	0428 848 486	gcvworkshop@glidingclub.org.au
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KEEPIT GLIDER TECH	LAKE KEEPIT	GRANT NELSON	0417 843 444	keepitglider@outlook.com
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MADDOG COMPOSITES	IPSWICH	ANDREW MADDOCKS	07 3143 3131	andrew@maddogcomposites.com.au
MORGY'S GLIDER WORKS P	WAIKERIE	MARK MORGAN	0427 860 992	morgans@sctelco.net.au
NORTH EAST AVIATION	LACEBY	DIANNE	0408 440 172	neaviation@optusnet.com.au
SL COMPOSITES	TEMORA	SCOTT LENNON	0438 773 717	scottl@internode.on.net
T & J SAILPLANES	TEMORA	TOM GILBERT	0427 557 079	tnjgilbert@internode.on.net
ULTIMATE AERO P/L	BOONAH	NIGEL ARNOT	0437 767 800	nigel@ultimateaero.com.au

Test Instruments: Conrod Bearing Clearance Tester (CGCT) required for 50 hour maintenance of 2 stroke engines

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MATTHEW SCUTTER'S BATTLE TO THE PODIUM

BY MATTHEW SCUTTER

After a time when many national and international gliding championships were postponed or cancelled due to the COVID-19 pandemic, the 36th World Gliding Championships in Club, Standard and 15m Classes took place at Montluçon, France. Overcoming difficulties at every turn, Matthew Scutter battled his way from Queensland to Europe and competed in the contest. Below he tells how the story unfolded in his own words and how the former Junior World Gliding Champion fought his way onto the World Championship podium in 15m Class.

BOUND FOR EUROPE

European pilots often complain about how expensive and challenging it is to get to Worlds in Australia, USA or South Africa, at which point I usually choose from a selection of novelty miniature violins to start playing, because Australians have to make that trip 9 years out of 10.

The difficulties of this trip to Montluçon began long ago and have affected everyone to varying degrees. Due to COVID, Australia closed its borders inbound and outbound, meaning I had to grovel to the government for permission to leave the country, and for an early vaccination. Thanks to the Gliding Federation of Australia for facilitating the references to make that happen!

The next challenge was to find flights that could get me to Europe without an extensive or expensive quarantine period. I needed to get to the UK to collect my camper van, head to Germany to pick up all my assorted gliding paraphernalia, then get into France to collect a glider and fly the Championships.

PLAGUE ISLAND

The UK was widely regarded as Plague Island by European countries at this point, so after visiting there, it was either not possible to enter other countries at all, or you needed proof of vaccination to enter. Most European countries do not recognise non EU-manufactured vaccines or would only recognise EU-injected vaccinations. The UK only recognizes UK-injected vaccines, which meant I needed to book a series of expensive PCR tests for Days 2 and 8 of my arrival into the country, despite my intention to transit onwards to France with my campervan in less than 12 hours.

That speedy transit was necessary to avoid upsetting continental countries that believed a UK stay of longer than 12 hours would make

LEFT: Matthew Scutter, the entire Team Australia, with about half the German team at the opening ceremony of WGC Montluçon-Guéret.

you an infected resident of Plague Island. Of course, all these requirements change every day, including whether you need PCR or lateral flow tests, done either yourself or in a lab, 24 or 48 or 72 hours before – although it takes 24 to 48 hours to get the test results back in any case. If you're lost by this point, you're beginning to understand the experience.

Where my plans started to rapidly go sideways was when my van catastrophically stopped on the M25 highway just short of Dover, leaving me standing in the weeds next to a public phone booth for 6 hours at 1am as the 12-hour window ticked down.

I figured it was better to move on to Germany and get a start on paperwork, and possibly buy a replacement van or even a car just to get me through the trip.

PAPERWORK

There is meant to be a process by which travellers to Europe can arrange to have their destination recognise their vaccine paperwork in advance and exchange it for a COVID passport, as it will be necessary very shortly to have this passport in order to enter most shops, restaurants and cultural institutions.

I now had to complete this paperwork for any onward travel. Germany was the lone standout on issuing the magic paperwork and through Sophie Curio's exhaustive calling of every pharmacy in North-Rhine Westfalia, we were able to find one that would issue the COVID passport allowing me onward travel with slightly less hassle.

If you'd missed the memo, the second most famous thing after German engineering is German bureaucracy, and it doesn't seem to be possible to buy, register and drive a car in Germany reliably in less than 10 days.

Running out of options, I had to lean on my friend Radek Krejčieík once again - Radek had the misfortune to ask me to lend him my car once in Australia, and now I've hit him up twice for his in return. A quick zip over to the Czech Republic with my fresh-off-the-printer paperwork, collecting a lovely van and a 2,000km drive with a brief stop in Bonn to collect a few bare necessities and I was off to Paris to pick up an immaculate Diana-2 New Generation from the very helpful Olive Dianadeux, organized by Bolesław Kawik. After a couple more phone calls and texts around the globe and Jake Brattle kindly agreed to bring me a spare logger from Navboys, and a tent from Graham Garnett as replacement van accommodation.

WUNDERCREW

It wasn't possible to bring a crew from Australia, so I'd put up a few blanket cries for help on various European soaring forums, and managed to find the effervescent Maciej Kukliuski who agreed to come crew for me. Wundercrew (operational meteorologist/top pilot) Aude Untersee agreed to come as well organising maps, water canisters and a 4WD vehicle.

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The British Gliding Team has functionally adopted me as one of their own (I am British after all, when it suits me), so I've been sneaking into their meetings and meals and borrowing everything from blankets to batteries in lieu of my usual boxes of bits in my van.

Borrowing a glider is always fraught – nothing quite behaves like it does on your own glider – so it was not entirely surprising that I had no ASI or variometer on the first flight and I needed some help from Łukasz Grabowski and Bolesław Kawik at AVIONIC in order to get flying again on the next day. Next up was the LX9000 flight computer, but some quick support from Toni Šibanc and Uroš Krašovic at LXNAV and we were back in the air. The bug wipers are the mountain not yet summited, but I hope to have them running before the end of the contest! Fortunately, the weather has been so bleak the last few weeks, even the bugs have forgotten how to fly.

GATHERING COURAGE

The inevitable paperwork problems popped up at registration. Fortunately Mandy Wilson and Terry Cubley were able to leap into action and send me some missing sheets of fluff. Aude Untersee and Olive Dianadeux helped tackle the next iteration of paperwork problems, securing the correct insurance for me to fly the glider.

COVID has affected various countries contests in assorted ways, so I'm likely not the only pilot in the World Championships flying the first contest they've flown in a year. I felt utterly unprepared mentally for the tactics that will be required or the complications that lie ahead. I kept myself going with a long term horizon of Narromine in 2023/24 and Uvalde, hoping that when we emerge from COVID, I'll still be current and flying at a high level again.

So, onward and upward. Acting as my own team captain with borrowed kit in a hostile weather environment was unlikely to lead to a good outcome, but I hope the long term investment is worth the pain.

DELAYED START

After three full days of grid squatting, which included watching Club Class and Standard Class get fed into the mass-landout meat-grinder, yesterday it was the 15m Class' turn to grid first and face the relentless optimism of the organisation.

The sniffer was launched not once, but twice, landing back both times shortly after – but remarking that probably more gliders would find a thermal. Indeed, all 40 of us did find a thermal – the same thermal – and we waited there for the better part of an hour for convection to 'start'.

I was reasonably sure our 240km task was going to be unachievable off a 4pm start into 1.5kt blue thermals up to 3,000ft AGL, but I didn't dare go with the leading French gaggle, as I decided I'd rather risk outlanding at the end of the day than at the start.

I'd wanted to go with the middle gaggle, but when they left I was a few hundred feet too low – not usually a problem, but when you're starting at 2,000ft AGL, a few hundred feet is a lot.

I ended up starting almost last, fighting to jump forward to just one gaggle behind the leaders. Unfortunately, I was 15 minutes too late for the last thermal of the day, and had to do my first outlanding in years.

The end of the flight was actually beautiful, smooth and calm thermals, setting sun through the altocumulus, with the Diana 2 effortlessly outclimbing the gliders while at 30kg/sqm compared to the turbo JS3/V3. Unfortunately it was not enough.

GETTING TO KNOW DIANA

This day was a day of lows and lows. The weather was worse than the day before with 1 to 2kt blue thermals to 3,000ft AGL at best.

The wing loading range really is showing as the critical factor in this competition – those of us in Dianas are not afraid to play start games until late. We can climb much better in the end of day thermals than the turbo and jetted V3 and JS3s. Eventually, some of the heavy gliders seemed to panic start and the whole gaggle started moving, but it was too late – 80km from home the thermals dropped to 0.5kts and while we could eke towards home, the heavier gliders all either lit up or outlanded beneath us.

I finally climbed in 1kt to 3,000ft onto a 48:1 glide and crossed the finish line with 30ft, one of the only finishers with truly exceptional glide performance on this sailplane in still air. I really could not believe I'd shoot that glide.

Then the fun started. My undercarriage folded up beneath me on landing – had there been a heavy landing some time in the past that had been fixed? It seems there was more delamination hidden below the repair which had given way and the whole undercarriage packed up.

Through the heroic efforts of Jake Brattle, Tom Arscott, Jon Pring, with advice from Sebastian Kawa and Lukas Grabowski, we stayed up most of the night repairing the glider

DODGING DISASTERS

The following day was cancelled after the start due to rain showers. The following day, after an overcast morning, we launched on a short AAT.

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I'd had a bad night's sleep, my landing gear doors were still not closing completely, the visibility was terrible and the thermals narrow and bubbly. I didn't want to try anything special and wanted to find a small gaggle to zip around with. Not having a teammate is hard work so I have to improvise a team every day.

I hung around the start line and was surprised that everyone seemed to go very promptly. I thought it was just starting to improve, though I actually missed all the people I'd like to have started with and ended up going alone. But at the end of the first glide, out of the soup appeared the German team, so I was feeling pretty comfortable. At the end of the second glide we found the two Polish Diana's, Sebastian and Lukasz - we now had a dream team.

We raced along for 100km or so before the Polish pushed and the Germans took some more height, but I'd had a good glide and was a bit higher than everyone so I opted to push on with the Polish. It was really a masterclass watching Sebastian and Lukasz work and seeing the decisions they were making. I learned a lot by studying how the Polish team worked together in my first European comps back in 2013, and they demonstrated this again today.

The sky looked great for a long final glide and everyone was pushing hard for the end, but it just didn't deliver and I found myself with the French, Polish, Czechs and a few Club Class gliders milling around about 200m off the ground, just short of and below the finish line, which really spoilt the average speed but we groveled over the line for another good result.

The speeds and distances we're achieving here are incredible, without going much above 3,000ft and 2kts average climb.

WEAK BUBBLES

Today's challenge was the discovery of active parachute drop zones that hadn't been in the airspace file just prior to launch, causing some very quick scrambling of paper maps and pens to avoid a potential disaster.

I initially had a problem that the LX9000 would switch off every time I used the bug wipers due to a low voltage cutout in the batteries. Lukasz had the same problem and offered to order me a new battery which I'd received and tested that day, and indeed the LX9000 no longer switched off. Instead the new batteries were so powerful that when I gave it a test run, it went 'ping ping' and both of my retrieve lines snapped. It was hot and I was busy preparing other things, so I opted to again fly without the wipers, as it hasn't been buggy enough to really justify the hassle just yet. That decision would cause a problem later.

Conditions were abysmal in our start area, as always at this start point it seems – rapidly bluing out and convection only to about 2,500ft above ground.

There were really only two good opportunities to start on top of a few weak bubbles. I missed the first and went with the second gaggle, which had most of the top 20 pilots in it. Like a meteorite crashing to earth, the gaggle slowly shed gliders out the sides until it was just the French and Polish left ahead of me.

BUGS

I felt they were pushing each other into higher and higher risk saves, so I broke away near the second turn, but I only made it 10km before I got rolled again, by now down to one Frenchman. At this point I heard on the radio that it was totally blue beyond final glide distance at Montlucon, and that it was going to be critical to be with gliders for the end, so I resolved to not try and break away again and to hold position so I'd have other gliders around for the blue crossing.

My wings at this point were blackened with bugs. It seems the light winds and moisture had brought out the plague. I had grossly misjudged the situation by not putting the wipers on. I was rapidly falling behind Max, Sebastian and Lukasz, and I was quite worried I would not reach whatever climb they found in the blue ahead. I decided to drop all my water to try and feel my way into a climb. Like magic, just after I dried out, I felt the tail of a thermal and sniffed my way into a solid 2.5kts.

The gliders ahead came back but had missed the bubble, so I had an extremely dicey glide home alone, topping up in 0.5kts a few times but still coming in below the finish height as I just could not string a glide together with the reduced performance of the dirty wings.

