# CluedUp

SPRING/SUMMER 2015

Civil Aviation Authority

**SAFETY MATTERS** FOR GA PILOTS

INSIDE


➔ ***WEATHER TRAPS***
Tips from a flying met man

➔ ***FUEL'S GOLD***
But how much is 'enough'?

➔ ***CHANGES IN THE AIR***
What SERA means to you


# *Who's out there?*

## Digital traffic warnings for GA

***PLUS*** / *KEEPING UP YOUR SKILL-SET* / ***SEMI-CIRCULAR RULES*** / *VISIT THE MILITARY* / ***INCIDENT REPORTS***


## COCKPIT B50
THE ULTIMATE **PILOT'S** INSTRUMENT

Aviation enters a new era with a multifunction chronograph delivering unprecedented performance. At the heart of this high-tech feat beats a (COSC) chronometer-certified SuperQuartz™ movement specially developed by Breitling for aviation. Equipped with a sturdy and light titanium case, the Cockpit B50 innovates with its huge range of functions, extreme user friendliness, rechargeable battery and an ultra-legible high-intensity display mode. Reliable, accurate, efficient: the ultimate pilot's instrument.

BREITLING
1884

BREITLING.COM

INSTRUMENTS FOR PROFESSIONALS™

# GOING DIGITAL

**Welcome to the new edition of *Clued Up*. For the benefit of new readers, the magazine aims to bring all the latest news, views and safety advice to recreational pilots in a short, easy to read way. Regular readers may have noticed that they have not received a copy of this edition in the post as usual. Well, we have made the difficult decision to discontinue the postal distribution in favour of an improved electronic format. We will, of course, still print paper copies for those who prefer a 'hard copy' magazine – these will be made available at flying clubs around the country and at GA events throughout the year.**

Ultimately, though, we want to concentrate on bringing you an interactive electronic product that you can access on your phones and tablets wherever you are. Same content, different format – watch this space for more!

In the following pages, you can read all about the latest research into the benefits of electronic conspicuity – or why you should be using a transponder. We also look at the importance of 'life-long learning' and assess what each of the general aviation associations provide by way of training programmes for qualified private pilots.

Meanwhile, bird lovers are well catered for as Caroline Carr from Natural England explains how to recognise and, hopefully, avoid flying over bird sanctuaries and habitats. Met Office forecaster and private pilot Derrick Ryall shares his weather-related hints and tips and gives details of an exciting new free online service for general aviation. Also, an airspace specialist from the CAA brings you everything you need to know on the Standardised European Rules of the Air, otherwise known as SERA, which have now taken effect.

With articles on the importance of good fuel management and the latest from Europe on improvements in helicopter safety as well as the usual news round-up and incident reports, this edition should have enough to keep you going during what will hopefully be your relatively short time on the ground this summer flying season.

Happy flying!

**Tony Rapson**
Head of the General Aviation Unit,
Civil Aviation Authority

> We want to concentrate on bringing you an interactive electronic product

An electronic version of this magazine is available at **archantdialogue.co.uk/cluedup**
To keep up to date on all airspace safety issues, follow **@airspacesafety** on Twitter.
CAA Flight Operations Inspectorate (General Aviation), Safety Regulation Group, CAA, Aviation House, Gatwick Airport South, West Sussex RH6 0YR ***caa.co.uk***

