

AOPAUK

NEW

All new **DESIGN**
Still **FREE** to our
members
ENJOY!

AOPA COMMUNITY

A new section on what
AOPA is doing for you

LEAD-FREE FUTURE?

The geniuses at Warter
Aviation on their UL91

TECH AND BOOKS

A look at the latest
products and books



WE TALK TO THE **Crafty cool** **CubCrafters**

We go inside the company that has brought the Cub
back to life and into the 21st Century. The new Cubs
bring together a historic aircraft with modern tech

25th
SHOW

AERO
FRIEDRICHSHAFEN

Visit us in:
Hall A6 - Stand 101

BOSE

AVIATION



Love the feel of flying? Hear this.

BOSE® A20® AVIATION HEADSET

Once you try the Bose® A20® Aviation Headset, you'll never want to take off without it. Experience our acclaimed noise reduction, high-performance microphone and light, comfortable fit. Every time you fly.

Take advantage of our Spring Promotion and you'll enjoy music on the go. If you love taking your music with you to the beach, the park, wherever - you'll want the Bose® SoundLink® Mini Bluetooth® speaker II (value £ 169,95).

SPRING PROMOTION April 3 - May 7, 2017

Buy an A20 headset, get a free Bose® SoundLink® Mini Bluetooth® speaker II (value £ 169,95).



Redeem your promotional item **before** June 18, 2017
on www.boseaviation.eu

Visit us at www.bose.eu/A20 or contact one of our authorised sales partners for a demonstration:

Mendelssohn Pilot Supplies
www.gps.co.uk

Heli Air Ltd.
www.heli-air.com

Pooleys Flight Equipment Ltd.
www.pooleys.com

Transair Pilot Shop
www.transair.co.uk

HSL Headset Services Ltd.
www.headsetservices.com

The AOPA Pilot Store - London
www.aopa.co.uk/thepilotstore

©2017 Bose Corporation. Offer valid with the purchase of a Bose A20 Aviation Headset from participating Bose authorised dealers. The promotion is valid from 03.04.2017 to 07.05.2017 and not to be combined with other offers or applied to previous purchases. Only available in Europe, the Middle East and Africa from official authorised Bose resellers. FAA TSO-C139 and EASA ETSO-C139 certified. The Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc., and any use of such marks by Bose Corporation is under license.

WELCOMING A NEW EDITOR!

This issue of the magazine is the first to be published by our new editor, David Rawlings, whom we welcome into the AOPA team. David has taken over from Ian Sheppard who decided to enjoy a 'new era, as a pilot and instructor'. Ian himself stepped in following Pat Malone's retirement from the post in April 2015, and took the opportunity to introduce a new look to the magazine that reflected the main interests of the membership. Ian's article in the last issue, on completing an Instructor Rating, provided encouragement to other pilots considering the same. Ian, we wish you well!

David Rawlings has worked in aviation journalism for 10 years. He promises to bang the drum for airfields under threat from unsympathetic developments. He was editor of Loop, which first appeared as a newspaper, then a glossy magazine, and finally in digital for the iPad. David will clearly adapt to the AOPA ethos, and we look forward to a long and productive relationship.

At this time of year, the lengthening of the hours of daylight is rapid and noticeable, bringing with it a lifting of the spirits and prospects of more flying. After several months without a serviceable aeroplane, it was a joy for me to get in the air once again. As usual, the choice of destination was by agreement with one's co-pilot, and thus it was that two of the trips were to Turweston, the purpose being to view the magnificent new control tower and restaurant. Both times the airfield was busy, especially the restaurant, and it was clear that this, and other services and facilities, such as flight training, maintenance base, paint shop and fuel availability (not to mention the headquarter office of the LAA) is what keeps an airfield viable. Turweston has a hard runway, and, although not having an ATZ, is typical of many of the other 100 or more such airfields with ATZs. These make a good starting point, particularly when considering the transportation needs of private owners, for the strategic network of airfields that is currently under discussion with the DfT.

The needs of motorists are satisfied by motorways, cyclists' needs in London are being met by the Cycle Superhighways. However, the requirements of private pilots to use their aircraft as transport for whatever purpose has never been properly addressed by any government, even though our fuel duty provides a substantial contribution to the government coffers. GA includes Commercial Air Transport flights, single engine IFR, and single pilot operations being an important example. These too, require a strategic network, with some aerodromes possibly establishing LPV (Localiser Performance with Vertical Guidance) approaches. AOPA is leading a project on this that has received 60% European funding (see February 2017). Together with other associations, including the newly formed All Party Parliamentary Group (APPG), AOPA is strongly involved in the DfT discussions on the strategic network of airfields. We rely on the continued support of our members to help promote key issues such as a modern transportation system that includes general aviation, so please take every opportunity to spread the word! ■



George Done
Chairman, AOPA UK
george@aopa.co.uk

AOPA UK

EDITOR

David Rawlings
david.rawlings@aopa.co.uk

ART EDITOR

Dan Payne
dan@aopa.co.uk

CONTRIBUTERS

Adam Winter, Robert Care,
Pauline Vahey, Ian Marshall,
John Walker, AirTeamImages

PUBLISHED BY

First Aerospace Media Ltd
Hangar 9, Redhill Aerodrome
Redhill, RH1 5JY
+44 (0)1737 200948

ADVERTISING & SUBSCRIPTIONS

AOPA UK
British Light Aviation Centre
50A Cambridge Street
London, SW1V 4QQ
+44 (0)20 7834 5631

HEAD OF ADVERTISING

David Impey
+44 (0)7742 605338

PRINTING

Fisherprint
Padholme Rd
Peterborough, PE1 5UL
+44 (0)1733 341444
www.fisherprint.co.uk

© British Light Aviation Centre Ltd
AOPA is a member of the International
Council of Aircraft Owners and
Pilots Association. IAOPA



Articles, photographs and news items from AOPA members and other readers are welcome. Please send to the Editor. Inclusion of material in AOPA Magazine cannot be guaranteed, however, and remains at the discretion of the Editor. Material for consideration for the June 2017 issue should be received no later than 5th May 2017.

CONTENTS

APRIL 2017

07

CHIEF EXECUTIVE'S DIARY Martin Robinson has been busy over the last two months working hard to ensure the need of the private pilot has been met.

09

AOPA COMMUNITY The magazine's newest section housing everything you need-to-know about what AOPA is doing for you.

10

WORKING FOR YOU The latest news from the meetings of both the Members Working Group and the Corporate Members Committee.

13

AIRFIELDS UPDATE As developers lick their lips at the wide open spaces of the UK's airfields, John Walker updates us with the latest news.

14

PPL CORNER If you've ever found weight and balance calculations confusing, head here first. Adam Winter offers his fantastic insight.

16

NEWS How to get your 20% back on the cost of 8.33 radios, single engine CIT approved in Europe, Rotax anti-theft plan, and much, much more.

22

FEATURE UL91 is it the future of aviation fuels? We talk to the world's only producer, Warter Aviation to see how they can bring it to the masses.

28

COVER STORY The Super Cub is one of the world's best-loved aircraft ever produced. CubCrafters are keeping the spirit alive – this is their story.

37

FEATURE We welcome Ian Marshall, AOPA's new Training Committee Chairman. He has a thrilling aviation background and some exciting plans for the future.

41

TECH REVIEW The latest offering from Lightspeed Aviation is the Zulu 3, an evolution on the original that is even more durable.

43

BOOK REVIEW The latest Owners' Manual from Haynes is all about the Comet, so if you're stuck on how to fix yours, this is the book for you.

44

CLASSIFIED SALES There are some fabulous aircraft for sales in this issue's classified ads, including a share in a Cirrus SR22 and a Liberty XL2.



28



EDITOR'S MOMENT

AND IT'S HELLO FROM ME

Firstly, I'd like to say what an honour it is to be part of this prestigious organisation that stands up for the often-overlooked pilot and aircraft owner. In the short time I have come onboard AOPA I have been made to feel very welcome by everyone.

As you may have noticed, I, along with the new Art Editor, have decided to make the magazine look more vibrant and exciting. We really want to enthuse you the reader to be passionate about flying.

There is also the serious point of wanting to show you what AOPA is doing for you, the aircraft owner and pilot. That is why we have introduced the new AOPA Community section that houses all your favourite regulars.

I hope that in the future issues we will bring you exciting flight tests, features, as well as hard hitting news and everything that AOPA is doing for you.

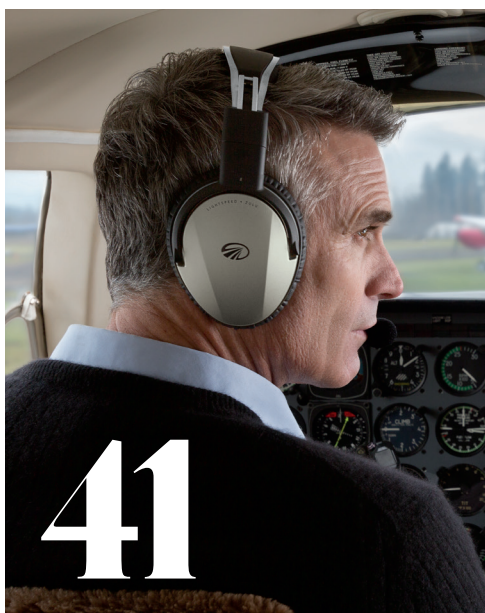
And please if you have any ideas, suggestions or criticism (heaven forbid), please do not hesitate to get in touch.

David Rawlings

Editor, AOPA Magazine UK
david.rawlings@aopa.co.uk



41



16



 DAHER

THE ULTIMATE

speed machine



As the world's fastest single-engine turboprop, the TBM 930 attains jet-like speed – yet is simpler to fly and maintain. Its 850-horsepower engine provides freedom to travel the skies effortlessly at 330 kts., smoothly climb to FL310 and travel up to 1,730 NM in economy cruise. And with Daher's all-inclusive maintenance program (5 yrs./1,000 hrs.), you can enjoy the ultimate combination of reliability, comfort and performance.

Speak to a TBM expert:
(Americas) +1(954) 893-1414
(International) +33 5 62 41 73 00

www.tbm.aero

TBM
930

PLAN TO MAKE UK THE BEST PLACE FOR GA

Spring is here and as people return to their aircraft it's important that we ensure the UK is the best place for aviation. Martin Robinson has had a busy month working on this...

7TH FEBRUARY

Today was an active day beginning with a meeting on Airspace at the CAA with Mark Swan, the Director of Airspace Policy.

The overall discussion was very useful and I felt that the CAA were 'in listening mode'.

In the afternoon the GBASF (General Business Aviation Strategic Forum) had a meeting at which the DfT gave a brief up-date on Brexit as it applies to aviation, which actually means no changes proposed yet as there are many discussions to take place before the UK formally leaves the EU.

We also spoke about the recent meeting with the Aviation Minister, Lord Ahmed, when the government renewed its commitment to 'making the UK the best place in the world for General Aviation'. This statement is important because it will shape future policies about how we achieve the goal of 'being the best place in the world for General Aviation'.

9TH FEBRUARY

I was invited by EBAA (European Business Aviation Association) to the Session on GNSS (Global Navigation Satellite Systems) – with the Project GAGA (GNSS Approaches for General Aviation) that AOPA is involved in, it is important to keep engaged so that we do not lose sight of how greater use of GNSS will help improve safety, efficiency and capacity throughout all phases of flight.

I was able to point out to the parliamentarians that it is difficult for small businesses to comply with many of the funding requirements.

16TH FEBRUARY

Thanks to the BMAA (British Microlight Aircraft Association) for organising some complimentary tickets I visited the Outdoor Adventure Show at Excel in Docklands. I think that promoting flying at such events is a wise move because there are large numbers of people visiting such shows who may get turned on to flying – the BGA (British Gliding Association) was also there with its sim. To grow interest in flying this is what we must do.

21ST FEBRUARY

I attended the FAC (the CAA Finance Advisory Committee). The CAA is aware of the issues reported to AOPA by members and it is committed to continuing to improve its service – so the 50-day PPL turn-around should be closer to 10 days.

23RD FEBRUARY

I visited Airways Aviation in Oxford for a discussion about the professional pilot training market.

Later that day I met with the head of Training from Stapleford Flight Centre for a similar discussion.

The training industry could do with more students and, even though the CAA/DfT gave a great deal of assistance with Visa applications, there are still problems to overcome.

7TH MARCH

ATC Global event in Madrid. The EVA (Electronic Visibility via ADS-B) Project was nominated for a 'Jane's Award' and was shortlisted in the Enabling Technology Category. Although we did not like it, it was an honour to be nominated and our thanks go to TRIG, FUNKE and NATS – our consortium partners – and also to AOPA Member, Bob Darby, who played a prominent role in the project. Last but not least, I would like to thank those members who took part.

The event, in Madrid, the World ATM Congress was an excellent networking opportunity and it was good to hear from senior figures in Eurocontrol, SESAR (Single European Sky ATM Research) and the Commission on how much they value my contribution and that I should continue to interact with them. There were some good discussions also with the GSA (Global Navigation Satellite Systems Agency) about Project GAGA where we are involved in the deployment of LPVs (Localiser Performance with Vertical Guidance) at Gloucester Haverford West and Stapleford. Other than delays caused by the French ATC strikes, the trip was well worth the effort. Also, a 'thank you' to Helios for their hospitality.