INTERNATIONAL LANDOUT

After the race today was International Night – a big party where you bring some food from your country – so, following tradition, the task was a mass landout.

It promised to be an easy day flying before the party and the tasks were set accordingly with ambitious racing tasks. After the sniffer struggled badly the tasks were revised down and we launched on a 280km flight at around 2pm.

The end of day was forecast to be at about 6pm, so I thought that with the good cumulus en route, a good start time would be about 3pm, which left very little margin for error. However, in general, I've found that if you leave margin for error, someone else won't and they'll get away with it.

Well, errors were made. I saw many pilots had already started so I didn't want to run too much risk and prepared for a slightly earlier departure, but I missed the right cycles and couldn't get up when I wanted to. I managed to start with a couple of other good pilots and had a fast run out relative to the pilots who'd left much earlier while conditions were still developing. Then I had a bit of a scare when an exuberant thermal join tried to cut me in half, which made me lose focus for a bit and fall off the bottom of the gaggle and nearly drive it into the ground.

FROM SELF-PITY INTO RAGE

After a low save, the self-pity had festered into a rage and I had a nice couple of hours of clear focus which let me catch up to the front of the gaggle again, just as the rest of the gaggle appeared to make a big mistake – heading 90 degrees off track down a street looking for a climb to cross a hole, while I decided to stay in the 1m/s they had discarded and cross sooner.

In retrospect, I guess the gaggle had done that because they'd heard from their other classes or ground stations that conditions ahead had deteriorated faster than expected, as some stratocumulous had moved in from the south and shaded the airfield and it was rapidly become very difficult to get home at all. I didn't know that, so I pushed off aggressively and was now by myself and heading into conditions that rapidly grew more challenging.

Unable to feel out the good climbs under the massive cu's, I dropped all my water for a few low saves and ended up getting very close to the airfield. The finish ring height is about 350m above ground, and I parked in lift about 2km from the finish ring at 200m above ground, under total overcast with 20kts of headwind. I couldn't figure out why this thermal didn't go above 250m or so, nor why it didn't seem to drift downwind when I circled, requiring aggressive recentring upwind on every turn.

ROLLING TOPOGRAPHY

Eventually it clicked. This isn't a thermal – I'm on the ridge. The topography near the airfield is rolling, and in the strong wind this location was making a bit of ridge lift. Unable to go anywhere with this height, and unsure if the field I could see

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ABOVE: Sebastian Kawa and his Polish teammate Lukasz Grabowski also flew Diana 2s, which turned out to be the best glider for the weak conditions at the contest.

just ahead inside the ring was really safe, I pushed forward until I got that tingly feeling in my toes before an accident. Then I went back to outland in a little postage stamp of a field I'd been keeping my eye on near the 'ridge' - easily the shortest and most difficult outlanding I've ever had to do. Although probably not abnormal by European standards, I'm used to Australia's 2,500m fields, not 250m fields.

The length wasn't the problem so much as the turbulence, which made it necessary to maintain 120kph until near the ground and made it float a long way. But I got it to stop 10m before the end with only airbrakes and moderate wheel brake.

The next few days of weather looked predictably chaotic, and while my position overall was still very strong, about seven of the pilots could easily have taken any of the three medals with a small swing of luck – something this place was delivering in spades. Yesterday, pilots climbed in a miraculous 2m/s at almost the same time as I took my last 0.3m/s, and some other pilots found a mysterious 'convergence' which they floated along to get home.

At the rate of only 35% of pilots in my class completing the task on any given day, anything could happen here. Survival is critical and defensive flying is impossible.

STRANGE WEATHER

This was one of the strangest days flying I've ever had – 8/8ths overcast of stratus/cumulus/spread out all merging and swirling. The airmass was cold and unstable, so just a ray of sun would kick off a few knots, but the wind was oppressive, totally chopping everything up.

I don't know whether the wing had too much polish or the thermal phase was out of resonance with the wing or the tanks were full of heavy water, but I just could not manage to string a climb and glide together for the first half of the flight. I started in a good position, a safe compromise between the day 'cooking' and the potential shutdown, but I totally lost the gaggle and only caught up to them again 10km before the last turn – except they'd already been around it and I hadn't.

The day was really shutting down so I took a weak climb all the way to the top of convection and set off on a marginal glide, and scraped it in with just a little top up. I was shocked to see that the gaggle had not made it and the airfield was quiet, except for a couple including Sebastian who seems to have had a blinder of a day. It seems the gaggle fell off glide and got themselves in a bigger and bigger hole trying to climb back on it, but the incredible glide of this Diana was just enough to shoot it direct.

LAST CHANCE

The final day of a contest is usually too hard to make points on, as everyone is covering someone, so when I saw an opportunity to do something quite different today on the penultimate task, I thought it was worth trying. There was a megastreet that nearly joined up between two AAT circles, but it was a long way off track in and out. The alternative involved flying the isolated cu and looked trickier although a lot more direct. I went for the megastreet and I'm pretty sure I was the only one to use it both ways, but it was a bit disappointing and tricky to find the cores by myself. I still had a respectable speed but I was coming into Montlucon alone which is always a high risk activity, with my class still averaging only a 35% task completion rate.

Despite just being 10 minutes behind the gaggle, I got a bad phase of the spreadout and was looking at a sky that was too bleak to try and pick up glide along. I was only 300ft below glide but instead, I opted to go deeper into the last circle, now 1,000ft below glide, where there were still good cu to pick up a climb onto glide with.

What I didn't understand was that I was flying into a different airmass, with a much lower cloudbase only 600m above ground, with very soft and narrow climbs. After an extended period of circling lower, I finally gave it away and parked it. The sun did eventually come out again through the spreadout and the cu cycled to a bit more definition, so I think it was possible but just not at the time I tried.

EXHAUSTION

I was mentally and physically shattered after the last four weeks. It was by far the most difficult contest I've ever flown in, with strenuous conditions both on the ground and in the air. The organisation had no shortage of enthusiasm or optimism and were very friendly and helpful, but they were short about 30 ground crew and most of the typical facilities you might be used to like wifi, running water or tow ropes were missing or limited due to COVID.

The flying involved more circling than cruising with my average climbs for the contest being less than 2kts. I haven't updated the numbers but I believe in my class some 70% of pilots outlanded - every day. I have calluses on my feet from the rudder pedals (I have to fly barefoot to fit inside) and at the very end I couldn't even turn left properly because of shoulder strain.

The last day came not with a bang but a whimper. Convection was only to 1,500ft AGL at launch time but we went anyway and I was glad for it. With 50 points to third and 200 to first, I did not intend to finish in 4th place again and I was content to lose the top ten if required.

As has been proven thoroughly by this competition, the pure Diana 2 excels in extreme weak conditions, and yesterday was to be no exception. We grovelled to the start line, still not climbing above 1,500ft AGL with many of our class not able to dump below 48kg/sqm. I held onto most of my water hoping for conditions to improve. I started about at 1,200ft AGL and hobbled with the gaggle down the first leg.

After almost falling out the bottom of the gaggle, I changed strategy and dropped my water completely, which quickly let me float to the top of the gaggle. Now on top, I could turn tightly and managed to climb in 2kts to over 1,000ft above the gaggle. I figured this was my big chance. Maybe I could catch the back of the Club Class gaggle ahead from here and leave the heavy 15m Class gaggle fighting over scraps behind.

FLYING ALONE

I ended up flying alone for the entire day, with Sebastian and Lukasz a few kilometres behind joining my climbs as I left them. It did improve slightly, up to 2,500ft AGL but it was still a very high-risk strategy to push out ahead alone, but if I waited for more gliders I would be potentially resigned to 4th.

Getting back to Montlucon has been the story of the contest – the terrain rises, the finish height is 1,000ft above the airfield, the last 30km is largely unlandable and the thermals always weaken dramatically in the vicinity of the airfield. I had almost got myself onto glide about 30km out, just a few hundred feet below, and with some wisps ahead I set off hoping to either make it up or climb again to make a clean finish.

I found only bad air in the last 20km and had to commit to landing in a field I'd scouted from the ground previously, one of the only options in the area and just inside the finish ring. However, with the finish height so high, being inside the ring doesn't matter as the penalty points dwarf the speed points, so it was just for the fact it was a 'good' field that I chose it.

I was lucky enough to remain in third place even though some managed to complete the task. I hope I gave Sebastien and Lukasz just a little scare.

REAL GLIDER CONTEST

Many pilots chose to bring motorgliders after seeing the outlanding options last year. I tried to secure an FES glider for this year again, but in the end it was usually only the motorglider pilots who had to start their engines. Those of us who could push a little lower and climb lighter avoided most of the outlandings, but those that we did have to suffer were harder than I've ever had to execute before. I think it's the first 'real glider' contest in many years, where having a motor glider put you at a distinct disadvantage.

Well, I made it. Through a strategy that was not so different from smashing my head against a brick wall for four months, at least in terms of cost and ongoing brain damage, I managed to get vaccinated, obtain permission to leave Australia and get flights, glider, car, another car, crew and everything else organised to compete as the only Australian at the World Gliding Championships in Montlucon, France.

Getting back to Australia will be a later problem. I don't know yet when and if I will be allowed back into Australia. I will scream if one more European asks me, "Why can't you just fly back? Aren't you a citizen?"

GA

LEFT : Contest Director Thierry Paris with Deputy Director Aude Untersee who provided the waether and helped Matthew get to the competition.

BELOW: Matthew on the podium with his Bronze Medal.

36TH WORLD GLIDING CHAMPIONSHIPS MONTLUÇON-GUÉRET - FRANCE 2021

8 - 20 AUGUST 2021

15 METRE CLASS

1	SEBASTIAN KAWA	POL	DIANA 2	4,470
2	LUKASZ GRABOWSKI	POL	DIANA 2	4,286
3	MATTHEW SCUTTER	AUS	DIANA 2	4,220

Full results at soaringspot.com/en_gb/wgc2021-club-std-15m-montlucon-gueret-2021/

THE DEVELOPMENT OF ETUG AND ITS PSRU

Michael Shirtley
E TUG

The Wright Brothers used a simple piston engine driving a propeller to power their aeroplane – the propeller speed matched the engine speed. Early aviation engines were designed to run at a speed of about 2,000rpm, which matched well with efficient propeller speeds. Jet engines apart, this system has been used for the 118 years since the Wright Brothers.

For the specific purpose of glider towing, eTug uses an automotive piston engine instead of an aviation engine to benefit from the higher efficiency and lower cost of automotive engines for that application. But automotive engines run most efficiently at about 4,000rpm, so a propeller speed reduction unit (PSRU) is needed, something relatively new to the design of aeroplanes.

HISTORY OF THE DEVELOPMENT OF THE PSRU

Nevertheless, the eTug PSRU has a 40+ year history, from a former Boeing engineer's original design, to its incorporation into Piper PA25 Pawnees in Australia. The use of a toothed belt reduced the experimental testing time by removing the potentially destructive force of crankshaft vibrations that produced harmonics in the system and the propeller. This facilitated its application to a number of combinations of engines and propellers.

BLANTON – AN AVIATION TRAILBLAZER

Dave Blanton, the PSRU's original designer, was an early member of the Experimental Aircraft Association (EAA) – creators of the famed Air Venture Oshkosh annual event – and variously Director, Vice-President and President of the National Association of Sport Aircraft Designers in the 1970s and 1980s, alongside such legends as Burt Rutan. At Javelin, he designed the Wichawk biplane (Lycoming-powered) as a project for homebuilders. Many were built, and a number of them are still flying today, 50 years on.

In the late 1970s Blanton did serious, lengthy work on testing and refining a 4-cylinder Ford Pinto engine as an aircraft power plant. This power plant carried the first model of the belted PSRU now used in eTugs. In industrial applications, the toothed belts he chose had a demonstrated life of 8,000 hours. Fitted to his first PSRU, which he rated at 360hp, he was on a safe path.

WHY AUTO ENGINES?

Auto engines are liquid cooled, maintaining an ideal operating temperature irrespective of power settings. Therefore, their descent speeds are not limited by the need to keep the engine warm, as conventional air-cooled engines require. They are made in the millions, at one sixth the cost of aviation engines.

FORD V-6 POWER INCREASES

The development of this Ford conversion culminated in Blanton's Ford V-6 STOL project, a Ford V-6 conversion carrying a refined and updated version of the original belted PSRU. It was reported in EAA Sport Aviation magazine that in ten years of Blanton's rigorous testing, the PSRU operated impeccably. Offered to home builders, the V-6 STOL conversion was fitted to many projects, as widely different as a stretched Piper Tri-Pacer, a Starduster biplane and a Rutan-designed twin-engined Defiant (fore-and-aft engine placement). Indeed, the Blanton Javelin V-6 was installed in Australia's AutoTug at Tocumwal (a project sponsored by GFA), the local precursor of the eTug project. In the US, Blanton had applied to the FAA for approval of the Javelin V-6 STOL project, and had gained acceptance for experimental and home-build applications. Many of the Blanton-engined projects are still flying.