9TH MARCH

Finally, I attended the BBGA Conference (British Business and General Aviation Association). Sir Gerald Howarth and Andrew Haines were also in attendance. During the Brexit discussion I made the point that, regardless of what the UK decides, apropos of EASA, when flying into the Eurozone we will have to comply with European rules. Just as we do when we drive into Europe so, whether we remain with EASA or the UK just mimics the rules, I think it is important for the CAA to remain a voice of influence inside the debates and we need the best solution for UK GA.

It was a good conference and I congratulate Marc Bailey and his staff for putting it together. ■



M Robinson

Martin Robinson
CEO, AOPA UK
martin@aopa.co.uk

Elevate your flying

We understand that flying isn't just flying. It's your passion. Your lifestyle. That's why Jeppesen offers several mobile solutions tailored for how you fly.

Jeppesen terminal charts + Garmin Pilot*
Fly with industry leaders!

Mobile FliteDeck VFR
Designed strictly for VFR pilots.

Mobile FliteDeck
Terminal and enroute charts on your iPad®.

Visit jeppesen.com/mobile40 for more information.

Join us at **AERO!**
5-8 April
Stand A3-401



*Restrictions apply. Call for details.

HELPING YOU STAY FLYING

Welcome to the new AOPA Community section of the magazine, bringing you all the news and insight from the world of AOPA...



WORKING FOR YOU News from the MWG and CMC.



AIRFIELDS UPDATE Updates from around the country.



PPL CORNER All about the weight and balance.



WORDS David Rawlings IMAGES Pauline Vahey

AOPA LOOKING OUT FOR THE PILOT

The AOPA Members Working Group and AOPA Corporate Members Committee are there to ensure the aircraft owner and pilot's concerns are being looked out for...

AOPA MEMBERS WORKING GROUP

Notes from the recent meeting that took place in February 2017

AOPA WINGS SCHEME

There has recently been a lot of interest in the AOPA Wings scheme and it was particularly noted that when AOPA member, Andy Torkington tweeted about achieving his Silver Wings he received a lot of congratulations as well as questions about the scheme. A popular aviation insurance company has also mentioned offering discounts on insurance premiums for members who hold Silver, Gold or Platinum Wings – more news on this to follow.

AIRSPACE INFRINGEMENTS

Martin Robinson reported that the CAA has sent communication inviting certain associations to attend a meeting at NATS regarding an Infringement Awareness course to be hosted by Irv Lee. The Members Working Group will formulate a recommendation that can be put forward to the CAA on issues affecting GA.

AIRFIELD CLOSURES

AOPA will produce a briefing paper focused on the closure of airfields to be sent to the MPs involved in the All

Party Parliamentary Group for General Aviation. The committee felt that MPs were not aware of the correct information regarding closure of aerodromes. Martin Robinson felt that until the government sees General Aviation as part of the transportation system, the GA industry will decline.

In positive news, there is a strategy which the government and CAA are signed up to. This enabled Robinson to address this issue when he met Lord Ahmed to discuss that the government are still on board with regard to stated intention to make the UK the best place for GA.

GENERAL AVIATION REPORT

The Home Office is making amendments to the GAR in that it will be available to complete on the Home Office website. The existing methods are still OK to use, that is via the AOPA website and through flight plan providers such as Sky Demon.

AOPA has raised the issue that when Schengen is temporarily suspended in some EU states, this information is not readily available to pilots. The committee suggests that pilots check with the country they're visiting that Schengen has not been suspended.

GNSS APPROACHES

AOPA has obtained funding from Europe to implement GNSS approaches. This will enable smaller regional airports to have CAT 1 look-alike approaches. AOPA will develop a template that other airfields can use.

AOPA CORPORATE MEMBERS COMMITTEE

Latest updates from the CMC and what they are hoping to achieve.

AIRFIELD CLOSURES

This obviously affects everyone involved in aviation. Martin Robinson discussed with Lord Ahmed the need for a review of general aviation activity in the UK. The government has the desire to make GA in the UK the best in the world, however this can only be achieved with less stringent tax rules. The government does not recognise General Aviation as a part of the transport network and this issue needs to be addressed. The government will not offer tax breaks on recreational flying.

Robinson stated that he felt the network of aerodromes should start at licensed aerodromes, as this is where you will find the facilities required to support General Aviation, for example maintenance companies and training organisations

IMPORTANT 2017 DIARY DATES

AOPA MEMBERS WORKING GROUP

SATURDAY 24 JUNE

Wellesbourne Mountford

SATURDAY 9 SEPT

Gloucester

SATURDAY 18 NOV

White Waltham

AOPA CORPORATE MEMBERS COMMITTEE

TUESDAY 27 JUNE

Wellesbourne Mountford

WEDNESDAY 13 SEPT

Stapleford

WEDNESDAY 29 NOV

Cambridge St. AOPA HQ



The MWG making sure the concerns of the pilot are being taken care of

etc. Lord Ahmed was very supportive and he was interested in visiting airfields and writing letters, Robinson has invited him to Aero Expo and Wycombe to see first-hand what GA is.

FUTURE PILOTS

Young people are our future and with the number of air shows being cancelled, there are less and less avenues to inspire young people to learn to fly. There are a number of other issues which aren't helping such as closure of airfields and lack of display pilots (due to the extra regulation as a result of the crash at Shoreham). Also, there has been a reduction in the number of facilities that offer cadet training. A suggestion was raised that AOPA visit schools to encourage pupils to learn to fly. The STEM initiative is helping. Recently Carol Vorderman, AOPA member, presented at the launch of

the APPG on encouraging more young people to learn to fly. She herself supports STEM and is also an officer with the RAF cadets.

Another suggestion was for AOPA to have a 'learn to fly' stand at a big non-aviation event such as the Ideal Home Exhibition or the London Boat Show. AOPA, along with our corporate members, has to rethink about how we can get more people learning to fly and demystify what qualifications and experience are needed. We have to show that the ability to fly is achievable for everyone.

TAXATION AND OTHER FINANCIAL ISSUES

There is shortage of Avgas and although newer, greener fuels are being developed, with the addition of taxes on fuel flight training is still expensive, Martin Robinson is in discussion with HMRC and the government to rethink fuel tax for training.

"With the addition of taxes on fuel still makes flight training expensive"

There are two other issues that may affect pilots travelling abroad. Firstly, the French are no longer offering customs facilities at many of their airfields, this information should be passed to any pilots travelling to France. Secondly, there are a number of European countries that occasionally suspend the Schengen Agreement; however, this information is not passed onto pilots until it's too late. Robinson has said he will ask the DfT how GV pilots can find out when Schengen has been suspended, and in what, European countries.

SHORTAGE OF FLYING INSTRUCTORS

Pauline Vahey has arranged to meet a representative of the European Regional Airline Association to discuss how AOPA and the ERAA could collaborate on ensuring there are enough flying instructors. ■

**NOW
EASA APPROVED!**
EASA AML STC COVERS
790 AIRCRAFT MAKES & MODELS.



THE EASY CHOICE.

IFD540 & IFD440

FMS/GPS/NAV/COMs

FEATURING 'HYBRID-TOUCH'

- Direct replacements for existing 530 & 430-Series navigators
- Feature an award-winning Page & Tab user interface
- Highly-intuitive 'Hybrid-Touch' (touch screen or knobs & buttons)
- Built-In WiFi & Bluetooth™

Now you have a **choice**.
And the choice is easy. **Avidyne**.

Contact your authorized Avidyne Avionics Dealer or
Steve at sgrubbins@avidyne.com for more info.

Learn more and see for yourself at www.IFD540.com.

AVIDYNE
www.IFD540.com

JET A1

AVGAS 100LL

AVGAS UL91

Supplied, all over the British Isles in Bulk and Drums and
around the World in ISO Tanks (23,000 litre stainless Steel)
and Drums (200 litre, Mild Steel Epoxy Lined)

**Speedy delivery service
Competitive prices
Quality assurance**

We operate a Quality Management System, which
complies with the requirements of BS EN ISO 9001:2000
in the Procurement, Importation, Storage and
Distribution of Aviation Fuels.

We are DCL registered (Defence Contractors List) and we
have recently been awarded, with a further two year contract
to supply the Ministry of Defence with Aviation Fuels.

For more information call Damian on
020 8440 0505 or E Mail: sales@cymapetroleum.co.uk



242-248 High Street, Barnet, Hertfordshire EN5 5TD
Telephone: +44(0)20 8440 0505 Telefax: +44(0)20 8440 6444
Email: sales@cymapetroleum.co.uk www.cymapetroleum.co.uk



Land yourself a better deal on insurance

**DON'T
RENEW
before getting
a quote
from us**

SC
SYDNEY CHARLES
AVIATION INSURANCE BROKERS
Light Aircraft & Jets
Helicopters & Gyrocopters
Gliders & Microlights
Flying Clubs
+44 (0)1420 88664
info@sydneycharles.co.uk
www.sydneycharles.co.uk

WORDS David Rawlings IMAGES AirTeamImages.com

LATEST UPDATES ON UK AIRFIELDS

John Walker provides all the latest news relating to the UK airfields

All the latest information to airfields under threat across the UK – updated on 7 March 2017.

BLACKPOOL

Balfour-Beatty appears to have sold their 95% interest in the airport to Regional & City Airports. Enterprise Zone status granted for the land on the north side of the airport which area encompasses the domestic facilities of the old airport. Recent statements from the Zone proprietors indicate that they are relying on the airport to attract businesses. The emerging Local Plan for the area retains the airport's existing aviation facilities as they currently are.

DEENETHORPE

Site accepted under the Government's Garden Village

scheme for development with around 1,250 homes which is supported by the site owner, Brudenell Estate. Full public consultation expected to be in May or June this year, leading to a site masterplan in support of a planning application.

DUNSFOLD

Planning application for mixed use development with 1,800 homes on site approved by Waverley Borough Council on 14 December 2016. As a result of Local Parish Councils joint request to Central Government, the application has been called in for a full Public Inquiry.

FAIROAKS

Surrey Heath Council made a confidential, unsuccessful bid to establish a garden



PHOTO www.airteamimages.com

1,600 homes have been proposed at Wellesbourne

village with 1,500 homes on site under Government scheme. Tenants advised later of proposal and public consultations started in February 2017 with submission of planning application due in late 2017.

WELLESBOURNE

Gladman Developments

in conjunction with the owner have proposed a housing development with 1,600 homes on the site although the Stratford-on-Avon Local Plan Core Strategy has earmarked Long Marston airfield as a preferred housing development site. The Core Strategy after approval by a Planning Inspector has been adopted by the Council and states that "The aviation related functions at Wellesbourne Airfield will have been retained and enhanced". Tenants previously notified by owner that flying activities will cease in December 2016 but the airfield will now remain open pending the result of court action by the tenants to obtain new leases.

The District Council has formally rescinded the owners permitted development rights for the airfield and is seeking to negotiate a possible purchase of the site. ■

MOD SITES

MOD document A Better Defence Estate issued on 7 November 2016 lists the following aerodrome sites for disposal:

Abingdon 2029; Alconbury 2023; Arbroath, RMB Condor airfield 2020; Brawdy, Cawdor Barracks 2024; Chalgrove airfield occupied and operated by Martin-Baker Aircraft has been transferred from the MoD to the Homes and Communities Agency (HCA). Site is one of seven being considered for a 3,500 home

development in South Oxfordshire District Draft Local Plan with a second Preferred Site Options consultation planned for March 2017. RMB Chivenor 2027; Colerne 2018; Dishforth airfield 2031; RAF Halton airfield 2022; RAF Henlow 2020; Hullavington airfield has been sold to Dyson who intend to preserve the existing on-site hangars; Mildenhall 2022; Molesworth 2023; North Luffenham 2021; RAF Wethersfield is being transferred to the HCA in 2020.

In addition to the above, RAF Wyton airfield is being sold off - Defence Infrastructure Organisation and local property developer Crest Nicholson proposal for up to 4,500 homes on site with planning application expected to be lodged in early 2017. Site earmarked in draft Huntingdonshire District Council Local Plan for mixed use development including housing.

WORDS Adam Winter

WEIGHT AND BALANCE WISDOM

Force Mass, weight, moment, pivot, torque, moment arm. These terms are all used in the quest for CoG. So let's make sure we understand what they mean and how they come together to allow us to calculate whether we will take-off

To start with some definitions. Mass, (S.I. unit is the kilogram) is a measure of how much 'stuff' something has in it. A one kg mass has one kg of molecules in it. If you take it to the moon it still measures one kg, and on the sun, and anywhere else.