NORTHWEST AERO PRODUCTS

When Blanton turned his interests to other aviation endeavours, the PSRU project was sold to John Lindgren of Northwest Aero Products in Seattle, who continued to develop and refine it. As the Northwest Aero Products PSRU, it continued to be available to project builders into the early 2000s. Lindgren subsequently sold to Steve Brown at Eagle Precision. Brown had been the manufacturer for Lindgren of many of the Northwest Aero PSRU components, and he maintained continuity of supply and parts until ill health forced his retirement.

AUTOTUG

Six GFA members, including Dave Sharples and Mike Burns, formed a company named Autotug Pty Ltd in about 1989. GFA funded a conversion of Kingaroy's VH-CTA to the Ford V6 and PSRU imported from Blanton's company. This became known as the Ford Javelin engine. Conversion work was done by Mike Burns at Tocumwal. It first flew on 11 December 1992.

In about May 1994, the GFA funding stopped and the aircraft moved to Kingaroy Soaring Club. Initially, it was grounded for 14 months waiting for CASA to permit the experiment to continue. Kingaroy Club funded the continuing research. Further development of the engine induction system was made by Dave Sharples, increasing power output to 200hp.

However, to produce this power, the engine had to run at 5,000rpms at about 800 hours, when problems with erosion and lack of parts brought the experiment to a close. The engine and PSRU are on display at the Gliding Museum, Tocumwal. Autotug Pty Ltd was wound up on 3 September 2002. The support from the Kingaroy Club enabled them to prove the concept of successfully using an auto engine for glider towing.

ETUG

By 2006, eTug Pty Ltd had bought 11 PSRUs, three from Northwest Aero, then eight from Steve Brown's company for installation in prospective eTug conversions in Australia. When Steve Brown announced his retirement, eTug bought the design and manufacturing rights from him, and are now the owner of the eTug PSRU that had started life with Blanton over 40 years before. We have made one modification to the design, which will be incorporated in all our current stock, and in the drawings for future manufacture.

MORE POWER

For eTug, observation of what had gone before pointed clearly to the use of a larger capacity engine, running at the lower speed of 4,200rpm. A GM V8 LS1 engine was chosen, developing about 300hp at that setting, and weighing less than a Lycoming O-540. The propeller pitch was set to limit the engine speed. GM had made 30+ million of this engine type, which had already achieved a reputation as one of the most reliable automotive engines ever made.

Because eTugs were hopefully to be taken up by clubs around Australia, enabling service by the local Holden mechanic was essential, so a stock standard engine was used. A three-blade propeller made by Rob Patroney produced a static thrust of 468kgs, an increase of 58% over a standard PA25-235. This increase in thrust provides very rapid glider acceleration, making wing-drops unlikely. A considerably increased climb rate is also an advantage, but the eTug shines with a descent rate of 2,500' per minute, enabling eTug to deliver a 3-minute tow to 2,000ft, repeatedly.

FIRST ETUG FLIGHT

The first conversion – that of VH-CUR – was undertaken by Ian Watson, Watson Aviation, Bundaberg Airport. Destructive tests were performed on the engine frame by Alan Kerr, Aeronautical Engineer. CUR first flew at Bundaberg on 14 June 2006 in the Experimental Category, certified by CASA delegate Stephen Dines. Considerable test flying was conducted at Kingaroy Soaring Club. The aircraft was delivered to Lake Keepit Soaring Club in November 2007.

CUR was mysteriously damaged there and taken to Scone in June 2008, repaired and then flown by Ian Barraclough to Benalla in May 2009. CUR has now flown 1,300 hours, and has recently been CASA-re-certified and issued a Special Certificate of Airworthiness in the Limited category for the special purpose of glider towing. It has launched approximately 16,000 gliders.

ADVANTAGES TO GLIDING CLUBS

The list of benefits of eTug to gliding clubs calls for serious consideration. Its engine replacement or overhaul cost is one-sixth that of a Lycoming, and it consumes one-third less fuel using unleaded petrol. It delivers a static thrust 58% higher than a Lycoming 235 and a launch rate that is nearly double, getting many more pilots into the air quickly once thermals have started.

AERO TOWING OUT OF PADDOCKS

When pilots go through cross country endorsement, the outlanding check is conducted in a two-seater and the instructor usually heads for a large flat paddock that will be suitable for the exercise. This paddock is likely to be well known to the instructor and, in principle, will be suitable for an aerotow retrieve subject to final checking. When racing cross-country, the situation is different. Pilots will certainly be looking for a safe paddock to land in, however, an aerotow retrieve is a secondary consideration. The safe landing is the priority, not the retrieve.

BY JAMES COOPER

So, when you have landed in a paddock, what are the factors to consider before calling up the tug? Read through the list below, not necessarily in order of importance.

OUTLANDING CONSIDERATIONS FOR PADDOCKS

When a total fire ban is in place, it may preclude any type of retrieve from the paddock.

600m is the legal minimum paddock length. Walk the full 600 metres. There may be rocks, rabbit holes and small indentations that will break your undercarriage and are not immediately obvious. Remember, there is no such thing as a short field take off. The paddock is either long enough or it isn't.

Look for a suitable point for the tug to touch down and convey any relevant factors to the tow pilot before he lands. Work out what you are going to say in advance. This will keep the radio conversation brief while he prepares to land.

Before the tug arrives have a good look at the surroundings. Each outlanding is unique, and there are no fixed rules. Work out the best flight line out. Is it better to take off into wind uphill or across wind downhill? The danger of uphill take offs are the long, slow ground roll.

Beware also of downhill take offs with a tail dragger! The centre of gravity starts to move nearer the front wheels as the slope increases, which has proven very expensive in the past. If the paddock is harrowed, is it better to take off along the harrows? There is a risk of breaking the undercarriage if you take off across them.

As there are a lot of factors to consider, make sure you have assessed them all. You will have plenty of time to do so awaiting the tug. A few such factors are discussed below.

Look at where you will land in case of a rope break. That is, formulate an escape plan.

DISCUSS AND PLAN

Discuss and plan the retrieve with the tow pilot once he has arrived. Don't hook on and rush off as soon as the tug has landed. Consider the line you will take out of the paddock, where and at what point you should abort. Discovering the paddock slopes uphill halfway through the take off is too late, and you could be in trouble. If in doubt, release.

As well as the paddock's slope, consider the wind direction and strength and also the temperature – the hotter it is, the less power the tug has. Discuss any radio talk required during the operation. State, "I will call as soon as I am flying" so he knows your progress without looking in the mirror. But don't be preoccupied with radio communications. Remember – aviate, navigate, communicate. Spend plenty of time planning the whole operation.

Do not assume the tow pilot knows all. It's a team effort and you don't have to proceed with the retrieve if you're uncomfortable with the situation.

Push the glider back to the limit of the paddock. In some cases this can be done alone, but if not, then with the tuggie's assistance. I am sure he will help. Remember, one of the most useless things in aviation is the runway behind you.

LOOKING AFTER WINGS

Prop up the wings. Dragging a wing on the ground places horrible strains on the airframe. When possible, I prop the wing up with sticks or fallen branches. These lie around the edges of most paddocks. Place one under each wing so that the wings are level prior to the start of the ground roll. A much less stressful launch for the glider and pilot results. As an alternative, a pile of rocks could be used instead of branches.

One also needs to consider which wing should rest on the ground if you can't prop the wings level. Naturally you want to lift the wing as soon as possible. The greatest assistance you will have is the prop draft from the tug. The prop draft will give increased lift to the wing that it passes over. So how do you take advantage of this?

If you are launching straight into wind, place the glider slightly off line to the tug. You will need to have told the tuggie that you are doing this and why. Place the left wing on the ground with the centre of the wing directly behind the tug. If, however, you have a crosswind - let's say, for example, from the right – it is better to have the wing that is into wind, the right one in this case, off the ground as the wind will bend the prop draft over the lea wing that is on the ground. Don't rush the launch. Be sure when you start the ground roll that all checks have been carried out and you are relaxed and confident. However, still be prepared to pull the bung if necessary.

Finally, if you think the paddock is not suitable for an aero-retrieve, call for a trailer – it's cheaper!

TAKE-OFF DISTANCE REQUIRED - TODR

It is in the glider pilot's best interest to have a basic knowledge of the factors affecting the take-off distance required (TODR) for a powered aircraft. After all, an aerotow upset can really wreck your day. Don't assume the tow pilot is fully aware of the TODR for his tug. Also, as the glider pilot, you do not have to accept his judgement for a particular take-off situation.

What affects the take off distance required for a powered aircraft glider tug? I hate to bring a formulae into the discussion, but all pilots should have a basic understanding of this: Lift = CLift. ½rho.V2.S where 'rho' is the air density, 'V' is the velocity of the aircraft and 'S' is the wing area. So the main factors affecting the lift produced by the tug's wing and hence its ability to fly is 'air density' and 'velocity'.

Two factors determine air density – heat and altitude.

- Hot air is less dense with fewer molecules per unit volume, which reduces lift for a constant 'V' and is also why thermals rise.
- Altitude/elevation. The higher you are above sea level, the less dense the air. On aircraft performance charts, these two variables are combined into what's called density altitude. To generate the same amount of lift with a reduced air density requires a higher velocity (see formula). This is also why true airspeed (TAS) is greater than indicated airspeed (IAS) at altitude.

IAS is a dynamic measurement proportional to ½rho V2, where TAS is the speed of the aircraft through the air. At 5,000ft, TAS exceeds IAS by 8% and at 10,000ft by 17%. I might remind pilots at this point that flutter is dependant upon TAS and not IAS.

A take-off on a hot day and/or from an elevated runway will need a greater TODR. Why? With a reduced air density the tug needs to accelerate to higher 'V' where the lift produced enables the aircraft to fly. This requires more time, which equates to a longer ground run and hence requires more runway. Also, a reduced air density decreases the maximum power produced by the engine, which has a further negative effect on the TODR.

AIRFLOW VELOCITY

The other essential element for lift generation by a wing is velocity. The velocity we are talking about is the velocity of the airflow over the wings, not the ground speed of the tug. Fortunately, the ASI indirectly measures the speed of airflow over the wing. The aircraft's ability to fly and its stall speeds are determined by reference to the IAS, not the ground speed or TAS.

Among significant factors affecting the tug's ability to accelerate to the IAS or 'V' for take off is the nature of the runway surface. A rough, sandy or wet paddock or long grass will retard the aircraft's acceleration on the ground roll, as will an up slope. Hence, the tug will take longer to reach the IAS for take off. A longer ground run requires a longer runway.

I landed at Jindabyne one winter's day to take some friends for a joyflight over the ski fields. RWY elevation was 3,400ft and length was 1,000m with long grass. The grass retarded the aircraft's acceleration much more than I expected and I could not reach TOSS. I elected to pull up into ground effect about 5ft with the stall warning sounding. As I maintained this altitude, the aircraft rapidly accelerated and I then commenced a normal climb out.

WIND SPEED

Wind speed is another vital element in the process of determining TODR. If you take off into a 20kt wind, the wing already has 20kts of lift, producing airflow before the take-off roll commences, so the tug will reach flying speed a lot sooner and hence have a shorter ground run than in calm conditions, hence less TODR.

Have you ever noticed how slow FSJ is moving with respect to the RWY? When on climb and taking off into a 15-20kt wind, IAS will be 60kts. The other benefit of taking off into the wind is that the climb-out is steeper relative to the ground, which has definite benefits for obstacle clearance, such as the trees at the end of the paddock!

Of course, taking-off down wind is not recommended. For a 10kt tailwind there will be no lift-generating airflow over the wings until the aircraft has exceeded 10kts forward velocity – that is, with a 10kt ground speed, the IAS will still read zero! TODR in this situation can be frightfully long and the climb-out very shallow. Also, for the glider pilot behind the tug, flight controls can be very ineffective during the initial ground run. NOT A GOOD SITUATION!