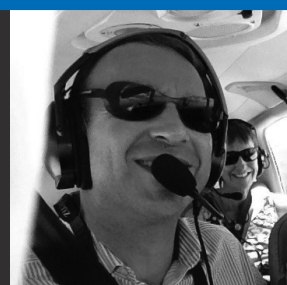
A Force is a push, or pull, or twist on an object that will cause it to change its motion. For weight and balance calculations we are concerned with the force of gravity, which causes an object to accelerate downwards at 10 metres per second every second*. The S.I. unit for force is the 'newton', and the definition of a newton is the force required to accelerate a mass of one kg by one metre per second every second.

WEIGHTY SUBJECT

The Weight of an object is the result of gravity acting on it, and can be defined as the mass times the acceleration due to gravity. Since weight is a force, its unit is also the newton. We often mix the terms mass and weight in aviation, but it really doesn't matter, as long as the calculations are meant for Earth. On the moon your weight would be 1/6th of your Earth weight.

A Moment is another force, but this time it is a force applied then felt at a distance, and it causes a turning movement, a Torque. Imagine holding a plastic bag weighing one kilogram out horizontally on your 1 metre long arm**. The bag is exerting

ADAM WINTER

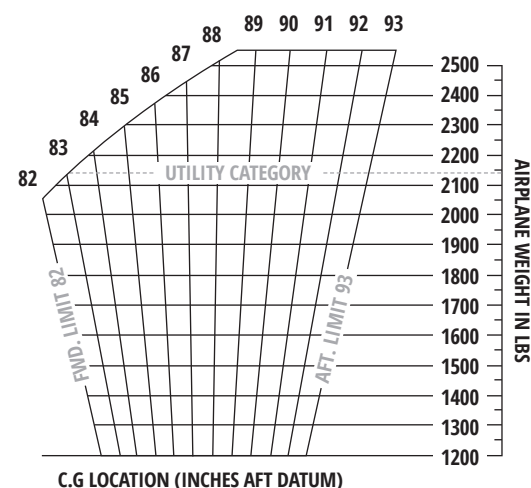


Adam is a commercial pilot with more than 30 years' experience. His career has included bish flying in Africa and island hopping in the West indies, as well as a stint in the airlines. He is also a qualified physics teachers with three years classroom expereince, that aged him 10 years, so he is back doing what he loves, teaching PPL.

a 10 newton (1kg x 10 metre/s/s acceleration) force downwards one metre away from your shoulder. The torque force you are feeling in you shoulder is the 'moment', the result of the force exerted at a distance. The unit for moment is a newton metre, or pound inch or pound feet***. The 'moment arm' is the distance between the shoulder and the bag. Now move the bag up to your elbow. The obvious result is less torque felt at your shoulder because now the moment arm is 0.5 metre away. The moment force felt at your shoulder is now 10 newtons x 0.5 metres, so 5 newton metres. Much less torque than holding it at arm's length.

WEIGHT VS C.G. ENVELOPE

2550 LBS MAX GROSS WEIGHT



WEIGHT AND BALANCE FORM

A SAMPLE OF A PIPER WARRIOR WORKSHEET

	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (IN-LBS)
BASIC EMPTY WEIGHT			
PILOT AND FRONT PASSENGER	340.0	80.5	27370
PASSENGERS (REAR SEATS)	340.0	118.1	40154
FUEL (48 GALLONS MAXIMUM)		95.0	
BAGGAGE (200 LBS MAXIMUM)		142.8	
TOTAL LOADED AIRPLANE			

The centre of gravity (C.G.) of this sample loading problem is at ????? inches aft of the datum. Locate this point (????) on the C.G. range and weight graph. Since this point falls within the weight - C.G. envelope, this loading meets the weight and balance requirements.

CENTRE OF GRAVITY

The centre of gravity (CofG) of an object is the point where the total weight of a body can be thought to be concentrated. For an aircraft it is also the centre point through which pitch, yaw and roll will occur. When we do a CofG calculation, we are doing it because the manufacturers and engineers of the aircraft have guaranteed that it will perform well as long as the CofG is within the stated parameters. The forward and aft CofG limits affect the longitudinal stability of an aircraft. As the CofG moves forward it becomes harder to raise the nose, which can cause serious problems at low landing speed if you can't raise the nose enough, and can't slow down. With the CofG too far aft, the increased elevator sensitivity in pitch up can lead to an inadvertent stall. This is just the tip of the iceberg for problems caused by being out of the suggested range.

So now the terminology is defined and hopefully understood, it should be easy to grasp the weight and balance calculation. Look at the basic weight and balance form. The columns are for Weight in pounds (lbs), the Arm in inches (meaning the length of the moment arm), and Moment, (which is that force felt at the shoulder) calculated by multiplying the weight and arm together. You might notice that the arms, the position from which the distance is measured, are all aft of the datum. This is a way of making the maths easier and less prone to error. By choosing an

arbitrary point somewhere at the front of the aircraft, all the calculated moments will be clockwise, so they will all be added. If the datum was the CofG itself the calculation would be harder and easier to make an error as you would be adding all moments rear of the CofG and subtracting all the anticlockwise moments forward of the CofG.

On the Weight and Balance form, the first row is for the Basic Empty Weight. Rows two and three are calculated for the pilot and passengers. You can see the front seats are 80.5in aft and the rear passengers 118.1in aft. The fuel tanks' datum is between the two rows of seats and the baggage is quite far back. To do the full calculation you have to fill in the weights and multiply them by the arms (as has been done for the pilot and passengers). When that is done, add all the weights together then check it does not exceed the maximum take off weight. There is no need to add all the arms, but do add all the moments together. Leave that number in your calculator, because you then divide the total moment by the total weight. You have just calculated the new position of the CofG. You then take that weight and CofG position and plot it on the CofG Range graph from the aircraft manual (example far left).

This article is not intended to teach you how to do a weight and balance, but rather familiarise you with the terms and show you how it is done. If you have learnt from it, great. ■

**10m/s/s is close enough for what we need ** You are a spider monkey
***the unit newton metre is not the same as the newton metre (joule)
that refers to work done. A joule is force times distance where the force
vector is in the same direction of movement of an object, whereas in
moments the newton metre is a torque, not a straight line.*



TOST

Flugzeuggerätebau

increased safety
in flying

SEE US AT
AERO
FRIEDRICHSHAFEN
HALL/STAND
NO. B5-009

Flugzeugräder
Aircraft Wheels

Flugzeugreifen
Aircraft Tires

Hydraulische Bremssysteme
Hydraulic Brake Systems

Schleppseileinziehwinden
Tow Cable Retractor Winches

Sicherheitskupplungen
Safety Tow Releases

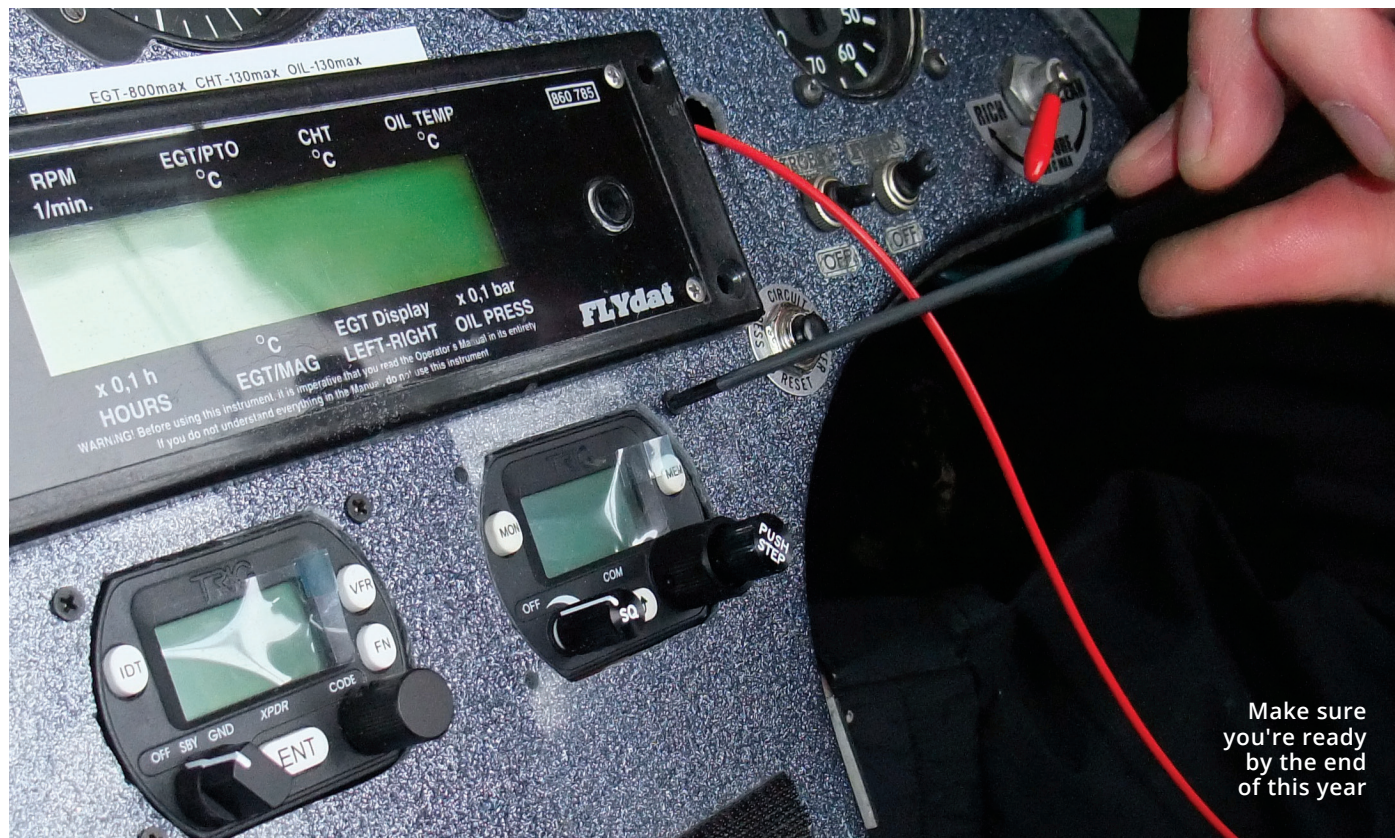
Seile
Cables / Ropes

Start- / Schleppausrüstung
Towing / Launching
Equipment

Tost GmbH Flugzeuggerätebau München
Thalkirchner Straße 62 D-80337 München
Tel. +49-(0) 89-544 599-0 info@tost.de
Fax +49-(0) 89-544 599-70 www.tost.de

AOPA NEWS

General Aviation news from around the world



Make sure
you're ready
by the end
of this year

BECOME 8.33 CAPABLE

Time is ticking, make sure your aircraft has an 8.33kHz capable radio installed by the end of this year if you want to keep flying cross country...

by **Malcolm Bird**

Do you want to keep flying cross country, through airspace classes as you have in the past? Then before the end of this year a radio in your aircraft will need to be 8.33kHz capable. Only one radio needs to be upgraded to be 8.33kHz capable and up to four radio upgrades can be covered by the CAA rebate scheme.

The good news is that a lot of information is now available and the procedures for achieving compliance are becoming much clearer.

Simply changing a transceiver is now considered to be a standard modification: in EASA speak, a CS-STAN modification. In particular, CS-SC001a, that refers to changing a radio.

Recently the CAA has also agreed that non-EASA aircraft can use CS-STAN process to avoid invoking the minor-mod process.

The CAA has gained some EASA funding and will rebate 20% of the hardware costs of an upgrade until the funds run dry. There is a pdf form that needs completing to claim the rebate and this

form will also cause the CAA Radio Licence details to be updated. So to ensure you can benefit, check you will meet the requirements of the CAA rebate scheme, select and obtain the hardware you plan to install (keep invoices and receipts) and then complete and submit the CAA rebate claim form. When asked, follow up with supporting documentation. This must be within 14 days from form submission. Check that you meet the requirements of CS-STAN SC001a and follow the CS-STAN procedure to

swap the radio – in some cases plug and play, get the installation checked by your Part 66, B2 maintenance engineer. Then complete the FORM123 and have the maintenance engineer sign off the FORM123. Then place signed form with the aircraft maintenance papers. At this point the aircraft is released back to service.

Note: For those under LAA oversight, the approach is similar but uses the LAA modification procedure. See LAA Technical Leaflet TL 3.03 (plus form MOD 7) on the LAA website. ■

THIRD PC-24 PROTOTYPE TAKES TO THE SKIES

by David Rawlings

The test aircraft designated P03, the third PC-24 prototype that completes the fleet of test aircraft, took off on its maiden flight late last month.

The first two prototypes have already flown a total of 1350 hours to date, including numerous significant test flights. Certification flights will be flown with the P03.

Pilatus stated that certification of the PC-24 is expected in the fourth quarter of 2017 with initial deliveries of the 84 pre-ordered aircraft to go ahead immediately after certification is obtained.

Oscar Schwenk, Chairman of the Board of Directors at Pilatus, commented: "I'm delighted to have seen the P03 in the air! The PC-24 test flight programme is proceeding as planned and the results are very



P03, the third and final prototype of the PC-24

encouraging. The data we have so far indicates that our jet exceeds published performance figures. I am confident that certification will be achieved in the fourth quarter, and am naturally looking forward with immense anticipation to the moment when our first customers take delivery of their PC-24!"