ALARM BELLS

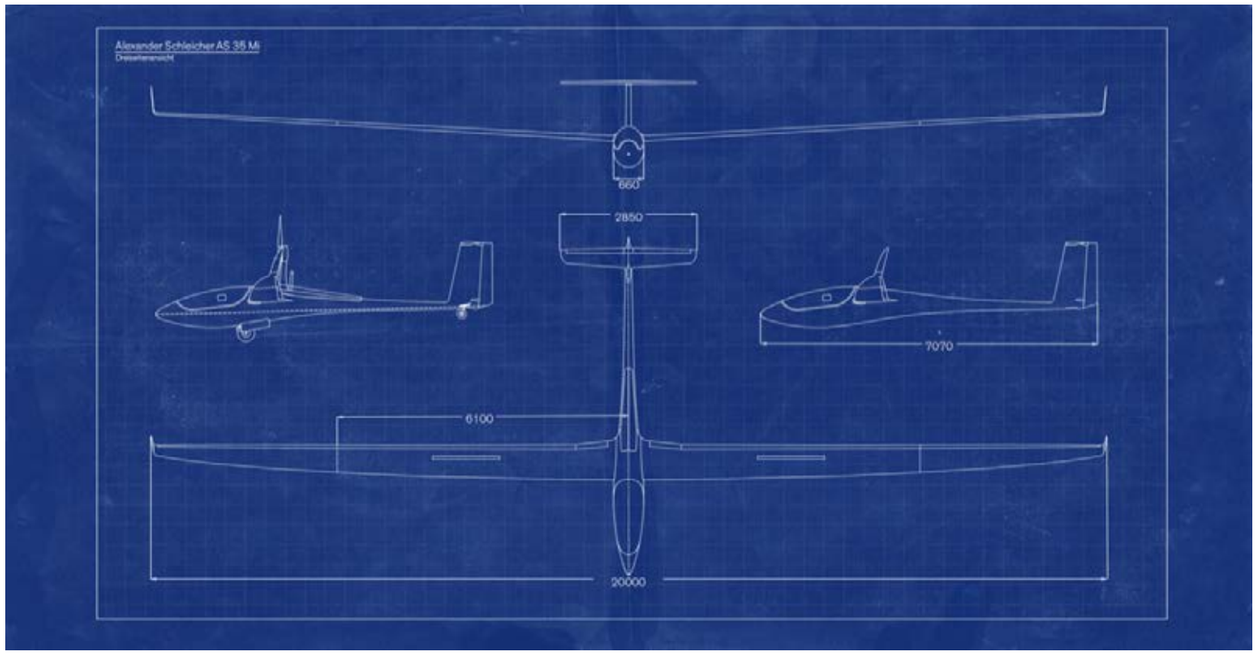
To summarise, a hot day combined with a rough boggy runway (paddock) surface with an up slope with nil wind should ring alarm bells for the pilot and he should realise that a greater TODR is required. In each powered aircraft's flight manual is a chart that allows you to input the temperature, runway elevation/slope/surface, and wind speed to actually determine the TODR.

So once you have determined the TODR, pace it out. If the take off distance available – in other words, the length of the paddock – does not equal or exceed the TODR, then aerotow is not possible. Add a bit extra to this figure, as the performance charts were compiled using a brand new aircraft/engine, which did not have a glider on tow. I am sure one of the Club's tow pilots would be happy to show you FSJ's 'P' charts. And finally, the RWY / paddock is either long enough or it isn't.

GA

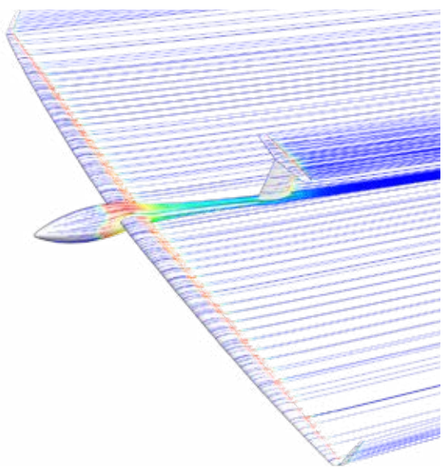
THE NEW AS 35 AND THE NEW PHILOSOPHY BEHIND IT

BY BERNARD ECKEY



The pace of Schleicher's new model releases continues unabated. After the introduction of the AS 33 and the all-electric AS 34, the world's oldest glider manufacturer has just announced its latest development – a new Open Class ship – the AS 35 Mi.

It comes as no surprise that Schleicher's has earmarked the ASH 31 as their next model for an upgrade. This very popular glider has already been in production for 12 years and to date almost 220 of these machines have left the German factory. This is a far greater number than the combined production of 21/23m gliders by all other manufacturers.



Also largely unknown are the inflight measurements recorded by the 'Idaflieg' institute, showing that the glider has a best L/D of 60:1 – a figure that comes as no surprise to most of its pilots. Not only that, but the ASH 31 ticks all the boxes for aviators seeking a self-launching, docile, uncomplicated aircraft with a reliable, smooth, powerful engine, a comfortable cockpit and very pleasant handling characteristics. Its fans will be pleased to know that, due to ongoing demand, Schleicher will keep the glider in production for quite some time to come.

TECHNOLOGY TO THE RESCUE

Soon after the legendary ASW 22 was discontinued in 2008, pilots of other aircraft began to occupy the podiums at Open Class competitions. In response, the young and ambitious team of Schleicher engineers has set out to make some changes. They are committed to success at the highest level of competition and believe that utilizing the very latest Finite Element Method (FEM) and Computational Fluid Dynamics (CFD) technology will be key to this success.

These modern tools have challenged current thinking and resulted in a new design path. Instead of wingspan, experience with the new AS 33 suggests wing loading to be more important. Several competition pilots supported this approach and reported that their new AS 33s could easily climb with other 18 metre gliders even with a 10% higher wing loading. Obviously, higher wing loading can lead to better gains compared to optimizing span.

The three consecutive first places of AS 33 pilots at three European National Championships speak for themselves and are quite remarkable, given that in each of the three contests, only one AS 33 pilot was competing. It is therefore only natural that the design team picked the new AS 33 as a yardstick and used the well-established lift and drag values of its individual components for comparisons with their new design.

WING MODIFICATIONS

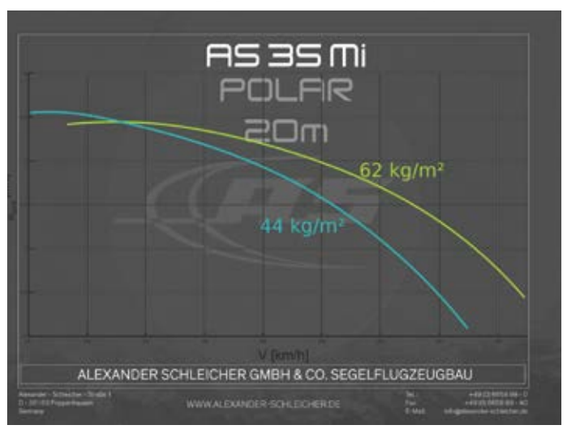
Right from the outset, it was clear that retaining the AS 33's superb ability to climb, even in weak conditions with a full load of water on board, would be crucial. Achieving this at an even higher wing loading would make the AS 35 very competitive in Open Class. Time consuming and highly complex computer analysis has finally resulted in a new family of wing sections, which can not only generate more lift but also shine with lower drag.

Many other design modifications, although minor, would also be included. Individually, they make small contributions, but the combined effect makes a noticeable difference. For example, reducing the size of pushrod outlets and integrating perfectly fitting and absolutely flush bug wiper garages eliminate unnecessary drag and help make the glider more slippery. A fully retractable tail wheel, new winglets, a perfectly covered tow release and flush mounted LED flashlights (embedded into the leading edge of the fin) are other examples.

Obviously, all of these refinements increase the cost of production but taking them into account during computer modeling confirmed that a wingspan of 20 metres with a maximum take off weight of 730kg was the optimum. This requires 170 litres of water ballast, which can just be accommodated in a very thin 20 metre wing.

INFLIGHT COMPARISONS

Well before more formal inflight performance comparisons could be arranged AS 33 pilots met up by chance with a modern Open Class glider while flying cross-country. It was spontaneously decided to find out how the performance of the latest 18 metre glider compares to the current state of the art Open Class ship with almost 10 metres of additional span.



While flying in close proximity to each other, and especially while cruising in the medium to upper speed range, the AS 33 easily kept pace and occasionally even managed to get its nose in front. This came as a slight surprise but when subsequent flights showed very similar results with both gliders ballasted to their maximum wing loading, the team was excited and delighted at the same time. Here was evidence that increasing wing loading matters most when it comes to improving cross-country speeds.

If an 18 metre glider with a wing loading of 60kg/m2 can keep up with a current generation Open Class aircraft, then an aircraft with only a slightly larger wingspan, but with improved aerodynamics and a higher aspect ratio and with increased wing loadings, should be the optimum. The direction for the design team was crystal clear – just like the AS 33, the AS 35 would be designed with as flat a polar curve as possible, and to maximise performance in the medium and upper speed range.

Another aspect of the design was to provide customers with flexibility in span and allow them to enter their AS 35 in either 18m or Open Class competitions. The outer wing panels are supplied as either 18m or 20m tips, whereby the Snap-On winglets are interchangeable and remain the same for both wingspan versions. In 20m configuration, the glider's wing area is 11.75m2 and features an aspect ratio of 34. Its maximum wing loading of 62.1kg/m2 is reached when fully ballasted to its maximum take off weight of 730kg.

The anticipated polar curve looks exciting. With a sink rate of less than 2m/s at 120 knots (220 km/h) the AS 35 will be hard to beat, especially under conditions of streeting or while flying in wave. Just as impressive for a self-launching glider is the empty weight of 448kg. It will make for very relaxing un-ballasted outings with a modest wing loading of around 44kg/m2.

HANDLING – ON THE GROUND AND IN THE AIR

The design team continued to look for additional areas of improvement. Reports from AS 33 owners indicated that the handling and control coordination of this new design is of exceptional standard and a glider pilot's dream. The obvious challenge was to give the AS 35 the same standard of handling.

Traditional Open Class gliders are renowned for their lack of manoeuvrability and slow rate of roll. This means that it can take quite some time find the core of thermals or waste valuable seconds while attempting to stay in the strongest part of the lift. In contrast, a smaller and more agile glider is far more efficient when it comes to thermal centring and by comparison to an Open Class glider, can save at least half if not a full unproductive turn at every thermal.

Considering that an average glider race requires taking about 15 thermals, the savings could easily amount to 10 full turns per flight. At 20 seconds per turn this would total to around three minutes per race and an astonishing 15 to 30 minutes over the duration of a competition. That's almost an eternity, considering that past championships have been won and lost by just a minute of difference between first and second place.

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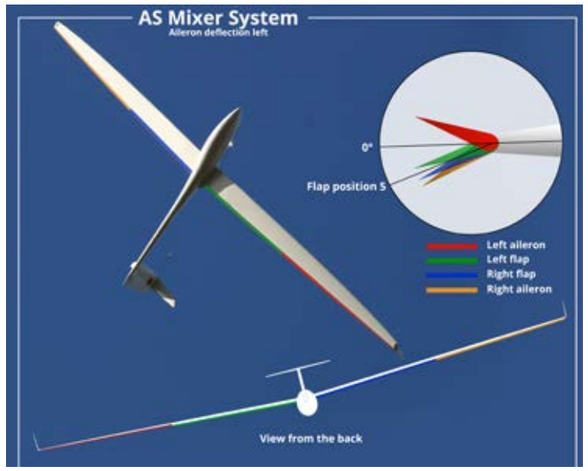
OUTER WING AND FLAP DESIGN

With this in mind, it was decided to incorporate the outer wing of the new AS 33, which would most certainly add considerable agility to the aircraft. The inner wing panels are a totally new design but feature wing sections very similar to the AS 33. It also transpired that a more refined control mixer would not only boost the roll rate but also enhance the lift distribution over the wing while thermalling. This in turn would further enhance the climb rate and improve the aircraft's manoeuvrability at the same time.

Just as important was integrating the popular Schleicher landing flap design. It has long been proven that feeding in slightly negative aileron deflections on selection of landing flaps makes landings easier and safer, and ensures aileron



control until the glider comes to an almost complete stop.

Easing the ground handling was next on the agenda. The strict application of FEM technology had not only proven useful in terms of optimising strength, rigidity and stability but it has also helped to minimise the weight of individual components. As an example, each AS 35 wing is about 5kg lighter compared to the ASH 31, which not only helps make ground handling easier but also resulted in a welcome increase in the weight of the non lifting components. Winglets with Snap-On fittings and automatic connections for all controls also ease rigging and speed up assembly. For more convenient ballasting, the wings are filled on the upper side of and the air vents are now located in the tips of the winglets.

The AS 35 even fits into a standard trailer for 15m gliders – another novelty for an Open Class Glider. The total length of the inner wing panels is below 6 metres and the fuselage is just half a metre longer. Some owners might even secure a hangar spot by removing the rather lightweight outer wing panels, which reduces the remaining wingspan to just 12.2m. A single person can easily fit or remove the outer wing panels, as their weight is only 16kg each.

PROVEN FUSELAGE DESIGN

When a thorough CFD (computational fluid dynamics) review of the ASH 31 fuselage showed no scope for aerodynamic improvements, the development team adopted its external shape for the new AS 35. It meant that the comfortable cockpit ergonomics, the inflight adjustable backrest and all safety features that customers expect from Schleicher, could also be retained.

However, the interior was modernised and the new rudder pedal design was copied from the AS 33. The most noteworthy modification is the new canopy seal, which stops cockpit ventilation air from leaking past the canopy frame and hence prevents a premature tripping of the laminar airflow around the front fuselage into a draggier turbulent one.