The P03 will be presented to the general public for

the first time at EBACE in Geneva, 22-24 May 2017.

Pilatus also state that the PC-24 will be the first business jet in the world to be equipped with a cargo door as standard, and is capable of taking off and landing on very short runways and unmade strips. The jet also boasts a spacious cabin designed for easy adaptation to personal requirements. ■

HONEYWELL ENTERS CLEAN SKY PROGRAMME

by Robert Care

Honeywell has joined the largest European research program, Clean Sky 2, with the desire to develop innovative technologies aimed at reducing carbon dioxide emissions and noise levels produced by aircraft.

Honeywell has received funding worth €35m to back the development of aerospace technologies in support of the initiative. The funding will further strengthen Honeywell's commitment to its European

engineering centres, particularly in the Czech Republic, France and the United Kingdom.

As part of its membership, Honeywell will undertake projects to develop priority technologies from cockpit solutions to health monitoring. It will also use the funding to advance its electromechanical actuators, which help improve aircraft performance and lower operating costs.

"Honeywell is honoured to join the Clean Sky 2 Joint Undertaking. We

are committed to make a positive impact on the environment," said George Papageorgiou, engineering director, Advanced Technology at Honeywell.

Honeywell has been awarded four Clean Sky 2 grants for projects with a duration of between four and eight years.

Clean Sky is funded by the European Union's Horizon 2020 framework programme, which aims to shape the future of environmental scientific research both across the globe. ■

LOOK BACK... THIS MONTH 105 YEARS AGO



FIRST WOMAN TO CROSS THE CHANNEL

In April 1912 American pilot Harriet Quimby became the first female pilot to cross the English Channel - but that wasn't the only first for the pioneering aviatrix.

Quimby was the first woman to gain a Pilot's Licence in the United States in 1911 and became a pioneer for women who rallied against the male-dominated society of the time.

On 16 April Quimby took off from Dover en route to Calais. She made the crossing in 59 minutes, landing about 25 miles (40 km) from Calais on a beach in Équihen-Plage, Pas-de-Calais.

Her achievement made few headlines due to the sinking of the Titanic the day before.

Away from aviation, Quimby also authored seven screenplays that were made into silent films. She had a small acting role in one of them.

Quimby was tragically killed later that year when her Bleriot monoplane, at an altitude of 1,000 feet (300m), suddenly pitched forward ejecting Quimby and her passenger. The reason is still unknown.

**AOPA NEWS
HIGHLIGHTS****GAMA SAY MIXED 2016**

GAMA's year-end report showed a mixed year with turboprops being the only market to grow in 2016. Turboprops had a +3.4% growth with 576 aircraft being shipped. Piston aircraft fell by 4.9% with only 1004 aircraft shipped, 52 less than 2015. Business jet sales also dropped by 7.9%.

CLASS D FOR EXETER?

Exeter Airport wants to change its current Class G airspace into Class D Controlled Airspace due to its continued growth. Exeter Airport wish to engage with all aviation stakeholders that might be affected by this ACP. The consultation period is 13 weeks and closes on 9 June 2017.

SONACA TO START TESTS

The new Sonaca 200 will begin flight tests in April to continue its EASA certification process. Two aeroplanes have been built with the first being entirely dedicated to ground tests and the second for flight tests. Production of the Sonaca 200 is scheduled to begin in June.

BUZZ AT OSHKOSH

The EAA has announced that second-man-on-the-moon Buzz Aldrin will attend AirVenture this year. He will be joined by Harrison "Jack" Schmitt (Apollo 17), representing the crews who made the space program's first and last lunar landings, as part of the Apollo program reunion on Friday 28 July.

SINGLE ENGINE CAT APPROVED IN THE EU

by **David Rawlings**

After more than 20 years of work and lobbying, EASA has said the use of Single Engine Turbine (SET) aircraft for Commercial Air Transport (CAT) operations at night or in IMC could be legal across Europe.

The operations have already taken effect with publication in the EU's Official Journal. The publication of these rules opens up new markets and stands to improve connectivity across the continent. Marking the end of a 20-year effort by industry and regulators, Europe is now aligned with the International Civil Aviation Organisation's (ICAO) standards for CAT operations which were established in 2005, and are the base for other operations of this type globally.

The General Aviation Manufacturers Association (GAMA), who participated in a group with EASA in 2012 to develop the regulatory framework, welcomed the European Union's acceptance of Commercial Air Transport operations using Single-Engine Turbine aeroplanes at night or in MC in Europe. "The EU's acceptance of CAT operations has been a long-awaited moment for General Aviation," GAMA President and CEO Pete Bunce said. "We are very pleased to see Europe joining other regions in permitting this important form of transport."



PHOTO: Textron Aviation

The Cessna Caravan can now be used for CAT

GAMA also state that the new regulation is based on rigorous safety analysis, and contains all of the necessary safeguards to facilitate this form of passenger transport.

It will greatly facilitate overnight cargo delivery and help provide connectivity to Europe's remotest regions.

"We applaud the leadership shown by EASA in guiding this important safety framework forward, along with many dedicated individuals who helped forge this rule over many years," Bunce added in a statement. "It will be a welcome

development for those underserved by commercial routes to date."

Work on a framework for single-engine commercial operations began in the early 1990s. Such operations are common around the world and it seemed unfair that Europe could not use the ICAO standards that were issued in 2005. GAMA, and several of the association's members, participated in a rulemaking group created by EASA back in 2012 to help develop the agency's regulatory framework on this matter. ■

TECNAM DELIVERS 200TH P2006T TWIN TO BARTOLINI IN POLAND

by **Robert Care**

Tecnam has announced that its 200th P2006T twin has just been delivered to one of Poland's leading Flight Training Organisations, Bartolini Air.

Since its introduction, Tecnam's P2006T Twin has established itself as both a fantastic training aircraft and favourite for private owners.

Tecnam has adapted its P2006T to suit specialist clients and has even partnered with NASA, a number of Air Forces and other niche operators who now fly specialist versions, such as the P2006T SMP.

Bartolini Air, who are no strangers to Tecnam's

products (they now operate an all Tecnam fleet of 11 aircraft: nine singles and three twins), operate more than 12,000 flight training hours a year and qualifies over 200 students who go on to fly for many of the world major airlines. Bartłomiej Walas, Managing Director of Bartolini Air, said he remembers the first time he saw a picture of the P2006T. "It was on the cover of an aviation magazine. It was just a drawing with a short description inside of it. I said to myself, this is exactly what we need to take the Bartolini Air training offering into the 21st Century," said Walas.

Tecnam has also recently delivered a P2006T to the



The 200th P2006T has been delivered to Bartolini Air

Patialia Aviation Club, in India, which is owned and operated by the Punjab State Government.

This deal led to Paolo Pascale, CEO of Tecnam to state: "We are very proud to have commenced

deliveries of Tecnam aeroplanes to India. There is no doubt that India GA will grow significantly and we are delighted to fulfil our potential in supporting future India based owners and operators." ■

NEW ENGINE REG SYSTEM FOR ROTAX

by **David Rawlings**

To combat the rising number of engine thefts from aircraft, BRP-Rotax has launched an online engine registration system.

The new registration can be done by following a three-step process. As a first

step, the customer enters all required registration data using the online registration form on www.flyrotax.com.

In the second step, the end customer receives a confirmation link via email after submitting the registration. By following this link, the data entered

must be validated and needs to be confirmed by the customer. As third and final step of the process, the submitted registration is validated by BRP-Rotax.

Rotax said: "This new paperless engine registration process offers various advantages for Rotax

aircraft engine owners. It is very important for BRP-Rotax to get to know its customers and their engines. This allows to optimise the distribution and service network according to customers' needs.

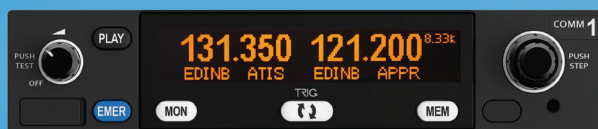
320 owners have already registered their engines. ■

BETTER BY DESIGN

Where innovation, quality and value stack up



TT21 – transponder



TY96 – 8.33 VHF



TY91 – 8.33 VHF

Visit Trig at Aero Friedrichshafen, Hall A5, Booth 501.

www.trig-avionics.com

TRIG



The proposed look of Boeing's new UK plant

NEW BOEING SITE IN UK

US company plan a 25,000 square foot facility in Sheffield to manufacture componets for Boeing's Next-Generation aircraft

by **Robert Care**

Boeing has stated it plans to open a production facility in Sheffield to manufacture components for Boeing's Next-Generation 737, 737 MAX and 777 aircraft.

The new facility is part of a broader plan by Boeing to begin in-house manufacturing of key actuation components and systems in the US and the UK to enhance production efficiency and reduce cost in its supply chain.

Boeing's new UK facility, to be named Boeing Sheffield, will produce actuators in Boeing's first manufacturing facility in Europe.

Boeing Commercial Airplanes' (BCA) facility in Portland, Oregon, US, will also produce actuators and

assemble actuation systems for these models as a new work statement.

"The UK provides Boeing with the talent and infrastructure we need to grow and maintain a high level of productivity and quality to meet our significant order book," said Sir Michael Arthur, president of Boeing Europe and managing director of Boeing UK and Ireland. "We are proud to expand our relationship with the UK still further with Boeing Sheffield. Our decision to start manufacturing high-value components in the UK is a step-change in our engagement and a further example of Boeing's commitment to grow here, supporting the UK's long-term prosperity."

When operating, Boeing Sheffield will employ approximately 30 people when it opens as part of BCA's fabrication operations.

The establishment of Boeing Sheffield will also open opportunities for UK suppliers to bid for work.

737 MAX CERTIFIED

After just a year-long test programme, the FAA has certified the Boeing 737 MAX 8 aircraft.

The 737 MAX 8 is the first in the family to be developed and meet customer demand in the heart of the single-aisle market. It is already the fastest selling aeroplane in Boeing's history, with more than 3,600 orders already.

The proposed 25,000 square feet Boeing Sheffield facility will be built alongside the University of Sheffield's Advanced Manufacturing Research Centre (AMRC) with Boeing.

Professor Keith Ridgway CBE, executive dean of the AMRC with Boeing said: "We look forward to supporting Boeing and continuing to ensure that UK manufacturers remain competitive, through access to our expertise here." Boeing expects to recruit UK employees for the site as early as 2018.

Boeing also plans to initiate a major R&D programme with the AMRC to develop new manufacturing techniques that can be applied in the new Boeing Sheffield facility. ■

HAWARDEN RMZ APPROVED BY CAA

by David Rawlings

Hawarden Airport recently announced that the Airspace Change Proposal for its Radio Mandatory Zone has been approved by the Civil Aviation Authority.

The new Hawarden RMZ became effective on 30 March 2017 after a long consultation process.

The Air Traffic Control team has produced a General Aviation Guide which can be found at www.hawardenrmz.co.uk. It is the ATC's hope that the GA Guide will assist

pilots with the airspace change and help reduce airspace infringements.

Non radio aircraft should contact Hawarden ATC by telephone (01244 522012), email (atcopshawarden@airbus.com) or by text message to 07786 208 291 prior to commencing any planned flights that will enter or cross the RMZ.

Hawarden has set up a website for those wanting more information about the new RMZ, visit: www.hawardenaerodrome.co.uk. ■



Hawarden airfield now has a RMZ

NEW FORCE FOR EXAMINERS

by David Rawlings

The newly established Independent Flight Examiners Association (IFEA) has been formed to address the issues and problems experienced by authorised flight examiners conducting flight and simulator tests on behalf of the CAA. The number of CAA employed examiners (staff examiners) has dwindled to just three fixedwing and two rotary

examiners in 2017. Test centres have disappeared, as has the capacity of the Authority to select or standardise the examining work-force.

IFEA has been formed to assist the CAA to maintain its high standards in the flight training industry. IFEA intends to work with the CAA in developing new policies for the selection, training and supervision of examiners. For information visit www.ifea.org.uk. ■



POOLEY'S
60th
ANNIVERSARY
1957-2017

Pooleys Flight Guide United Kingdom 2017
— plus 1 year iPlates subscription available



Now Features:

- More than 930 Landing Site Entries
- Over 450 Aerodrome Charts
- Every Plate re-mastered & Graticule Ticks Added

Available in 4 versions:

Spiral Flight Guide £26.99 plus iPlates £36.99
 Bound Flight Guide £26.99 plus iPlates £36.99
 Loose-leaf Flight Guide £36.99 plus iPlates £46.99
 Loose-leaf Flight Guide with Binder £46.99 plus iPlates £56.99
 iPlates one year subscription only £20.83 + vat £24.99

ACCESS TO THE POOLEY'S FLIGHT GUIDE WITHIN AIRBOX, SKYDEMON & POKKETSMS ARE SEPARATE CHARGEABLE SUBSCRIPTIONS AVAILABLE THROUGH EACH PROVIDER AND NOT INCLUDED IN OUR iPLATES SUBSCRIPTION CARD.



POOLEY'S is an Official Distributor for
Bose A20 Aviation Headsets and Accessories



GARMIN® POOLEY'S is an Official Distributor for Portable Garmin Products



























































































































































































































































































































































































































































WORDS David Rawlings IMAGES Warter Aviation

UL91, THE PERFECT FUEL?

With the world turning green it's long overdue to look at safer, alternative fuels. Warter Aviation, a fuel company dedicated to the needs of pilots, is the world's only producer of UL91 and it sees the product growing and growing...



The use of UL91 is spreading and surely that's a good thing for the environmentally conscious out there. But it has been met with a lot of resistance since its introduction and one of the main reasons is education about the relatively new fuel and its availability.

Warter Aviation is the only producer of UL91 and see the product as the future of aviation flying. It believes that for the fuel to grow and become more popular there is a lot of education needed in aviation that will encourage more pilots to put it in their aircraft.

Warter has more than 40 years experience in refining Avgas and the supply companies such as Air B, Eni, Agip and many more. They also supply the fuels to the Red Bull Air Race world series, as well as delivering its aviation fuels to more than 88 countries world wide and are in the best position to research and develop UL91. Warter also has one of the most modern fuel testing, research and development facility in Europe. It produces and tests its fuels independently and they are never blended from half-made components. Warter claim it refines its fuels from scratch.

Warter started work on UL91 in 2010, after a need from the military; they needed an aviation fuel for their drones that wouldn't crystallise when they're flying high. The market also needed a solution for 100ll, especially Rotax engines – they don't like lead so

they needed an aviation fuel without lead.

WHY USE UL91?

There are plenty of benefits to using UL91 according to Kamil Skorupski, the company's CEO, "There is a big difference between UL91 and mogas," he said when he spoke to AOPA. "This is an aviation fuel, mogas is for cars, but general knowledge about the difference between those fuels is low. There is also confusion between the difference between MON and RON octane number. Aviation use MON and Mogas use RON."

Obviously the CEO of the only producer of UL91 is going to tub-thump his product, but a quick search on other fuel companies websites and they're quick to discourage pilots from using mogas. AirBP says: "Mogas is not a recognised or approved AirBP product. It is not approved for aviation use. Please take into account the dangers of using this product before flying..."

The reason for the concern over mogas is that it's not as regulated strictly. "You have no idea how much ethanol is in it. The problem with ethanol is that it absorbs water, which can create carb icing or vapour locks. I was speaking to pilots in Indonesia, a very hot, humid country. They fly with mogas and they say they experience a vapour more often than not," explained Skorupski.

LYCOMING ON BOARD

Micheal Craft, the Senior VP and General Manager



UL91 is available in drums for the private pilot

of Lycoming believes UL91 is a wise choice for many pilots. "Our 180hp, 360 engines are approved to run on many fuels including autogas, UL91 and 100ll. If I had a choice between the three fuels I would choose the UL91. It's unleaded, it will form less deposits in the engine, which will provide lower maintenance costs, and UL91 is an aviation grade fuel for the engine so it's very predictable."

Craft went on to say: "Mogas has a lot of variables, just look at the vapour pressure it varies from winter to summer, in hot and cold climates. There can be different percentages of ethanol, depending which country you're in and they can either be mandated or just suggested – and you don't really have the control on motor gasolines. Mogas has a very different shelf life compared to aviation fuel. Aviation gasolines are

designed to have a very long shelf life, mogas is designed for higher turnaround time and they don't always hold their properties for a long time period."

PROBLEMS

The scale of production between mogas and aviation fuels is staggering, the total amount of fuel produced by Warter in 12 months is the same amount produced by other brands in a single day. When compared to JetA1 the Avgas business all around the world is less than 1% of the JetA1 business so it's a really niche product.

Warter has also come across several hurdles in getting knowledge about the benefits of UL91 out to the general public and to aircraft owners. "Our main barriers to get pilots to use UL91 is price and availability," said Skorupski.

"A lot of airfields only have one filling station so

"Aviation fuels are designed to have a very long shelf life"

they use 100ll, but we are noticing a lot of airfields are buying UL91 in drums as are private owners for private use. For airfields it represents an initial investment for new stations, tanks etc. but the volume isn't that big, unlike 100ll."

If you're flying 50 hours per year you're paying 20p less per litre flying on mogas. At the end of the year, you're saving £400.

"The price for UL91 sits between 100ll and mogas, but the excise duty is more than mogas because it is an aviation fuel. Why should we pay more duty because it's an unleaded fuel? If we could get that amended then UL91 will be a very similar price to mogas. It's the perfect solution for a lot of countries, but if a company is producing 100ll they still need a completely separate installation to produce UL91, so it's a big investment," added Skorupski.



Visit Us At
AERO Friedrichshafen
Hall A5, Stand 100

Why sacrifice comfort for performance and durability?

The **DC ONE-X** features an Outlast® fabric head pad that virtually eliminates hot spots and keeps your head cool during long flights. And full size, leatherette ear seals that surround your ears with soft, memory foam for a perfect seal. It's built on a rugged, yet lightweight alloy suspension system.

At just 12.3 ounces, it's the lightest full-featured ANR headset in its class. But it's also one of the quietest. With Hybrid Electronic Noise-Cancelling technology for superior ANR performance. And **Bluetooth®** wireless technology for pairing with cell phones, tablets, MP3 players and other devices.

Comfort, performance and durability—the **DC ONE-X** sacrifices nothing...and gives you everything. Including a 30-day money back guarantee.



For more information and to purchase direct
from David Clark Company, visit:

www.flytheone.com



WWW.DAVIDCLARK.COM

© 2017 David Clark Company Incorporated
® Green headset domes are a David Clark registered trademark.



Clockwise from Left: UL91 can be used in a variety of aircraft; it can be delivered by Cistern Truck; or drums; to swap over will not break the bank for the aircraft owner

FUTURE

There does need to be a solution for the future of aviation. There needs to be an answer to leaded fuels. Michael Craft has stated, "The biggest movement in aviation fuels is the movement from leaded to unleaded so I anticipate the fuel UL100 type as well as the lower grades to continue. I think it'll be good for all consumers to see this unleaded avgas future so it's quite promising."

It's not a big problem to make a UL100 fuel, but there is a much bigger cost involved. The simplest way to put it is, in 100ll you have lead, if you take the lead out you have to add something to raise the octane number back up. The problem is that the 'something' that needs to be added can be worse than lead. "We've made UL100 here, it's just the question

of the certification, how to use and the costs. The components we have to use to bring that octane level up are really expensive, it makes it incomparable to 100LL," said Skorupski.

In the future the next step will be UL100. For now 70-80% of aircraft are able to use UL91, but high performance aircraft still need 100LL. "The use is growing in every country we ship to, even outside of Europe, including Indonesia and China. The biggest challenge we have is educating those guys. Some day in the future I think we will switch to one type of fuel like 100UL, but work still needs to be done," concluded Skorupski.

AWAY FROM AVIATION

Although Warter Aviation prides itself on being an aviation company, a new

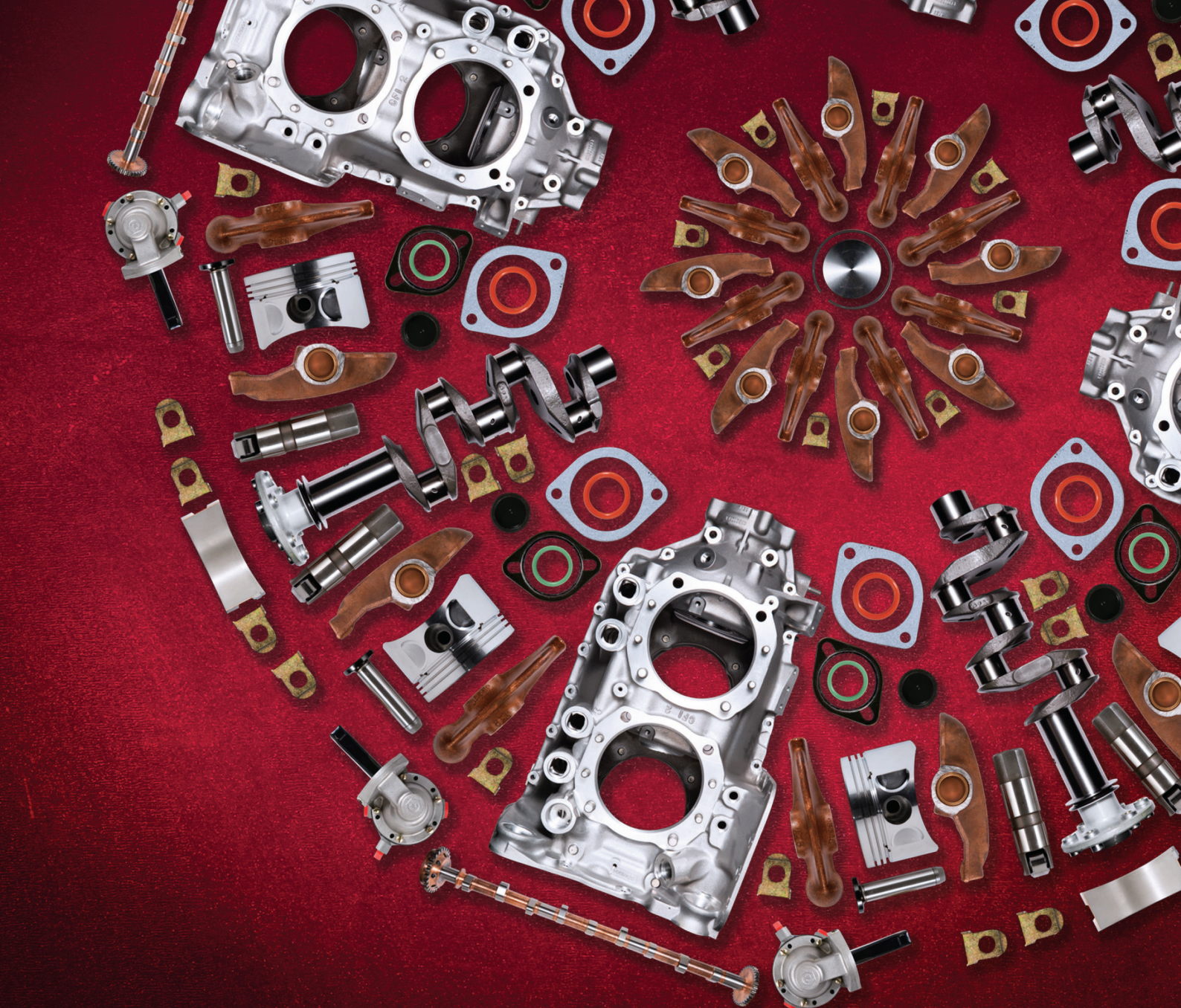
avenue has opened up for them and for the first time they are producing a non-aviation fuel. It's a gasoline for car racing.

The fuel is called Racing 102 and it has been designed for supercharged and naturally aspirated engines. It is a high octane fuel designed to fulfil many racing needs. It has been tested in all forms of racing such as the World Rally Championship and the S2000 series. Warter Racing 102 is FIA (Federation Internationale de l'Automobile) compliant.

It began as a pet project by the company's owner so he could use something in his high-performance cars and has grown to be used by motor racing teams across the world. Warter uses the same processes to ensure the company delivers high-quality fuels. ■

THE HISTORY OF WARTER AVIATION

In 1972 OBR was born, in Plock Poland and was producing military fuels for the USSR as well as aviation fuels for many countries around the globe. In 2000 OBR produced aviation gasoline and fuel additives for the GA market. In 2012 the name changed to the Warter Group, from the outset the company fast became an industry leader throughout Europe and today it supplies its products to 88 countries across the globe. The company produces many types of aviation fuels and can be delivered in any amount from an ISO container to a 45g drum.



WITHOUT GENUINE LYCOMING PARTS, IS IT EVEN A LYCOMING ENGINE?

CHOOSE INNOVATION, NOT IMITATION.

That's a question we ask ourselves here in the shop, where we've been making genuine Lycoming factory parts for piston engines since 1929. We engineer our parts for a precise fit, with exceptional wear characteristics that extend their life and time to TBO. It's our commitment to innovation that gives Lycoming parts—and, thus, Lycoming engines—their reputation for durability. Because an engine is the sum of its parts, and genuine Lycoming parts make all the difference.

Lycoming.com

VISIT US AT A3-115



WORDS David Rawlings IMAGES CubCrafters

The spirit of the Cub lives on

The Cub has been in the hearts and minds of pilots for many, many years. We go and look at CubCrafters – the people keeping the spirit of this iconic aircraft alive



The first incarnation of the Cub was launched by Piper back in 1938

(1920, if we count the Taylor E-2 Cub), it changed the world of aviation. It brought aviation to the masses and was seen as a vehicle to be used in the same way as thousands used their cars – to get from A-to-B. Who would've thought that more than three quarters of a century later it would still be one of the most popular aircraft still flying and also be in production.