To ensure sufficient cockpit ventilation, two separate air inlets plus the usual air scoop in the sliding window are provided. The air vent on the right cockpit side comes with a fully adjustable nozzle. To allow such vast amounts of ventilation air to escape again, a CFD optimised air extractor is placed under the aircraft's belly and positioned to cause a

minimum of airflow disturbance.

RETRACTABLE TAIL WHEEL

Another welcome design change is a steerable, fully retractable tail wheel, which instead of being an optional extra, is part of the standard design. This will allow unaided take offs as well as limited taxiing in conjunction with the small removable wingtip wheels.

The tail wheel door design Schleicher uses is an improvement over those that open outwardly. As these doors are always only within a few centimetres of the ground (and more often than not scraping dense vegetation) they are vulnerable to damage or even being completely ripped off. The solution is a single-part door cover, which retracts entirely into the tail boom. Very smart indeed! A welcome byproduct is an improved forward visibility as the wheel extends further and hence lifts the tail higher off the ground.

ROTARY ENGINE

Total independence and reliable self-launch capabilities are always top of the priority list for Open Class owners, and AS 35 customers are unlikely to be an exception. Therefore Schleicher will install their

well-proven, liquid and air-cooled rotary engine from Austro Engine.

This power plant has been continuously improved over the years and now comes with a dual ignition system and a fully electronic fuel-injection system with automatic altitude compensation. Almost 700 of these engines are in worldwide operation already.

The engine has an excellent power to weight ratio and the folding drive belt allows it to remain stationary in the fuselage where it is permanently connected to a large, efficient muffler. Only the propeller lifts up and tensions the drive belt in the process. This not only keeps the air resistance to an absolute minimum but also prevents stretching of the belt over time and hence avoids regular re-tensioning.

For inspection or maintenance purposes, the entire power plant can be removed easily. Another welcome advantage is the very straightforward engine management and the lack of service life limitations or overhaul requirements after reaching a certain number of running hours or years of service.

QUIET, SMOOTH, EFFICIENT

The engine's surprisingly quiet, smooth, vibration-free operation at all power settings has also greatly contributed to its worldwide popularity. Maintaining an assigned altitude (for example, while flying through controlled airspace) no longer presents a problem and is best conducted at approximately 140 km/h (70 to 75kt). The previously applied 'saw tooth' climb/cruise method used with conventional 2-stroke engines is no longer necessary or recommended.

To convert the power output of the rotary engine into climb performance, the entire system consisting of engine, propeller and aircraft is perfectly fine-tuned. On paper, the Wankel engine has a slightly lower power output than comparable systems but its efficiency is second to none. Customer experience clearly shows that figures on paper are meaningless and that only climb rates and good aircraft acceleration count. As the propeller plays a pivotal role, Schleicher not only designs but also builds their propellers in-house. Just like the wing profiles, they are constantly fine-tuned in order to boost overall power plant efficiency.

Another advantage of this power plant is the modest fuel consumption, which is significantly lower compared to conventional two-stroke engines. It runs on high-octane fuel or Avgas and there is no need to mix in 2-stroke oil on refuelling. The removable 16-litre fuselage tank fits into the wheel well and allows approximately one (1) hour of engine running time.

STANDARD ISSUE OR OPTIONAL?

Schleicher is also breaking new ground in terms of including items previously only available as optional extras. The standard package comes with a two-pack polyurethane finish, antennas for radio, transponder and Flarm (located in the fin) as well as tail dolly, fin tank, a 20 Ah (LiFePo4) avionics battery, a cockpit air extractor and the fully retractable and steerable tail wheel. An automatic refuelling system, which turns itself off on a full tank, has also been integrated. Other goodies such as solar cells on engine bay doors, leather interior, bug wipers with garages, CofG optimisation for pilot weight, oxygen system, LED flashlights and so on remain on the list of optional extras.

COMING SOON

In summary, the days when Open Class gliders with impressive best glide ratios (and wingspans of 25m to 28m) were dominating the competition scene seem to be nearing their end. At medium to high speeds, longer wings translate into more drag and as competition flying predominantly involves fast to very fast cruising, the long big wings become more of a hindrance.

On the other hand, long and flexible wings can provide sheer delight for pilots who prefer relaxing, enjoyable cross-country flying to racing. Nothing can beat sharing a flight with another gliding addict and handing over the controls from time to time. It is often said that "Sharing enjoyment equals doubling the enjoyment" and I gladly confess to be a firm subscriber to this theory.

However, contest pilots have different priorities. They are always looking at competition results and have noticed that – at least over recent years - gliders with shorter wingspans are just as successful as so called 'bigwings'. Aircraft like Antares, Quintus or JS1 have finished ahead of traditional Open Class ships on many occasions, although their wing loadings are well below the 60 kg/m2 mark.

But gliders are evolving constantly. The very latest generations of wing profiles are capable of producing significantly more lift and hence tolerate much higher wing loadings. They also cause less drag at high-speed and, in combination with additional aerodynamic refinements, we can expect smaller wingspan gliders to give the 'bigwings' a run for their money. Time will tell but all indications point to the AS 35 becoming a truly formidable weapon in Open Class championships.

Wing span	20 m - 65.6 ft
Wing area	11.75 m² - 126.4 sqft
Aspect ratio	34,0
Separation point	6.1 m - 20 ft
Empty weight	448 kg - 987 lbs
MTOW	730 kg - 1609 lbs
Min. wing loading	44 kg/m² - 7.8 lbs/sqft
Max. wing loading	62.1 kg/m² - 12.76 lbs/sqft

WINNING THE MENTAL BATTLE IN GLIDING PART 6

BY BERNARD ECKEY

In the previous five articles we have already looked at various proven methods of working on our mindset in order to improve our rate of success and enhance our enjoyment. Today we will expand on this topic and deal with decision-making as well as concentration.

DECISION-MAKING AND OBSERVATIONS

Everything we do as glider pilots must be done for a reason – otherwise we rely on good fortune rather than good management. Without fail, careful decision-making makes the difference between sweet success and bitter disappointment. However, in gliding the choices are seldom clear, which dictates that benefits and likely consequences are weighed up carefully.

Top glider pilots are switched-on and continually engage in gathering information! The reason is simple and doesn't need much elaboration. If we don't want to rely on good luck, our decision-making must be underpinned by observations and a careful evaluation of all available information. The more information we gather the easier it gets to evaluate the pros and cons and the better our chances of getting it right. The next step is a prompt implementation of our decisions. Procrastination must never be allowed to get the upper hand in gliding.

The advantages of information gathering extend to the subconscious level. It is often said that truly great pilots fly intuitively and just know what to do next. Far from being exceptionally talented, these pilots pair their experience with their mental storage of hundreds of seemingly insignificant observations. This allows their brains a subconscious evaluation of all these inputs and a lightning fast implementation. Put differently, their intuition or their 'gut feeling' takes over.

PILOT'S INTUITION

Heavily relying on intuition when rational thinking doesn't dictate a clear path of action is a trademark of thriving people and it is particularly common among successful glider pilots. Even the greatest minds of all times freely admit that intuition accompanied rational thinking in some of history's greatest discoveries or breakthroughs. Be careful though – never let intuition overrule facts and logical thinking, and don't confuse intuition with impulse. Decisions taken in haste often stem from anger due to a lack of alternatives.

How does all of this apply to a newcomer preparing for local soaring? Observing a few launches and closely watching other gliders, rising dust, smoke or soaring birds is just as much part of the observation process as noticing areas of lift or strong sink. Indications like these are vital and must be memorised. The windsock, the nearby vegetation and the surrounding topography provide equally important clues – especially if the wind direction has a strong effect on local sources of lift and known thermal triggers. Every clue is taken into account and that includes drawing on past experience and local knowledge.

IN COMPETITION

Decision making in a competitive environment takes on a totally different meaning. Observations must become much broader and this includes an assessment of flying conditions at least as far as 50km ahead. Only a constant evaluation of weather and terrain allows a change of flying tactics if and when necessary. This includes an assessment of flying conditions on the next leg well before arriving at a turn point, and an early look at the clouds along the intended track is an integral part of this process.

Fact-finding extends to pilot briefings as well, and weather briefings in particular. At high-level competitions, the interpretation of weather data is often left to the pilot. A detailed study of synoptic charts with an independent assessment of possible changes to soaring conditions during the day should therefore become part of every competition pilot's flight preparation.

A frequent reassessment of our in-flight decisions is just as vital. Here are a few examples for the thermalling part of a flight:

- Adjust the angle of bank
- Correct nose/horizon attitude
- Use more (or less) rudder
- Adjust airspeed
- Check flap setting (if applicable)
- Re-evaluate thermal strength
- Decide when to leave the thermal

REASSESSING ASSESSMENTS

Pilots need to continually evaluate whether previous actions have proven successful or not. The winner of a competition day (or the whole contest for that matter) is usually the pilot who spends the least amount of time circling. In other words, neglecting to reassess previous decisions at short intervals is likely to leave us behind.

For the cruising part of the flight, the list would include such things as:

- Heading changes for a better extraction of atmospheric energy
- Circumnavigating areas of overdevelopment
- Speed adjustments in areas of lift or sink
- Detours to sample areas marked by soaring birds
- Bypassing irrigation areas
- Cruise speed variations in view of changing conditions ahead

Of course, we can't expect all our decisions to be correct, but if we want to improve as pilots we had better keep working on this. Smart decisions usually make the difference between success and failure. Lady Luck may favour us on occasions, but have you ever noticed that the same pilots usually have all the luck? The more decisions they make and the more observations they evaluate, the better their chances of getting things right – and the luckier they get!

DECISION FATIGUE

Now to the downside of decision-making. No matter how rational or high-minded we try to be, we can't make decision after decision without paying a biological price. It is very different from ordinary physical fatigue where getting tired or becoming exhausted is easily recognised. However, getting low on mental energy is an insidious process and one we are not conscious of.

The more choices we make during the day the harder each one becomes. Our brain gets exhausted and will look for shortcuts, one of which is to act impulsively instead of expending the energy of thinking through the consequences.

Another shortcut is the ultimate energy saver – doing nothing. Instead of agonising over decisions we avoid them, although it is well known that making no decision is the worst decision one can possibly make! This often creates bigger problems in the long run, but in the short term it eases the mental strain. There can be little doubt that this has been a contributing factor to some aviation mishaps in the past.

By now it should be abundantly clear that good decision-making is essential, regardless of whether we fly competitively or just engage in some relaxing Sunday afternoon local soaring.

CONCENTRATION

Concentration is the art of focussing on the right thing at the right time. The very safety of a flight depends to a large degree on the ability of the pilot to concentrate until the aircraft is back on the ground or, better still, back in the hangar. On some flights, we can't relax for a single minute, while on others we can sit back and admire the view while at ease.

The necessary level of concentration also depends on whether we fly competitively or fly locally and just for the fun of it. This statement doesn't imply disrespect for pilots conducting local soaring, but the fact remains that it requires nowhere near as much concentration as cross-country or competition flying.

Pilots who fly competitively know only too well that intense concentration for five or six hours a day over a two-week period is very hard work indeed. A proven method of avoiding excessive mental slackness is to keep one's blood sugar levels up by eating small amounts of suitable food every two hours or so. But not just any food will do – the right food with high nutritional values is what matters when it comes to sustain an adequate amount of blood sugar in our system.

SWEET DANGERS

Beware of simple carbohydrates such as sweets, chocolate and any sort of so-called 'fast food'. They tend to elevate blood sugar levels rapidly and hence trigger insulin production. This promptly deals with the problem and rapidly reduces blood sugar concentration again. Just 10 to 15 minutes after eating these concentrated sugar treats we are left with much lower levels of blood sugar and we can be significantly worse off than before. The same warning applies to soft drinks, as they contain huge amounts of refined sugar, colouring agents and preservatives. Plain water, possibly mixed with some fruit juice, is much better.

The graphic below clearly indicates that even during flights lasting for only three hours or so, it is highly advisable to eat something. My preference is for fruit containing fructose, such as apples, sultanas or bananas. Sure, that is nothing more than sugar in another form but, compared to refined sugar, the body takes far longer to absorb it. The net result is a more even release of brain food and an extended period of effectiveness.