Piper produced the Cub in one form or another until 1994. The baton is now firmly in the hands of CubCrafters based in Yakima, Washington USA with a dealership

network covering the whole of Europe.

ONE MAN'S DREAM

Owners of a CubCrafter's Cub have Jim Richmond to thank who in 1980 decided he wanted to rebuild and refurbish Super Cub's that had seen better days. After a trip to Alaska, Richmond noticed that the Super Cub was a bush pilot's dream and regarded as one of the best aircraft for the job. Right there and then Richmond took the brave decision to sell his home insulation business and switch to rebuilding Super Cubs thus CubCrafters was born.

From the beginning, Richmond's aim was to make

Super Cubs even better by restoring and repairing the stalwart aircraft. Richmond believed that the Super Cub had never been developed to reach its full potential in terms of performance. Richmond has always been an innovative engineer as well as an accomplished Airframe and Power Plant mechanic, he was constantly on the lookout for interesting modifications and refinements. This effort led him to developing a community of like-minded enthusiasts by publishing the Super Cub Newsletter and other activities.

Over the next two decades, CubCrafters evolved and developed STCs for improvements to the original

design. In 1999 Richmond's company began building PA-18 aircraft under the US's FAA's 'spare and surplus rule'. These aeroplanes were improved from the original Cub, they were stronger, safer and easier to fly.

In 2004 CubCrafters produced its first Type Certified aircraft, the Top Cub. The dream was to produce an aeroplane based on the shape and attributes of the Cub – that made it so popular – but using modern components and materials CubCrafters say: "The response from the aviation community was sensational."

It wasn't the instant success story they would've hoped. More recently,





From any angle the CubCrafters versions of the Cub are instantly recognisable

upon the creation of the Light Sport Aircraft class, the 100-horsepower Sport Cub was designed and built and then the 180hp Carbon Cub SS was introduced.

CubCrafters wanted to ensure the Carbon Cub was going to work and although it was based on the Super Cub it was a 'clean sheet' design. So the design team, with the help of CADs, came up with the engine configuration and the wing. The result was an engine half the weight of the original Cub, but producing 180hp. It also has a composite propeller and has new avionics. Although a full glass cockpit is a nice touch, it's not necessary in an aircraft like the new versions. Grzegorz Nowak is the Chief Test pilot at CubCrafters Europe, based in Poland. When talking to Nowak, he is more than just a mouthpiece for the company, he genuinely loves the new range of Cubs,

"Flying a Super Cub is considered by most pilots to be a pure joy"

but says to fly it well all you really need is "a speed indicator. It's so stable, easy to fly and a 'natural' aircraft that you really don't need the Garmin G3X."

When building the new generation of aircraft, CubCrafters knew that it had to keep the spirit of the original Super Cub alive. Flying a Super Cub is considered by most pilots to be a pure joy. The controls are light and well harmonised for an aircraft of this type.

The X-Cub, which is the Part 23 Certified version pictured, checks every box on an adventure pilot's wish list: remarkable STOL performance, generous useful load, class defining speed and cross-country range.

WHY THE CUB?

In one word: versatility. The X-Cub has been designed for off-airport operations with a powerful engine, strong

lightweight airframe and nimble low-speed manners.

The X-Cub and other variants have redefined expectations for backcountry aircraft. It has taken the fundamentally superior design of the Piper Super Cub and reinvented it using 21st Century materials and computer-aided design. Modern engineering results in the new Cubs having 50% fewer parts, and weighing 300 pounds less than a similarly equipped Super Cub.

It can take off and land in patches that you thought were accessible only to helicopters and hikers, all while being able to take the abuse of backcountry exploration. Kamil Skorupski of CubCrafters Europe feels that Europe has the ability for more bush flying and the CubCrafters range of aircraft are perfect machines to take on this challenge. "I've landed our demonstration aircraft

It is the hope of CubCrafters Europe that its aircraft will be used as a bush flyer in Europe



CARBON CUB EX-2 YOUR OWN ADVENTURE

CUBCRAFTERS
Europe



CUBCRAFTERS
Europe

www.cubcrafterseurope.com
12 C Beulah Buildings | Finisklin Road
Sligo | Ireland

Lukasz Gancarz - Sales and Marketing Director
Office +353 71 9180050 | Cell +353 879 591 431
lukasz@cubcrafterseurope.com

REFUEL YOUR EXPERIENCE

- ☑ AVGAS 100LL
- ☑ UL91
- ☑ SMOKE OIL

WARTER
aviation

www.warteraviation.com
office@warteraviation.com

Your safety comes first
Best Quality | Best Price | **Best AVGAS**



Clockwise from left: With 180hp the new Cub has a beast within, the wing profile is exactly the same as the Super Cub. Four inches more in the cabin provides exceptional pilot comfort

in my parents 150m garden. It's a fun aircraft that you can land where others can't go," he said.

WEIGHT WATCHERS

The Carbon Cub was the best selling LSA aircraft in 2012, which is a surprise as it's not the cheapest aircraft on the market, but like all Cubs, it talks to the hearts of pilots.

The fuselage is four inches wider than the original Cub but is lighter and stronger thanks to the new materials used in production, such as carbon fibre and aluminium.

The wing profile is exactly the same but vortex generators have been added to improve its STOL performance and make it

"It's not the cheapest aircraft on the market, but it talks to the hearts of pilots"

even more stable in flight.

The flaps are exactly the same as the original Super Cub, but the newest version, the EX2, will have modified flaps to make it more responsive and improve its roll rate. "In the US and Canada they use this aircraft like we, in Europe would use our car," explained Grzegorz Nowak. "For them it's practical because of the distances they travel. For us in Europe – it's for fun. A lot of people have flown old Piper Cubs, they love them and want to keep flying them."

Nowak went on to add "Weight is very important for the LSA category so they use lighter materials, even down to not painting the entire

fuselage. They paint only part of it and the leading edge of the wing."

So how does this new aircraft compare to the original Super Cub? According to those that fly it, it is obviously more powerful and more comfortable, but it's still a Super Cub. The biggest difference is the performance, Nowak said: "I've flown a 150hp Super Cub and although this is only 30hp more, it's very noticeable. With the power and the vortex generators on the wing, you can take off in a much shorter distance."

VARIANTS

The Carbon Cub is available in three variants: Carbon Cub

SS (production Light Sport Aircraft), Carbon Cub FX which is a Builder Assist E-AB aircraft, the Carbon Cub EX-2 and the X-Cub.

The performance figures speak for themselves as well. On a day in average conditions, X-Cub will climb out at 2,100fpm and pass through 10,000ft climbing at 1,100fpm.

A takeoff roll of just 60ft and landing roll of 53ft means it's perfect for bush flying and getting in and out of any airfield. And it has a cruise speed of between 105-115mph, depending on the tyres fitted.

Much like the original Cub it is inherently safe due to its slow stall speed. The fundamentally sound wing and vortex generators increase low-speed stability. It has been designed to generously exceed required loads. Real-world static

tests using lead weights and hydraulic pressure assure the strongest structure in this class of aircraft.

As of last year, to offer peace of mind to owners and another safety option, CubCrafters announced the ability to install a ballistic airframe parachute system from BRS. In May of 2016 they offered it as an optional extra and from late last year, the company announced that it would offer the system as a retrofit option to owners. "The super-strong chrome-moly steel cage surrounding occupants in the Sport Cub and Carbon Cub is best in class. The addition of a BRS systems airframe parachute to our fleet not only provides a proven life-saving technology, but also additional peace of mind for Carbon Cub pilots and passengers," said CubCrafters' President, Randy Lervold.

"Much like the original Cub it is inherently safe due to its slow stall speed"

SET UP

CubCrafters operates in a group of facilities on the edge of McAllister Field Airport in Washington. The company claims it's an idyllic spot for flying and testing its aeroplanes with big skies, punctuated on the Western horizon by the always snow-capped peaks of the Cascade mountain range. Around 290 days of sunshine also helps.

CubCrafters has more than 160 employees on hand to build the Carbon Cub. The process is a unique combination of the latest computer-aided design and fabrication with time-tested craftsmanship.

The entire facility is Part 21 certified by FAA, a requirement to produce Part 23 certified aircraft like Top Cub and X-Cub. It is the only manufacturer in America building Light Sport Aircraft (LSA) in an FAA Certified



STOL performance, generous useful load, class defining speed and cross-country range – what more could you want?

facility. Its factory houses all departments involved with the design, support and sales of the aeroplanes. They state that it is an indispensable part of what makes a CubCrafters aircraft so special.

FUTURE

CubCrafters Europe has managed to reintroduce a true bush flying spirit. "We have Carbon Cubs flying in the high-altitude environment in the Alps, cruising amongst Scandinavian fjords, British countryside, German grass strips, French highlands, skies of Poland and many, many more. Its goal in Europe is to bring the spirit of the Cub back to the GA community," said Skorupski.

The EX2 model, launched in 2016, is the owner-build version. The aircraft can be certified at 1320lb qualifying it as an LSA or it can be certified at 1865lb gross

weight offering a useful load of 900lbs. It can be fitted with Garmin's impressive Garmin G3X Touch flight display system, which offers all the bells and whistles, including Synthetic Vision, an AOA indicator, GTR G200 VHF Comm and the optional Garmin autopilot. This is far removed from the original Cub, but you can't avoid technology forever.

The FX build assist programme is now being offered in Europe. Those who would like to fly a homebuild but have no time, can order for it to be built at its facility.

The success of CubCrafters aircraft is something to behold and whatever comes next will certainly be exciting whilst keeping the ethos and spirit of the Super Cub. ■

You can see the CubCrafters aircraft at Aero Friedrichshafen on 05-08 April 2017 in Hall A5.

TECH SPEC XCUB

CERTIFICATION: FAA part 23
EMPTY WEIGHT: 1,216lbs
GROSS WEIGHT: 2,300lbs
USEFUL LOAD: 1,084lbs
LENGTH: 23ft 10in
WINGSPAN: 34ft 4in
CABIN WIDTH: 23ft 10in
CABIN HEIGHT: 34ft 4in
CARGO AREA: 23ft 10in
CREW: 2

POWERPLANT: Lycoming O-360-C1G 180 horsepower
PROPELLER: Hartzell Trailblazer constant speed, composite
CRUISE SPEED: 126kts at 75% power
MAXIMUM SPEED: 133kts in level flight
RANGE: 695kts



Let Total Fuel your Passion.



At Total we have been developing and marketing aviation fuels for over half a century. This is something we are very proud of and has ensured we are a leading provider of aviation fuels all over the world. Our professional teams have more than an interest in Aviation, they have a passion for it and they know how to make our products and services work for you wherever you are, however you fly. In the UK we manufacture, store and supply Jet A-1, Avgas 100LL and Avgas UL91 with our London based sales support team on hand to assist whenever you need them. We are able to support our customers with fuelling equipment, pay at pump machines, tanks and trucks as well as fuel quality training and financial services.

aviation@total.co.uk - www.total.co.uk/aviation



TOTAL



HAYWARD AVIATION

BECAUSE
WE KNOW
YOU'RE ONLY
HUMAN
HAYWARD
AVIATION

AVIATION INSURANCE BROKERS

+44 (0)20 7902 7800 | www.haywards.net





WORDS David Rawlings IMAGES Ian Marshall/Nigel Ish

INTRODUCING THE TRAINING CHAIRMAN

Ian Marshall has taken up the reins of the AOPA Training Committee

Ian Marshall is a vastly experienced pilot, instructor and all round thoroughly decent chap. He has just taken the Chair of the AOPA Training Committee, so we spoke to him about his love of flying and what he hopes to achieve in his new role.

Marshall has more than 17,000 hours of Air Transport, Flight Training, Air Taxi, Freight, and Aerial Work in his logbook. He has pioneered twin-engine aerial advertising, contract flying for the military, been an instructor since 1981, been named AOPA instructor of the year and even worked as a stunt

double for a Hollywood actress when piloting an aircraft in a film scene.

"I've had huge fun in my flying career, I've been an instructor since 1981 and I worked for the airlines for 25 years," he said when he spoke to AOPA Magazine.

His varied career so far, has included writing the book on twin-engine aerial

advertising, literally. "My colleague and I wrote all the documentation to get the CAA's approval to use multi-engine banner towing in the UK, so it could be flown over London," explained Marshall. "We did everything by the book to be approved. It was huge fun, there was no training available for

this, so we went down to Britten-Norman on the Isle of Wight. We put a banner up (the only one available was in Russian) and strung it across the airfield, then used a sky hook to pick it up. We sorted the technique out pretty quickly. I can only imagine what the residents of the Isle of Wight thought seeing this banner written in Russian being towed around the skies."

Marshall has also had fun working in the TV and film industry. "I was Jessica Lange's stunt double once. I was wearing a fetching little day dress over the top of my clothes," he said.

The film was *Sweet Dreams*, where Lange was playing the part of Patsy Cline. The film included a scene involving Cline's death in an aircraft accident. "It was a huge operation with two film

crews, three helicopters and two fixedwing aircraft," explained Marshall. "And we were up in Snowden crashing into the side of a mountain for two weeks, it was a lot of fun. Luckily there are no photos in the UK of me in drag, I've got a reputation to keep!"