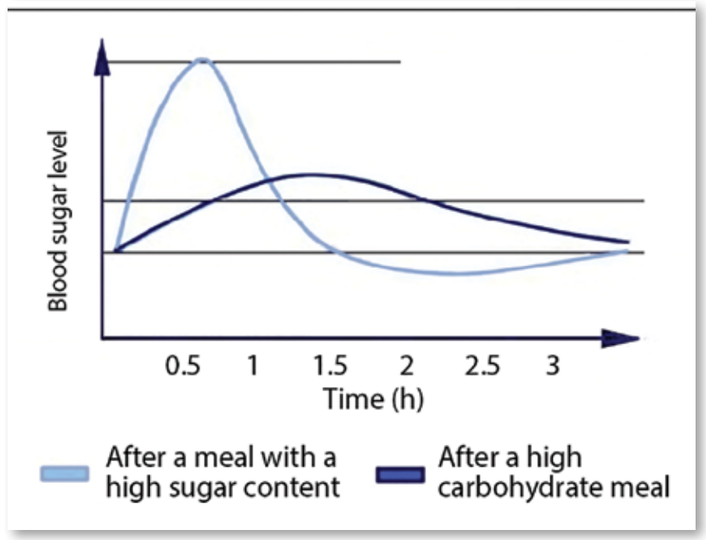
On long to very long flights, it is imperative to complement this with an additional high carbohydrate intake, such as a sandwich or two. Otherwise we are at risk of making very poor decisions towards the end of the flight. No doubt there are plenty of aviation mishaps where low blood sugar levels played a significant role.

CONCENTRATION VS PRESSURE

The necessary level of concentration also depends very much on the different stages of the flight. Apart from take-off and landing, our utmost concentration is required when we are getting low and therefore we must learn to adjust our concentration level to meet specific situations.

Of course, maintaining a top level of concentration is impossible over a long period or over the entire duration of the flight. After a good climb to a comfortable altitude, for example, we can and should relax a little. Now is the time for a drink, to eat an apple or take a bite or two of a sandwich. In other words, especially during long duration flights, it is important to pace ourselves and regulate concentration and arousal levels.

Even highly experienced pilots can buckle under pressure and lose concentration under competition stress. Certainly, pressure is an integral part of competition flying but when it leads to poor concentration and decision-making, it is very easy to confuse bad luck with bad judgement. How stress and our own performance expectations affect concentration will be the subject of the next article. Please remain



AEROTOW UPSET INCIDENTS

Aerotowing may appear to be a benign method of getting airborne in a glider, but there are inherent hazards, the most significant of which are tug upsets. In the last 10 years there have been 11 incidents in which gliders have become seriously out of position and in at least two of these incidents, the tug pilot felt they were about to lose control. The majority of these occurred during a 'boxing the slipstream' exercise.

Generally speaking, the tug pilot is the person at greatest risk if an upset occurs. In the mid-1980s an educational campaign on safe aerotowing followed two fatal tug upset accidents between 1980 and 1984. A similar program was also run in the UK around that time. Since then, glider and tug pilot training has increased awareness of tow upset accidents and prevention. However, while the fatal accidents have stopped and tug upset incidents are now rare, some of that can be attributed to the protection afforded by the weak link in those cases where the glider has been flown well out of position. The following reports illustrate the dangers.

20 JULY 2020 – POTENTIAL LATERAL TUG UPSET

During the aerotow launch and at a height of about 1,500ft AGL, the student commenced an exercise to 'box' the tug's slipstream. The exercise had been pre-briefed with both the student and tug pilot. The student commenced the exercise from the low tow position and moved the glider quite quickly to the right.

As the student began to transition into the high tow position while still out to the right of the slipstream, the tug pilot made a radio call to the crew in the glider advising that the glider was displaced too far to the right and that he was having control difficulties – specifically that he was being pulled into a roll to the left.

The instructor directed the student to return the glider to the normal low tow position but in so doing, the student allowed a significant bow to develop in the tow rope. The instructor took control of the glider but was unable to prevent the rope from quickly becoming taut, at which point the weak link broke.

As the towrope was re-tensioned, the tug pilot reported that this caused an excessive yawing movement, and the tug commenced an uncommanded roll to the left that he managed to counteract before it became too severe. Upon the weak link breaking, the rope sprang back and draped over the glider's starboard wing. The student operated the glider's release and the rope slipped off the wing and fell to the ground. Both the tug and glider landed safely back on the airfield.

The glider instructor advised that the student was unsure how far to the right the glider should be flown to avoid the slipstream. As a consequence, they flew far too wide and near the limit of the tug pilot's ability to control the aircraft. When the tug pilot made a radio call to advise of his control difficulties, the instructor commanded the student to return to the normal towing position.

BOWED ROPE

During this manoeuvre, a large bow developed in the rope while the glider was still slightly displaced laterally from the tug's centreline. The instructor took over control but was unable to prevent the rope from quickly tightening and yawing the tug. The tug commenced an uncommanded roll to the left that was only prevented by the weak link breaking and by corrective control inputs made by the tug pilot.

The effect of lateral tension on the towrope may result in either a vertical stabiliser (fin) stall or a dynamic lateral upset of the tug. Both situations will result in the tug entering an uncommanded yaw, roll and nose pitch down. In either case, events would develop rapidly and probably take the tug pilot by surprise. For a fin stall to occur, the glider would need to apply a constant lateral force to the tail of the tug via the towrope, requiring the tug pilot to apply a constant rudder input to counteract that force.

If the tug pilot's rudder input was nearing maximum and further lateral force was applied causing the tug to yaw further, the critical angle of attack of the fin may be exceeded, resulting in the fin stalling. In turn, this would result in a rapid loss of yaw control of the tug. With the lateral towrope force still being applied, the tug would roll and descend before the tug pilot could react.

For the dynamic lateral upset, divergence between the glider and the tug can induce a large, abrupt yaw of the towplane when the rope comes taut. The tug pilot won't have applied rudder to correct the yaw before it happens, and once the yaw and roll turns the towplane onto a further diverging flight path, the upset increases in magnitude. Further information on lateral tow upsets can be found in the **GFA Aerotowing Manual at Section 10.3.**

BOXING THE SLIPSTREAM

Boxing the slipstream is an exercise in control, resulting in the balancing of forces on the glider while on tow. The aim is to perform a square box outside the slipstream, pausing at each corner under control, and taking the smallest route outside the slipstream to safely carry out the task. In the context of aerotowing, the slipstream is the turbulent flow of air driven backward by the propeller of the tug.

To avoid the propeller slipstream, the glider only needs to be displaced about half the glider's wingspan from the tug's centreline – usually when the glider's nose is pointing just outside the wings of the tug. This exercise must always be performed at a safe height (about 1,000ft AGL), and while maintaining tow rope tension. On completion, the tug pilot is to be advised that the exercise is completed.

Should a significant bow appear in the rope, release the cable immediately rather than attempt to 'fly it out'. Invariably, attempts to 'fly out' the bow results in broken weak links and ropes draping over wings or otherwise contacting the glider. For further information, refer to **Operational Safety Bulletin No. 01/12 – Boxing The Slipstream.**

7 JUNE 2021 – POTENTIAL VERTICAL TUG UPSET

During an aerotow and at approximately 4,000ft (2,920ft AGL), the solo glider pilot climbed out of station and started to lift the tail of the tug. The tug pilot was about to activate the tow release when the glider pilot released from tow. Both aircraft landed safely, and a debriefing was held with the Duty Instructor.

The flight was the pilot's third solo after 17 dual training flights, having recently returned to gliding after a break of several years. The glider pilot reported that the tug climbed unexpectedly, then descended, at which point the glider unexpectedly climbed, resulting in the glider being significantly out of station above the tug. The glider pilot also reported that he had misidentified the tow release handle, and when he attempted to release from tow, he may have inadvertently pulled the wheel brake control, which is a similar shape to the release handle but a different colour.

MISTAKEN RELEASE

After realising that the tow cable had not released, the glider pilot then identified and operated the cable release control. The tug pilot, who is the club's Tugmaster and an experienced sailplane pilot, advised he was about to release the glider when the tow rope was released by the glider pilot. The tug pilot reported that the air was particularly smooth, and that the combination had climbed well above the temperature inversion when the incident occurred. The tug pilot stated there was no environmental turbulence at any time during the launch.

Investigation by the CFI concluded that the glider pilot probably operated what he thought was the release handle and most likely performed a climbing clearance turn to the right. By the time he realised that the cable had not released, he then identified and operated the actual release control, by which time the glider was most likely well above the tug and pulling the tail of the tug upwards and to the right.

Tug upsets are serious and have caused the deaths of a several tug pilots around the world. If the glider is allowed to climb rapidly behind the tug, it can very quickly become impossible to prevent it accelerating upwards in a slingshot action, rather like a winch launch, and tipping the tug over into a vertical dive. Once that has happened, the tug pilot will only be able to recover provided there is sufficient height.

GLIDER DISPLACEMENT

Downward displacement of the glider below the slipstream is quite acceptable, but upward displacements are much more critical. The glider pilot must release immediately if the glider is going high and the tendency cannot be controlled, or the pilot loses sight of the tug. The circumstances which make tug upsets more likely are:

- A light pilot flying close to the minimum cockpit weight
- An inexperienced pilot – particularly wire launch pilots with little recent aerotow experience
- Glider with a belly or CG hook
- An all-flying tailplane, or a glider with very light elevator forces
- Short rope
- Turbulent conditions

Vertical upset can also arise when the glider releases if the glider turns before the pilot has confirmed that the rope has separated. A tug upset is less likely to occur if the glider pilot avoids transitioning above or below the slipstream prior to release. If towing in low-tow, then the glider pilot should release from low-tow and vice versa.

ESSENTIAL CHECKS

It is essential to check that, prior to release, the airspace is clear (a) to the right where the glider is just about to turn, and (b) to the left and below where the tug is just about to descend. The glider pilot must then 'Locate, Identify, Operate' the tow release. The release should not be operated until it has been positively located and identified as the one required. This eliminates any possibility of error in selection of the wrong control.

The same principle applies to all ancillary controls. When ready, the glider pilot will pull the release, and must observe the rope falling away before beginning their clearance turn to the right, while simultaneously applying normal targeted scan. The release should be operated while the towrope is still under some tension, and the tug pilot, after feeling the release, should check that the glider has in fact released and begin a descending turn to the left.

CHRISTOPHER THORPE
Executive Manager, Operations
emo@glidingaustralia.org

Post release actions should then be carried out and transition from launching pilot to soaring or landing pilot. For further information on tug upsets, please refer to **Section 10.3 of the GFA Aerotowing Manual**.

AROUND THE REGIONS

QUEENSLAND

In late January 2021, Denis Lambert took over the role of RMO Queensland from Ivor Harris, who completed his five-year term on the GFA Operations Panel. Denis is an experienced Level 3 instructor and former CFI of Darling Downs Soaring Club (DDSC).

The year started with planning for some Operational Safety Audits and organising an instructor training course at Kingaroy in March. Al Sim organised and led the course, supported by Level 3 Instructors from Kingaroy and Warwick, with seven students qualified as either Level 1 or Level 2 instructors. The student standard was very high and comprised a number of airline pilots and one student with over 3,000 hours.

Some one-on-one instructor training was also conducted for those few members who were unable to attend a formal course. Two clubs, DDSC and Byron Gliding Club, ran a Flight Instructor Refresher Course (FIRC) to requalify some of their instructors. The Region is focussed on supporting the smaller clubs in particular, growing its instructor ranks, and is expecting to add a further 13 instructors into the Queensland system by early 2022.

NEW SOUTH WALES

There has been very little activity in NSW due to lockdowns. The Regional Manager is working with his CFIs to get through outstanding Operational Safety audits, but the planned instructors' courses are on hold. The RMO reports that the new training system has been well received and a number of clubs are trialling it.

VICTORIA

The Covid Lockdown in Victoria has also been more extensive than in the rest of the country, and with the majority of GFA members in the State confined to within 5kms of home for most of the year, activity has been low. FIRCs were completed at Ararat, Benalla and Raywood. At the time of writing an online FIRC was being considered as Melbourne enters its extended sixth lockdown and second period of curfew.

SOUTH AUSTRALIA

As in the other Regions, planning for audits, training and refresher courses has been difficult. However, Operational Safety Audits are up-to-date and the last FIRC was run at Parafield during August.

Occurrences & Incidents

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.

The Gliding Federation of Australia Inc
SOAR Accident and Incident Occurrences
General Statistics

Date From: 01/03/2021
Date to: 30/04/2021

Damage

	VSA	SAGA	NSWGA	WAGA	GQ	Total
Nil	6	1	6	1	4	18
Minor	3		1	1	2	7
Substantial		1		3	1	5
Total	9	2	7	5	7	30

Injury

	VSA	SAGA	NSWGA	WAGA	GQ	Total
Nil	9	1	7	5	7	29
Serious		1				1
Total	9	2	7	5	7	30

Phases

	VSA	SAGA	NSWGA	WAGA	GQ	Total
Outlanding	2				1	3
Landing	2	1	5	3	4	15
Launch	1		2		2	5
Ground Ops	2			2		4
Thermalling	1					1
In-Flight	1	1				2

Type of Flight

	VSA	SAGA	NSWGA	WAGA	GQ	Total
Competition	2					2
Local	2	2	5	3	1	13
Ground Ops	1			2		3
Training/Coaching	4		2		3	9
AEF					1	1
Cross-Country					2	2

6-MAR-2021 SAGA
ASTIR CS 77
TERRAIN COLLISIONS

What Happened

During final approach, the pilot realised he had not lowered the undercarriage. The pilot changed hands on the control column, and inadvertently pushed forward on the stick coincident with lowering the wheel. The aircraft flew onto the ground heavily at approach speed. The pilot suffered back injury and the glider was substantially damaged.