One thing is clear, Marshall is a pilot's pilot and relishes all forms of flying. "I've been flying for the best part of 40 years and I'm not bored of it yet."

"I enjoy flying all aircraft, I adore gliding, but it doesn't adore me. I've flown so many aircraft and appreciate it all from the love of sport flying, or a long hop to Le Touquet for some lunch, but if my Euro Millions came in there would be a DC-3 parked at White Waltham."

These days, Marshall mainly works as an airline training consultant around

"I've been flying for the best part of 40 years and I'm not bored of it yet"

the world. He was asked to become Chair of the Training Committee recently, but already knows what he wants to achieve...

ROLE AS TRAINING CHAIR

"We need a new start in the training and instruction world. There are two sides to training; we have trainees and trainers, the Training Committee should represent both aspects. The point of the training committee is that you have some of the most experienced instructors in the land (I don't count myself in that list) and we have all this expertise, but we're slightly disconnected. If someone is having a problem with their training somewhere there should be a place for them to come to for wisdom."

"I want to have all the AOPA members feeling that they can refer any training



Clockwise from left: The Edgley Optica which Ian test flew, A Piper Grasshopper, coming into land at London City Airport and Ian flying a Robinson R22

matter to the Training Committee for a resolution, but on the other hand, the Training Committee should lead with information on the best way of teaching. We need to work with the CAA to get us back to the point where we're the natural point of reference for matters on training. And literally get that interface between our membership and the Training Committee. We need to come out with materials that people can use; I would also like to increase the membership of the committee so we have a wider representative of the AOPA membership."

"We really want to enthuse the entire thing and turn it into a dynamic force across the land that members will find useful when they're getting their licences and their ratings. From airline training all the way down."

"We really want to enthuse the whole thing and make it a dynamic force across the land"

"A lot of stuff we are taught when we become an instructor comes from a military background. Now this is absolutely fine for the military because potential pilots are screened within an inch of their lives before they commence their training. But our basic audience, those that want to learn to fly, are self-elected, if they have the money, they're in. So it's not as clear-cut as exercise one to 19 in a select order, and people's learning skills differ widely. The instructors role is to be able to take the basic material and convert it into a method and terminology that people can pick up and understand, and it's not always that easy. From the instruction point of view, Flight Instructors come out of their training and they've got the technical knowledge but learning the

instructing technique can be difficult and they've got nobody to get mentoring from. They should be able to come to us for help. Instructing is one thing, but dealing with the customer is another. The wide variety of trainees can range from the switched-on techno kid to the 50-60 year old that has always wanted to fly, they could have the patience, but not the knowledge to pick up on what you're talking about. There's also the social dynamic of someone in their 20s teaching someone in their 60s, how would they handle that situation?"

"We've never really addressed this in the instruction community before and it's always been a 'go along and work it out for yourself' attitude. We should start to leverage that collective knowledge for the greater good." ■



CENTENARY YEAR 1917-2017



History, fun, adventure and the warmest welcome in the UK

Open year-round to all light aircraft

- ➔ Licensed café
- ➔ Aircraft fuels
- ➔ Special events

- ➔ Flying training
- ➔ Hangarage and parking
- ➔ Aviation museum

www.oldsarumairfield.co.uk • info@oldsarumairfield.co.uk • 01722 322525

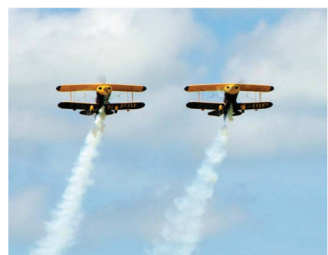
AeroExpo^{UK}

THE UK'S FESTIVAL OF AVIATION

1 - 3 June 2017

WYCOMBE
AIR PARK

— EGTB —



BOSE

BEA

HQ AVIATION Ltd

GARMIN

bookeraviation

ATAVIATION SALES LTD

HAYWARD AVIATION

TOTAL COMMITTED TO BETTER ENERGY

HAYWARD AVIATION

www.aeroexpo.co.uk



LIGHTSPEED PROMISES MORE COMFORT

The new Zulu 3 headset elevates an already iconic line to new levels

Product Zulu 3

Maker Lightspeed Aviation

Lightspeed Aviation has announced the launch of its new Zulu 3 ANR headset.

Much like any evolution, the new model builds on the performance and features that made the original Zulu and Zulu 2 popular choices for private and professional pilots but adds a number of enhancements that Lightspeed claims has resulted in improved comfort and durability.

The Zulu 3 benefits from new contoured ear seals, designed to hug the curve of the jaw and new cables built around a Kevlar core to boost strength and flexibility

while weighing less than the cables in earlier models (these cables are standard on other Lightspeed headsets such as the PFX).

For peace of mind, pilot Lightspeed offers the new Zulu 3 with a seven-year warranty, two years more protection than offered on other premium headsets.

While incorporating new enhancements, the Zulu 3 retains the familiar features that have made the previous models popular, including Bluetooth phone and music capability, Auto Shutoff and Streaming Quiet ANR.

The Zulu 3 also benefits from the durability and longevity of nearly 100% stainless steel and

magnesium construction, user-adjustable mic gain, and ear seals that, according to Lightspeed, deliver more comfort than their nearest competitor by offering 50% more space inside the cup and 20% more surface area. For those with a smaller cranium, a free taller head pad is also available with the newest headset.

"We've taken an iconic product that is trusted by

a large cross section of pilots around the world and made it even better," said Teresa De Mers, Executive Vice President of Sales and Marketing for Lightspeed Aviation. "Zulu 3 is the most comfortable, most durable headset Lightspeed has ever made," she added.

Zulu 3 is available with Dual GA, LEMO (panel powered) and U-174 (heli) connectors. ■

NEED TO KNOW

- ✦ Contoured ear seals designed to hug the curve of the jaw
- ✦ Seven-year warranty
- ✦ Kevlar-based cables that are stronger and lighter
- ✦ It's one of the most expensive headsets on the market

Where www.lightspeedaviation.com **Price** \$850 (£685)

THE ELITE

LONDON

London's most exclusive jet-set lifestyle event

11TH - 13TH MAY 2017

LONDON BIGGIN HILL AIRPORT



JET-SET
LIFESTYLE

Exclusively
SUPERCAR SHOWCASE

Exclusively
LUXURY BRAND SHOW

The
Marine
Showcase



Featuring over 150 luxury lifestyle brands

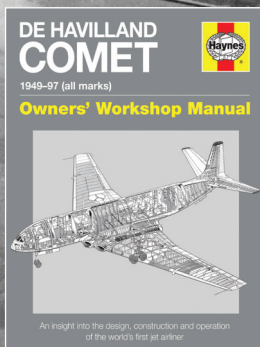
Luxury brands . Unique experiences . Exclusive location

LONDON
BIGGIN HILL
AIRPORT

www.theeliteevents.com/london

MEDIA PARTNER





THE COMPLETE COMET GUIDE

Haynes has done it again with the Owners Workshop Manual of the de Havilland Comet

Book De Havilland Comet
Author Brian Rivas

Haynes, the people famous for helping DIY specialists take apart cars and never put them back together again, has launched its latest owners' workshop manual – the de Havilland Comet.

Haynes believes that air travel as we know it today could look quite different if the world's first jet airliner, the beautiful de Havilland Comet, hadn't been conceived back in 1949. A symbol of Britain's technological prowess and its hopes for the future after the deprivations of the war years, its inaugural passenger-carrying flight in 1952 heralded a new era of luxurious air travel.

The de Havilland Comet's fascinating story of triumph and tragedy is captured

in Haynes' latest manual. The first classic airliner to receive the Haynes manual treatment, the de Havilland Comet Manual is written by Brian Rivas, a well-known aviation author and an authority on the de Havilland Aircraft Company.

It not only tracks the highs and lows of this iconic aircraft, but also explores how de Havilland held faith in its darkest hour, and in turn how the legacy of the Comet has lived on into the 21st century.

Charting the history of this much admired passenger

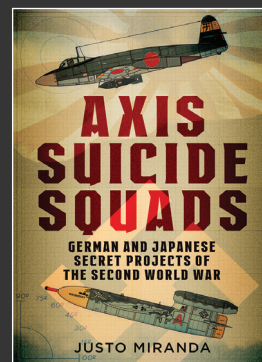
jet between 1949 and 1997, the manual examines the design and operation of the Comet in civil and military service, including its later development the Nimrod. It also offers a detailed close-up look at its construction as well as providing insights into the investigation of the fatal Comet crashes.

The manual also features over 250 high-quality archive photographs and technical drawings, and gives detailed coverage of all marks of the Comet, as well as its development into the Hawker Siddeley Nimrod. ■

NEED TO KNOW

- ✦ The full history of de Havilland's Comet, from its inaugural flight to its sad end. It also includes more than 250 photos.
- You might struggle to actually own a Comet to see if the manual is up to scratch!

Where www.haynes.com **Price** £22.99



INSIGHT INTO SECRET WWII PROJECTS

Book Axis Suicide Squads
Author Justo Miranda

Axis Suicide Squads is a compilation of previously unpublished German and Japanese secret projects of suicide aircraft that includes never-before-seen scale drawings of Axis piloted bombs with historical framework and performance for each model/variant.

Axis Suicide Squads: German and Japanese Secret Projects of the Second World War is gloriously illustrated and covers all known designs of Axis suicide and panic fighters.

Author, Justo Miranda is an aviation historian. The exciting discovery of microfilm on secret German weapons in the early 1990s is what has driven him to publish the books *Secret Wonder Weapons of the Third Reich*, *The Ultimate Piston Fighters of the Luftwaffe* and *The Ultimate Flying Wings of the Luftwaffe*.

Where fonthillmedia.com
Price £30

CLASSIFIED ADVERTISEMENTS

AIRCRAFT FOR SALE

GA 7 Cougar



1979 4 Seater. Twin Lycoming 0320 160HP engines. 4146 hours. Very well equipped with GNS 430 & 2nd Radio. Professionally maintained & in very good condition. Based Rochester, Kent. Price: £35,000.00. Tel: Ian Mason, 07973 242672 or ianm@london-marketing.com.

JUNGMANN AIRFRAME FOR SALE



1951 ex-Spanish Air Force C1131. In generally good condition, with wings off. Based west of London. £40,000 ono. Engine available separately.

CONTACT ROBERT EDMONDS
+44(0)1628 673392 rcsedmonds@btinternet.com



DHC-1 Chipmunk. G-BBMN. One owner since 'Demob' from Royal Air Force in 1977, in original colours. Military no: WD.359. Always hangared and CAA schedule maintained till 2016. Now completed under LAA schedule and all mods incorporated. Ready to fly away. Wings, ailerons & flaps re covered in Ceconite 1996. All engine hoses replaced, New batteries fitted 2016. AF 8449 hrs, TTE 1462 hrs as at April 2016. Situated Essex. UK. gipsymajor10@gmail.com or 0208 954 5080.



1987 BEECH BONANZA F33A

British Reg. Beautiful example maintained regardless of cost. TT since New: 1840, ET: 890 (October 2000), PROP: since Overhaul: 185 Jun 12, Annual/Arc due: New, Full logbook history from import-present day, Avionics installed. KMA24 Audio-Panel, GNS430Nav/Com/GPS, KX155A Nav/Com, KR87ADF, KMD540 Moving Map, TT31 Transponder, SPA400 Intercom, WX10A Stormscope, KN63 DME, KFC150 Autopilot + flight director KFC55 Compass System + HSI. Offers around £115,000 no VAT, private sale but PX considered. Contact : Tel: 0771196070. email: aircraft48@yahoo.co.uk



G-JAKI, 1995 MOONEY M20R

1468h TT, 154h SMOH, 12h PROP, 180kts, 280hp TCM IO-550-G, speed brakes, full IFR panel with Garmin 530 and Sandel 3308 EFIS, KFC-150 flight director, KX-165, KN-62A DME, KR-87 ADF, KT-73 mode S transponder. Shadin fuel computer, Insight GEM-602 engine monitor and SF-2000 Strikefinder. Wingtip recognition lights and electric standby vacuum pump. Fresh annual August/16. VAT paid. Further details available from David Abrahamson, email david@cs.tcd.ie or telephone +353 1 896 1716.

Derrick Ings Aircraft Sales

offer a professional, friendly & individually tailored service to both business & private clients to suit your specific requirements & budget



ROBIN HR100/200B ROYALE

4-seat single. (1971 but refurbished in 2005)

TTAF 2622 Hrs. Engine 191 Hrs SOH in 2007. Propeller 47 Hrs, last overhauled in 2012. Stunning looking aircraft
See full spec at www.derrickings.com
GBP£39,950 NO VAT.



FOURNIER RF6B-100

Aerobatic two-seater. (1976)

A fun aircraft that was the first production RF6B-100 and was flown by Fournier himself. TTAF&E 2150. 296 Hrs STO in New Hoffmann wooden prop May/2016. Microair 760 COM, King KT76A Transponder. Hangared. Currently G-BOLC, formerly F-BVKS. GBP£14,950 NO VAT

CHECK WEB SITE FOR LATEST LISTING - WHICH CAN CHANGE AT SHORT NOTICE - IF YOU ARE A SELLER - DON'T FORGET TO CHECK THE WANTED PAGE ON THE WEB SITE.