Analysis

The glider was launched by winch and upon release the pilot turned downwind to chase a thermal. After a minute or so the glider had lost altitude and the pilot broke off the flight and flew towards the circuit joining area. The pilot stated that he joined circuit lower than usual and only realised prior to touchdown that the undercarriage had not been lowered. He said that he swapped hands to move the undercarriage lever, located on the right side of the cockpit, into the lowered position. At that moment the glider pitched forward and struck the ground hard. A witness on the ground stated the glider "flared a little higher than normal and suddenly pitched forward and touched down with a puff of dust onto the rubble runway". The witness claimed the glider had plenty of speed when it hit the ground, and that it skidded for 70 metres before coming to a stop. The witness initially thought the glider had landed with the undercarriage retracted, however it soon became apparent that the undercarriage was down and had collapsed on impact. The pilot exited the glider before ground crew arrived and complained of a very sore back. He was immobilized and transported to hospital by ambulance. Subsequent inspection of the glider revealed the impact had broken several bulkheads as well as the undercarriage system. Potential causal factors include breaking off the flight too late, increased workload and fixation on the landing area due to the low circuit, failure to configure the aircraft for landing before joining circuit and forgetting to complete the pre-landing checklist.

Safety Advice

Circuit and landing are high workload environments and pilots are encouraged to reduce their workload by configuring the aircraft for landing at an early stage. GFA training is to lower the undercarriage once the decision to land has been made and the undercarriage should be down before the circuit is joined. When the aircraft is configured early, the risk off a mishap from the omission of the pre-landing checklist, for whatever reason, will be reduced. Refer also to OSB 01/14 'Circuit and Landing Advice'. This accident also highlights the risk of injury to the pilot who attempts to lower the undercarriage in the late stages of the approach. Where the undercarriage control lever is situated on the starboards side of the cockpit, a pilot has to change hands on the control stick to lower the undercarriage. If the glider is not trimmed, it can tend to drop the nose during this action. Over the years there have been many accidents, including fatal, caused by the pilot changing hands to lower the undercarriage at low height. On the other hand, most gliders only suffer minor scratches from a well-conducted 'wheel-up' landing.

7-MAR-2021 NSWGA
SZD 55-1
LANDING GEAR/INDICATION

What Happened

During an aerotow launch the tug accelerated for take-off prior to the slack being taken-up in the tow rope. The glider was thrust forward, and the mainwheel struck a large tussock of grass that bounced the glider prematurely into the air. When the glider touched down again the undercarriage partially retracted but the glider and tug became airborne and climbed away. The glider pilot, after lowering the glider's undercarriage, maintained a routine and normal aero tow, separation, thermal flight, and subsequent uneventful landing.

Analysis

The undercarriage mechanism was subsequently examined, and it was identified that the port-side lower overlocking arm had been installed 180 degrees around. This prevented that side of the glider's undercarriage leg from locking over centre. When the glider travelled across the rough ground, the undercarriage mechanism moved resulting in the starboard leg unlocking. The port-side lower overlocking arm was reinstalled correctly, returning the mechanism back to specification.

Safety advice

Aviation safety relies heavily on maintenance. When it is not done correctly, it contributes to a significant proportion of aviation accidents and incidents. Some examples of maintenance errors are parts installed incorrectly, missing parts, and necessary checks not

being performed. In comparison to many other threats to aviation safety, the mistakes of an airworthiness inspector can be more difficult to detect. Often times, these mistakes are present but not visible and have the potential to remain latent, affecting the safe operation of aircraft for longer periods of time. Inspectors are confronted with a set of human factors unique within aviation. Often times, they are working alone, in confined spaces, and in a variety of adverse temperature/humidity conditions. The work can be physically strenuous, yet it also requires attention to detail. Being aware of the human factors involved in maintenance can lead to improved quality. For further information, refer to section 3.2 of Basic Sailplane Engineering dealing with 'Systemic and Human Factors'.

9-MAR-2021 VSA
LS 3-A
OUTLANDING

What Happened

During an aerotow from an outlanding paddock, the pilot lost directional control when the wing dropped into the stubble and he released from tow.

Analysis

The pilot was competing in the Victorian State Championships and was on the last leg of an assigned area task. On nearing the 'control' turnpoint, and at a distance of about 15kms from the home airfield, an outlanding became inevitable. The pilot conducted a safe landing in a harvested paddock containing 30cm wheat stubble. After assessing the suitability of the paddock, the pilot contacted the competition organisers and arranged an aerotow retrieve. Due to an absence of ground crew, the pilot conducted a 'wing down' take-off behind the tow plane. After taking-up the slack in the rope, the tow plane accelerated for take-off creating a cloud of dust that reduced the glider pilot's visibility. The drag of the wing on the ground caused the glider to veer 20 degrees to the right before the pilot got the wings level. While attempting to straighten the glider, the left wing contacted the ground and began to drag in the stubble. The pilot decided to release from tow and pushed the control column forward to keep the tail in the air as the glider conducted a ground loop. The glider was undamaged and subsequently retrieved by trailer.

Safety Advice

During an outlanding retrieve it is sometimes not possible to find a person to hold the wingtip for the launch. This necessitates a wing-down take-off, which is quite feasible but only if the surface is suitable. Any vegetation over about 10cm long should rule out a wing-down take-off, as the glider pilot will not be able to keep straight due to the drag of the wing in the grass. Even with a wing-tip holder, the pilot may still be in trouble. Modern gliders often drop wings some considerable time after the wingtip holder has let go, a function of their rather high angle of attack with the tail on the ground, combined with the spiral prop wash from the tow plane. If the wing drops into long stubble or grass, a ground loop is a certainty. Don't take chances with long stubble or grass and don't drop your guard just because it looks like it's only in small patches. If in doubt, get the trailer.

20-MAR-2021 GQ
ASK 21
LOW CIRCUIT

What Happened

During circuit to land the glider passed through a heavy rain shower. The pilot flew too far downwind for the conditions and conducted a very low approach to landing..

Analysis

The pilot was conducting an Air Experience Flight in overcast conditions with occasional showers increasing in frequency. After been airborne for about 30 minutes the pilot decided the break off the flight and head back to the circuit for landing. The pilot observed local rain showers approaching the airfield from the South and extended the flight by a few minutes to allow the nearer shower to pass. The pilot joined circuit for RWY 04 with the windsock indicating a weak crosswind. Shortly after joining circuit for RWY 04 the Duty Instructor on the ground made a radio call to the pilot suggesting he consider landing on RWY 22, which was more into wind. The pilot decided to continue to land on RWY 04, but the glider flew into another rain shower and the pilot noticed the glider was drifting away from the runway. The pilot stated: "This confirmed my sense of drift, and so I adjusted to around a 45-degree angle toward the strip. By this time, we started to enter the influence of the shower and light rain started to fall. Another more urgent call came over the radio to modify my circuit. We were now roughly in line with the touch down point, so I curtailed the downwind leg and pointed us straight toward the airstrip." On turning base the rain got heavier and the glider's descent rate increased; possibly due to sink and rain contamination on the wings. The pilot flew a very low approach around the Club hangar, touched down on the runway threshold and came to rest about

continued over page

300 meters down the runway. The CFI noted that the pilot committed himself to a landing on RWY 04 and did not realise how heavy the rain was or the effects it might have on the aerodynamics of the glider.

Safety Advice

Many modern glider aerofoils are severely affected by rain, resulting in reduced performance and an increase in stall speed. This is because drops of rain on the wing disturb the airflow, thus reducing lift and changing the stall characteristics. Most manufacturers suggest adding at least 5 Knots to the approach speed to take into account the increased stall speed. Flying too fast with contaminated wings will severely reduce the glide performance and will lead to increased sink rates.

2-APR-2021 VSA
ZEPHYRUS
HARD LANDING

What Happened

An aerotow launch in slight tailwind conditions was aborted by the glider crew when it became apparent that the combination was not climbing satisfactorily.

Analysis

Weather conditions during the day were benign, with light and variable wind progressively moving to the East. Operations were being conducted on RWY 27 in accordance with local procedures for the conditions. The flight was a training sortie involving a solo student who was flying under supervision without reference to the ASI and Altimeter to qualify for the 'A' Certificate. Just prior to the flight the wind had moved to the East and had increased to a few knots. The gliding operation continued with a slight tailwind, as the two Pawnee tow planes were providing safe launches. However, the tow plane for the incident flight was low-powered and unable provide the same performance as the two Pawnees. The initial ground roll was well managed by the student flying but was longer than usual due to the tailwind component. The glider became airborne first and maintained a height of about 2 metres above the runway as the tow plane got airborne and began a shallow climb. Due to the long ground run and slow climb rate, it became obvious to the flight instructor that the combination would pass very low over the airfield boundary. To avoid getting into the non-manoeuvring area and while only about 5 metres above the runway, the instructor activated the tow release with the aim of landing straight ahead. The student was also concerned about the slow climb rate and had been focussing on the boundary fence that was looming ahead. When the glider was released from tow, the student pilot reacted by opening the airbrakes and simultaneously pitched forward on the control column. Due to the low height, the glider almost immediately struck the ground nose first, impacting on the front skid near the fuselage mounting point. Although the instructor was maintaining a defensive posture on the controls, the action happened too fast for the instructor to react. The glider rolled 50 meters and came to rest about 200 meters from the airfield boundary. The tow pilot continued to climb and then joined circuit and landed safely. Initial inspection of the glider identified the nose skid had cracked at a previous repair. A detailed inspection later identified the forward skid mounting tube had slightly deformed. The glider was repaired and returned to service. The instructor debriefed the student who explained that he was concerned that they were running out of runway and when the release was activated, he felt he needed to get the glider on the ground immediately to avoid running into the airfield boundary fence. The student acknowledged that his actions were inappropriate and that he should have maintained the landing attitude. The instructor advised they did not assume control before releasing from tow because they believed the student could handle the emergency and that he had allowed sufficient room for the glider to land straight ahead. The instructor had conducted most of the student's flight training and advised the student had not reacted in that way previously. The instructor considers it is likely the student was startled by the sudden release from tow at a critical stage of the launch and, in the absence of the ASI to confirm the aircraft's speed, he acted instinctively to lower the nose and get the aircraft on the ground. The instructor stated that the aircraft struck the ground almost coincident with the over pitching of the elevator control and that he had no time to react.

Safety Advice

1.Startle Response

The startle response is the physical and mental response to a sudden unexpected stimulus. More commonly known as 'fight or flight', this physiological reaction occurs in response to what you may perceive as a harmful event, attack, threat to your survival or simply fear. The fight or flight response evolved to enable us to react with appropriate actions: to run away, to fight, or sometimes freeze to be a less visible target. In aviation, startle often occurs when in a highly dynamic, time-critical condition. Two systems in the brain—the reflexive fast system and the slow system—play different roles in our reaction to danger. The reflexive fast system acts immediately—in one twelfth of a second—by sending information directly to the sense organs through the thalamus to the amygdala. The slow system sends sensory information to the hippocampus and cortex for further evaluation. It's slower because it requires conscious processing. Pilots finding themselves in non-routine, emergency and abnormal situations will have difficulties in recognising that a problem has occurred and difficulties in getting out of the normal mode of operations. While GFA does not have a formal policy with regards to 'startle factor training' as a specific issue, training in non-technical skills is required to recognise and manage situations that can occur in a sudden event. The idea is to give pilots the skills to manage a 'startle' type event. This training is also encompassed in the GFA's Flight Review regime, where a pilot's competency in emergency procedures is demonstrated in flight following simulation of the emergency by the instructor or examiner.

2.Control inputs close to the ground

Pilots should never use coarse elevator control inputs close to the ground, as gliders are sensitive in pitch and such action is inconsistent with a safe transition from a stabilised approach into the flare and landing. Course movement of the elevator control at low levels usually results in a sudden and unrecoverable steep dive into the ground. Instructors should also note that a student pilot's sudden forward elevator control inputs, initiated at low level (under 100ft), will usually be beyond the limits of instructor intervention and safe recovery.

4-APR-20211 WAGA
PW-6U
HARD LANDING

What Happened

The pilot was on their second solo flight and turned onto final approach somewhat higher than normal. The pilot deployed full airbrakes with the aim of landing abeam the control vans but rounded out too late and did not close the airbrakes. The glider struck the ground heavily on the main wheel and bounced back into the air. The pilot pushed the stick too far forward to recover resulting in the glider striking the ground hard a second time on the nose wheel. The front canopy ejected and the nose wheel inner tube burst.