For further information contact:

DERRICK INGS AIRCRAFT SALES

PO Box 1559, Gillingham, Dorset, SP8 4WB, UK.
Tel: +44 (0)1747 825378 Mobile: +44 7836 708564
Email: sales@derrickings.com

www.derrickings.com

CLASSIFIED ADVERTISEMENTS

PA23 APACHE

...with GERONIMO CONVERSION

FOR SALE



A fine example of PA23 Conversion based at Thruxton (EGHO).

Full details are available at www.warrenarmstrong.co.uk



DRUINE TURBULENT G-BUKH (£6500)

Build 1994 by RAF Engineer. VW 1600 cc with Leburg Electronic Ignition. EVRA Z3405 Propeller. Airframe 329 hours. Max weight 620 lbs. Empty weight 419 lbs. Hangared Pent Farm nr Folkestone Kent

CONTACT

afc.tulips7@gmail.com



PIPER PA-28R-201 ARROW

Registration: G-OTGA. Serial Number: 28R-7837281. ARC Expiry: 15-09-17. Annual due: 14-09-17. Airframe: 5023. Engine: 486 hours (Overhauled 07-05-10). Propeller: 3 Blade Hartzell HC-C3YR-1RF/F7282 (Overhauled 14-07-15). KING KX155 NAV/COM. KING KR87 ADF. KING KT76A TRANSPONDER. KING KN64 DME. Based: Lydd. £55,000 PLUS VAT (Reasonable offers considered)

CONTACT SUE GIRDLER

01843 823656/07511526529 sue@tgaviation.com www.tgaviation.com



MOROVAN ZLIN 526 MASTER TRENNER FOR SALE £61,500

Built 1969 (Serial No 1082) TTAF 1418. Walter Minor 6 cylinder 160hp, 260 SMOH in 1995. Prop 1.0 SMOH in 2016. Garmin GTX 328 transponder, new Icom A220T radio. Retractable gear. Price includes Garmin Aera 500 GPS, canopy cover and tow bar. Averages 32 ltrs/hour at 2100 rpm. May use 100LL or UL91 fuel. One of the nicest examples of this beautiful historic aircraft.

CONTACT

David Cowden - david74cowden@gmail.com 01892 771310



AA5 Traveler

G-BBDM – AA5 Traveler 1/4 Share £3,500 £110 pcm and £80 per tacho hour (wet). Excellent availability - internet booking. Four seater, full IMC fit - Based Thruxton (EGHO). Contact: Tony Harris (0777 5504526 or anthonywharris@hotmail.com)

AIRCRAFT FOR SHARE



1/8TH SHARE IN TECNAM P2002JF (SIERRA) BASED AT BRIMPTON, BERKSHIRE.

G-TECI is an EASA certified real fun-to-fly 2 seat aircraft, capable of cruising at 100kt using only 15L per hour, which makes it cheap to operate and a real pleasure to fly.

The aircraft is powered by the Rotax 912S engine. She is fully certified to operate on AVGAS or MOGAS and you can even mix the two so that fuel at your destination is never a problem. The aircraft has an analogue panel plus Garmin 430 with built-in terrain warning, a Garmin 328 Mode S transponder and a Garmin intercom. It is already 8.33kHz capable. The Tecnam P2002JF is also authorised for flight training. The STOL and grass performance is very good and handles the relatively short 520m runway at Brimpton with ease even at full load.

TECI is comfortable and has enough luggage space for long trips.

I have flown her to Munich and to Scotland.

If you want a cheap to operate yet modern aircraft which can operate easily from short grass runways, this is the only aircraft to consider. Come and join this friendly and well run group and enjoy the good mix of social and group flying opportunities from Brimpton.

£9250 for an eighth share, £35/hour wet and £60 per month.

Please contact Bob Darby on 07951 206215.

bobdarby@hotmail.co.uk

N747MM DENHAM (1/5 SHARE)



£4000 plus costs renewing N reg Trust, £170/month and £90/hour wet

- Airframe 5768hrs - Engine TSN 4193hrs, TSO 1950 hrs (we have an engine fund)
- Cruise at 130-135kts true at FL090 - Fully IFR equipped - Bendix/King KLN89B IFR GPS - Garmin GTX330 Mode S transponder - Piper Autocontrol III autopilot (tracks heading, VOR, LOC, GPS) - Digital CHT monitor/Fuel flow computer

A friendly and well established 5 person group based at Denham is looking for a 5th member to join them.

PLEASE CONTACT andrewflyboy1@aol.com or 07956 282 940

CLASSIFIED ADVERTISEMENTS

AIRCRAFT FOR SHARE

PROBABLY THE BEST CESSNA FOR SALE IN EUROPE!



1984 CESSNA GOLDEN EAGLE 421

• Registration: G-JACK • Serial: 1411 • Total hours: 2274 • Price: £298,000

One of the last 421s built, original Cessna interior, cabin dividers, 2 stowable writing tables, flushing toilet, 7 belted seats, bare metal repaint 2004, excellent condition, always hangared.

CONTACT STEVE BORROWDALE

steve.borrowdale@multiflight.com or telephone 0113 238 7100



MESSERSCHMIT BOLKOW MONSUN 209

Semi aerobatic 2 seat tourer based at Biggin Hill. 160hp engine approx 700 hrs Prop 375 hrs. Constant speed prop & retractable nose wheel. Good avionics with Mode S & new Trig 8.33 radio. Always hangared. Good availability.

£100 PM £125 PH WET. OFFERED AT £2500.00

Contact Gary 07785340368 or papaechogroup@gmail.com

LIBERTY XL2

Shares Available for Biggin Hill based touring aircraft

20% shares in this very comfortable 2-seat aeroplane are currently available at £10,000. (Reasonable offers for outright purchase will also be considered.) N518XL is hangared, and is equipped with complete IFR fit (Garmin 530, 2nd nav/comm, Mode S transponder, DME & 2nd Altimeter). The Liberty XL2 offers FADEC engine control and a 115 kias cruise at 6.0 US galls/hr. Current costs: £160/month and £80/ hr wet. Further details and demo flight available on request. FAA licence required for flights outside UK. (With a JAA/ EASA licence, acquiring an FAA licence is possible without a skill test or exams.) Trial period possible. Ideal candidate will have 200+ hrs. Contact Bill Roberts: 0207 564 5461, williameroberts2@aol.co.uk.



1/3 SHARE AVAILABLE IN A VAT PAID CIRRUS SR22G2 2004. LOADED WITH OPTIONS! £55,000

Based at Fairoaks Airfield. Dual Garmin GTN 650's (touchscreen), MLX770 satellite datalink, Fully IFR equipped, Fresh Annual (Jan 2016). Well established group including engine fund
Aircraft Stats: Serial Number 0977, 1675 TTSN. Brand new engine and propeller in March 2013. 245 hours on new engine/prop at annual Jan '16
Extras: DME & NDB, TKS ice protection - Leading Edge Protectant, H.I.D. landing light, Semi-portable oxygen system for 4, 3* Bose Aviation-X headsets, 4* lifejackets, Liferaft. If you'd like to find out more, please contact Ben: 07789625099 benlakin@lahitere.com or benlakin2@lahitere.com.



FOR SALE - 1/6 SHARE ARROW2 200R CONINGTON, PETERBOROUGH - VERY FRIENDLY PA28 GROUP

1976 G-GDOG. Well maintained and professionally cleaned every quarter. 125kt cruise. Annual Feb 2017. TT 3850hrs Engine 1600hrs (Top end overhaul, new cylinders and heads 2011). Prop 350hrs since last o/haul (2011). All ADs up to date.

Garmin Mode-S GTX328; Garmin GNC300 COM1/GPS;
King KX170 COM2; ADF (RBI + RMI);
King KNS80 RNAV; HSI; Century II Autopilot; EDM700 engine/fuel management.

Cambrai aircraft cover; Rear seat headsets; PLB; Engine Fund.

1/6 share £7000. Monthly £80. £110ph wet.

Contact: **Chris Curtis** 07703 558174 **Roger Clemo** 07952 634652
chriscurtis27@btinternet.com or roger@camsaps.co.uk

CLASSIFIED ADVERTISEMENTS

INSURANCE

Aircraft Insurance Are you paying too much?

Visicover is a unique service that lets you buy and manage your aeroplane or helicopter insurance online whenever it suits you.

- Get an instant quote online
- Spread your premiums for free
- Select the cover you want
- 24-Hour claims hotline service

To find out more go to Visicover.com

Visicover

Authorised and regulated by the Financial Conduct Authority



life cover for pilots

Without specialist advice pilots can often face expensive premium loadings when applying for life cover.

We can usually secure standard rates with no aviation exclusions.

- Life assurance for your family, mortgage or business
- We help recreational, commercial, instructor and student pilots
- Cover can be arranged over the phone
- Our insurance advisor holds a PPL
- Online discounted quotes

stein pilot insurance



01793 491888
www.flyingcover.co.uk



TRAINING

Cubair

FLIGHT TRAINING
Redhill Aerodrome
Large Varied Fleet
PPL, IMC, Night, Tailwheel
& Aerobatics



Tel: 01737 822 124
email: ops@cubair.co.uk
www.cubair.co.uk

TECHNICAL

Planeweighs Limited

Aircraft weighing & technical services

PIPER CUB to BOEING 747
Load/Trim sheet design
CAA approval A1/8538/79

Engineers throughout the UK

Tel: 44+ (0) 1792 310566 Fax 310584
Mobile: 07798 662 939

email: info@planeweighs.com
www.planeweighs.com

OTHER

Cambrai Covers

Specialist Covers Since 1979

www.cambraicovers.com

Cambrai Covers
- Home and Dry

- Reduce Aircraft Deterioration
- Reduce Pre-Flight Time
- Improve Engine Starting
- Reduce Maintenance Costs
- 400 Patterns in Stock!



email: info@cambraicovers.com

+44 (0)1377 267426

LIVE THE DREAM!



Secluded contemporary designed large 3/4 bedroom house on Atlantic Air Park Lucon, France, for sale. Large Hangar DA42/PA46 or similar, adjacent to taxiway and 760m tarmac runway. Garage and swimming pool with mature gardens. For further details contact: www.atlanticairpark.com.



3 BEDROOM HOUSE WITH HANGER on

Atlantic Air Park in the Vendee area of France

450,000€

Traditional style 3 bedroom house located just inside the entrance of the Air Park with beautiful views of the runway and surrounding countryside.
Plot size 3040m2, area of building including hangar 260m2.

SOLD FURNISHED



ENQUIRIES TO: TREVOR HOUGHTON

Email: newbarn_flier@hotmail.com

Tel: +441474 706470 Mobile: +44 7867803108

CLASSIFIED ENQUIRIES

Please contact **Charlotte Pulham** with any queries you may have - charlotte@aopa.co.uk
+44(0)1487 830 105 or +44(0)7583 140 127

MENDELSSOHN

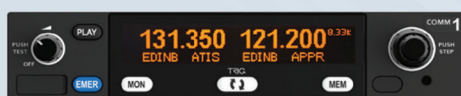
THE UK & EUROPE'S AVIONICS SUPPLIER

2018 8.33kHz COMPLIANT RADIOS



Garmin GTR 225A VHF Transceiver w/8.33

Offering a variety of original features never seen before in a stand-alone COM radio, bringing new efficiencies to cockpit radio management.



Trig TY96 Slimline VHF Radio

A new standard in 8.33 kHz radio design. Combining great quality and performance each radio is housed within a superbly engineered unit, slim-line and light. A certified 10 Watt radio, designed for general aviation and light sport applications.



Icom IC-A220 VHF Air Band Transceiver

Operating information is clearly shown on the OLED display, providing higher contrast, wider viewing angle of almost 180 degrees and faster response time than a conventional LCD.



Becker AR6201

This VHF Transceiver is smaller and lighter, due to implementation of DSP, offering state of the art technology, compact dimensions, and low weight.



Trig TY91

The Trig TY91 takes up minimal space and weight. The innovative use of a control head and separate radio hardware unit provides more installation options, especially when space is at a premium.



Funke ATR833 OLED

The Funke ATR833 OLED is a complete solution for radios in small aircraft with the new channel separation of 8.33 kHz.



Dittel Avionik KRT2 VHF Transceiver

The newly developed 8.33 kHz radio. The entire electronic system is largely digitized, ensuring high frequency stability and channel separation under all circumstances.

Visit our website to see our full and comprehensive supplies of aviation products

GPS.CO.UK

+44 (0) 131 447 7777

Suppliers of all leading manufacturers

BOSE

LIGHTSPEED

rc allen
instruments

ICOM

GARMIN

BendixKing

DYNON AVIONICS

David Clark

DITTEL AVIONIX

f.un.k.e.

AVMAP
SATELLITE NAVIGATION

TRIG

Bad Elf