Analysis

The pilot had struggled with the landing phase during training but had demonstrated consistency in recent weeks. On the day prior to the accident the pilot had flown on eight occasions in crosswind conditions and had demonstrated an ability to safely handle rope breaks in difficult situations. On the day of the accident the pilot also demonstrated rope breaks and unusual landings and was sent solo for the first time, and the flight was completed competently. On the second solo flight the pilot joined a high final approach that required the use of full airbrake to achieve the selected aiming point. The pilot was late to round out and forgot to ease closed the airbrakes to arrest the rate of descent. The glider struck the ground heavily and bounced back into the air. The pilot over corrected the recovery from the bounce and pitched too far forward on the elevator control causing the aircraft to strike the ground heavily on the nosewheel. The impact caused the canopy to eject and the nosewheel tube to burst, and the aircraft came to rest about 100 metres from the point of impact. A 'hard landing' inspection was conducted, and no further damage was identified. It was found the front canopy attachment was poorly adjusted and probably would not have ejected if correctly adjusted.

Safety Advice

When landing with full airbrakes the pilots should commence the roundout at a height sufficient to overcome the effect of inertia before the ground intervenes. If the pilot rounds out too late, the first action should be to reduce the airbrakes to arrest the descent rate. If the aircraft bounces, the pilot must ensure that any elevator control inputs are small. This is because the faster and cleaner the aircraft, the greater the pitch sensitivity. Recovery from a bounce should not be thought of in terms of 'control movements', but by reference to the glider's attitude and its position in relation to the ground. In other words, the pilot needs to recover by selecting an attitude which prevents any further climb. Bounces can be avoided by the pilot establishing the glider on the approach at the correct airspeed for the conditions using half or more airbrake. Pilots must endeavour to maintain the approach speed to roundout and aim to touch-down with low energy on the main-wheel and tailwheel simultaneously. For further guidance, refer to OSB 01/14 'Circuit and Landing advice' and OSB 01/19 'Avoiding Approach & Landing Accidents During Training'.

9-APR-2021 NGQ
DISCUS B
CONSEQUENTIAL EVENTS

What Happened

During a cross-country flight in weak conditions and at a height of about 2100ft AGL, the pilot decided to head back to the airfield some 31 kms away. The pilot recognised that the glider was below final glide height but pressed on in hope of making it. The pilot stated "with the area being surrounded by paddocks and suitable landing options I continued on the track back to the strip continuing to lose altitude. I lost track of my height and continued to speed up in a desperate attempt to make it back." The pilot did not make the decision to conduct an outlanding until the glider was very low and made a turn at 100ft AGL to land in a paddock about 10kms from the airfield. The pilot stated: "I was still in disbelief that I had frozen up and did not land sooner. I believe that I put too much faith in the performance of myself and the glider to make it back."

Analysis

Investigation by the Competition Director revealed that, at the time the pilot elected to return to the home airfield, he was in the vicinity of an agricultural airstrip where a safe outlanding could have been made. The pilot was also aware that he was below final glide and that conditions back to the home airfield were soft. At this point a sound option would have been for the pilot to search for lift while staying within safe glide of the agricultural airstrip, as the lift was going high enough to achieve a safe glide home. The Competition Director reviewed the flight with the pilot and identified some gaps in his knowledge and/or training. The pilot will undergo some remedial training to ensure he has the skills, aptitude, and attitudes to fly cross country safely.

Safety Advice

A common reason for outlanding accidents is the pilot not accepting soon enough that an outlanding is likely, and not prioritising the available height to allow them to fly to a good safe area. Pressing on with the flight in the hope that that all will be well is fraught with danger. Unlike landing at the home airfield where the runway layout, ground features and hazards are usually well known, when landing in a strange paddock the pilot is faced with the unknown. Such a situation demands the pilot take additional precautions to ensure a proper survey is undertaken of the landing area so as to identify all hazards and ensure a safe landing can be accomplished. To enable this check to be done adequately, pick a general area for outlanding at 2,000ft AGL; by 1,500 AGL a specific paddock should have been selected in that area and by 1,000ft AGL you should be committed to planning a circuit and landing into that paddock. Leaving an outlanding decision too late, at too low a height above ground, eats into the available time and eventually shuts off all the pilot's escape routes. This often has fatal results. Under 700ft AGL, the number one priority is to land safely! For further advice, refer to: The 'Outlanding' section in Australian Gliding Knowledge; and

- A Guide to Outfield Landings – by Allan Latemore

GA

AROUND THE CLUBS

During the winter months, glider training has continued at a rapid pace as many new pilots achieved first solos around the country. Here are a few of them.

Congratulations to Fernando Sandri for going solo at Adelaide University Gliding Club. Now the real fun begins!

Congratulations to Grant on going solo at Darling Downs Soaring Club.

Congratulations to Paul Millachip for going solo at NT Soaring, plus some soaring on the second flight.

Congratulations to Kirren for his first solo at NT Soaring in the Junior

It's been an exciting couple of weekends for our Victorian Juniors who had some professional aerobatics training at the Gliding Club of Victoria. Plenty of smiles seeing the fun to be had over the winter!

It has finally happened. VH-TGN Bearhawk completed its first flight Friday with Bill Bartlett at the controls and Paul Tridgell as scribe. Later in the day, Bill and John Trazise spent some time in the circuit. Congratulations to Paul, John and Darin for the mammoth effort in getting this new build a/c to flight, soon to be the new RAAFRGC tug.

CLASSIFIED ADVERTISING
Classified Ads can be purchased from the Gliding Australia website at magazine glidingaustralia. org Go to Classifieds then click on the link and complete the online form where you will need to provide the text for the ad and any photos, if required. The cost for the ad will be determined by the number of words and any photos you wish to add. You will then be taken to a secure payment area to process your payment. Your ad will be placed on the GFA website for a month from the date of payment. Ads that are financial at magazine deadline (1st of every second month) will appear in the GA Magazine. For any enquiries please contact the GFA office on 03 9359 1613.

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SINGLE SEAT

VH-GJY Glasflugal 205 Club Libelle. Serial No 140,

1892 hours, 1799 landings, winglets. Comes with trailer. Has been in long term ownership with Caboolture Gliding Club and is now surplus to our needs. Cockpit load 91kg max. $12,000. **Jim Thompson 0407590636**

VH-GOG Nimbus 2

3698 hours,1066 flights, Anschau clamshell trailer (new in 2010), Clearnav CNx, LX Nav PowerMouse, Tost hydraulic assist main wheel brake, full set fuselage and wing covers, ground handling gear, significant maintenance renewals in 2019 included new main wing lift pins and new l'Hotellier fittings. True open class glider with "long legs" for the start and end of the day. $33,500 with a fresh Form 2 or $31,000 with Form 2 expiring 7 Nov 2021. **Contact Grant 0429 985506 f**or photos and details.

VH-IUG Jantar 2B, recently refurbished.

Excellent cross country performance.
- 20.5m, 49:1 L/D,
- Perfect ballast tanks,
- New Compass
- New main tyre. Oudie.
- Winglets,
- Removable front canopy allowing easy access to instruments.
- Towball ground gear,
- Advanced rig gear and trailer.
- Excellent condition.
- Price $19,500. Contact **Rob Brown, 0394994275**,

rwb103@hotmail.com

TWO SEATERS

VH-IKM GROB Twin Astir

was registered in Australia in Jan 1978 and the sellers have owned this glider since 1985.Remaining hours 7679 and 6033 landings.

A rare Twin Astir with fully functioning retractable undercarriage and water ballast system. This glider is ideal for training, private flying and cross country flying with its 1:38 max glide angle.This glider has flown numerous 500Km tasks and even 600Km.

Original logbook is available for inspection, Form 2 just completed-Due May 2022, and new seat harnesses installed.
Comes with wing walker, tail dolly, tow out bar. Trailer is registered, dual axle and enclosed.
More photographs are at sailplanes.co The price is $49000 negotiable.

Contact Chris 0414476151 or email cthorpe@bigpond.com

MOTORGLIDERS AND TUGS

VH-DXN Whisper Motorglider 16m.

Limbach L200 80HP and Hoffman V62R 3-position prop. Engine and propeller 12 hours TSOH. This is the original manufacturer's prototype built in 2004. Now more than 30 flying in the world. Total airframe time is approximately 275 hours. Comfortable cruising at 90 knots with minimal fuel burn or sound gliding performance at 1:28. AD687 completed. Currently located at Bindoon WA. Price $45,000 neg. Contact **murray.dixon2@bigpond.com**

VH KFP Grob 109a

Total frame time 2165 hrs, Engine 395 hrs. New Hoffman Prop fitted with less than 10hrs. Recent top end overhaul with new heads fitted. Fly's well priced to sell $49000.00 ono **Contact Cliff on 0405 450 881**

VH-YBE ASH25 self launching Motor Glider

It's your choice, use a tug or launch yourself
25m and 26.5m options
very good condition
3330 hours, 1300 landings
Motor Rotax 505A 147 hours
Accessories and parts inc. Full set of Jaxida covers, solar panels on engine doors,
spare engine with muffler and much more
Anschau Trailer
Contact Dieter, preferred contact by email, admin@sdr13.com, or phone 0428 860 160

VH XXF Nimbus 3DM serial No 005, dom 1988, 24.6m and 25.5m, Genuine hangar queen, in stunning condition for its age, 700 hours total time, eng 70 hours. Engine overhauled 2017, Trailer refurbished and re painted 2020. One man rigger, trailer winch for fuselage trailer insertion, B600, B400, Trig 8.333 radio, Mode C transponder, Flarm. Gelcoat is Aussie ferro gel in excellent condition. Arcus performance at one third the price. Mander assisted cockpit egress, oxygen, two canopy covers, Vertigo(UK)full glider covers etc it is all there. Preferred contact email **resanders@gmail.com**, **0488774557** may or may not be attended.

VH-ZHX Sundancer 13/ 15,

2 seat motor glider, LSA approval by GFA, 4 ½ years old, engine 85 hours, form 2 included, had a terrific time flying the morning glory with Ian McPhee September 2018, have to sell because of health reason, glider currently at Camden Sailplanes,
for more info call **Heinz 02 66492783** after hours or **0400 347412** Price $105'000 ono

VH-GVW Alpin DM8 2 Seat Motorglider by TeST

Fun and reliable soaring machine that is easy and cost effective to operate. Registered Experimental class with no life limitations. Rotax 503 and timber prop only 67.4hrs and runs well. Extension/retraction unit is electric worm drive and has been very reliable and simple to use allowing for quick air starts if required. I have owned this beautiful glider over the past three years and have approx 200hrs logged for only 5.5hrs engine run time over 70 flights. Average motor run time from start on ground to shut down in 1st thermal 6-10mins. I have logged plenty x-country flights in her with many 200-280km out and returns, a couple of 300km triangles and many 'Cats Cradle" type flights of around 180-200kms (as i like to stay within 50kms of home base for convenience). This is simple, one person operation, soaring fun on a very frugal budget that allows you to take friends flying and is ready to flyaway. Reason for sale is I have purchased a Super Ximango for touring and need the hangar space. Form 2 due 16-10-21. No trailer. Located Tara Queensland.
Price: $35,000 Negotiable Contact Jason
jasonr65@bigpond.com 0408 356185

INSTRUMENTS & EQUIPMENT

Parachutes Australia Slimpack Parachute Container

manufactured 2008 (20 year service life), in very good condition, never used in anger or anguish, includes carry bag.
Caution does not include canopy.
Ph Brian Gilby 0427320912 QLD

T & J Sailplane Services
Australian Agents for DG & LS

Tom Gilbert
call **0427 557079**
email **tnjgilbert@internode.on.net**
web **www.gliderstuff.com.au**
facebook **tnjsailplanes**

webstore online now - visit **gliderstuff.com.au** for tyres, tubes, tapes and more

In one glider you can have

- 20 metre tips with winglets, water ballast and retractable landing gear*
- 18 metre tips with Neo winglets.
- 17.2 metre tips for the full range of aerobatics.

* standard configuration

Other options include three landing gear configurations...

- Electrically operated main gear (or manual on request) with tail wheel.
- Three wheel layout with retractable main gear, fixed nose and tail gear.
-Three wheel layout with fixed and faired main and nose gear.
- Other great features include tail and cockpit ballast blocks to optimise C of G for XC and spin training.

The DG-1001 is available in 4 versions...

- DG-1001 Club with fixed and faired landing gear and 18 metre tips with Neo winglets.
- DG-1001S with 20 metre tips and winglets, water ballast and retractable landing gear.
- DG-1001T with sustainer engine.
- DG-1001M self launcher.

Also Available :

LS8-sc neo
Standard Class Racer

18m & turbo options available

DG-808C Competition
18m Self Launcher

outstanding self-launch performance