# / CONTENTS

SAFETY MATTERS FOR GA PILOTS

**Cover photo**
Keith Wilson



**Free distribution**
***Clued Up*** is distributed widely free across the UK and at selected GA events during 2015.



dialogue

ARCHANT Archant Dialogue is part of Archant Community Media

**Publisher**
Archant Dialogue, Prospect House, Rouen Road, Norwich NR1 1RE

**Tel:** 01603 664242 **Fax:** 01603 627823
**Email:** mail@archantdialogue.co.uk
**Web:** www.archantdialogue.co.uk

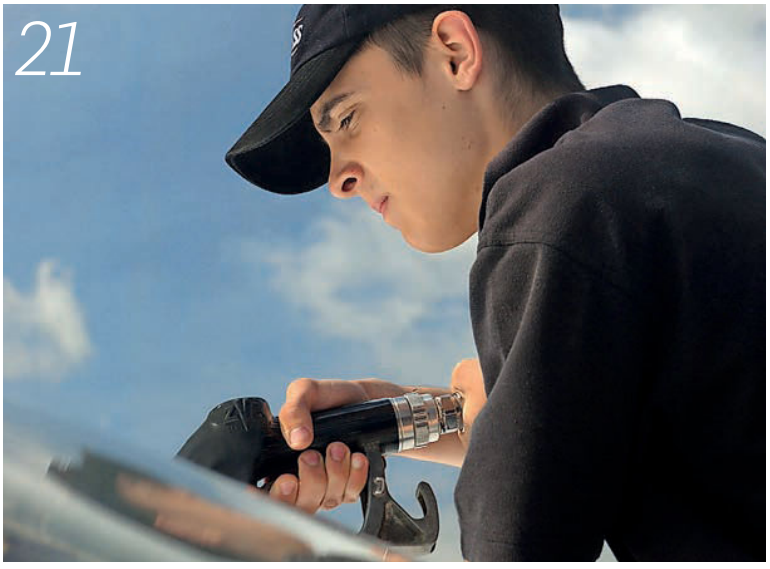
**Consultant Editor** Nick Wall
**Production Editor** Mike Waters
**Art editor** Craig Pearce
**Designer** Matt Copland
**Account Director** Katherine Berryman
**Finance Director** Jamie Kent
**Editorial Director** Jonathan Arnold
**Advertising Sales Director** Sam Overton
**Publishing Director** Zoë Francis-Cox
**Managing Director** Gavin Miller

**Advertising contact**
**Estelle Scott**
**Sales** 01603 772608
estelle.scott@archantdialogue.co.uk

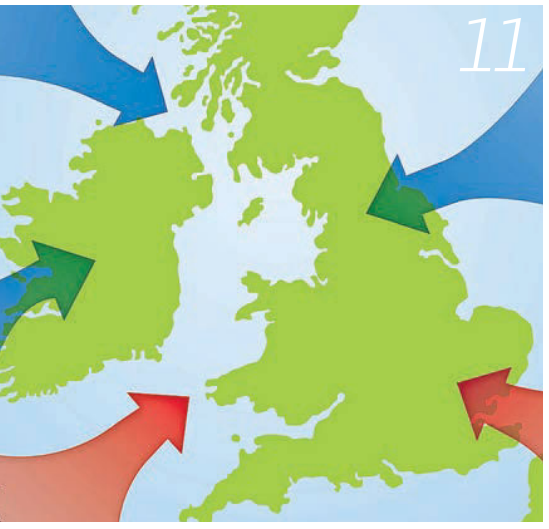
**Corporate Communications Department**
**CAA**

CAA House,
45-49 Kingsway,
London,
WC2B 6TE

**FOR FURTHER INFORMATION, PLEASE VISIT: *caa.co.uk***


PICTURE: RSPB



# What's inside...

***Clued Up*** magazine brings you the latest news in aviation safety, topical issues, advice and contribution from pilots, air traffic controllers and safety experts from across the UK's General Aviation community



07 **News**
New way to regain your 90-day currency; can you use forecourt fuel?; warnings over taking flying 'selfies'; easier met on your phone; weight relief for microlights and wind turbine 'wake encounters'

11 **Weather to fly**
A flying met man looks at summer weather issues and traps to watch out for

18 **Changes ahead**
What you need to know about Europe's new Rules of the Air and how they might affect us

21 **Fuelled-up**
Have you got enough and is it in the right place? Advice about fuel management in the real world

24 **Goodbye quadrantals**
Many GA pilots rarely used them, but now they have gone in favour of semi-circulars

26 **Traffic warnings**
Low-power, low-cost trials that tell pilots where airborne threats might be coming from

32 **One for the birds...**
Why bird sanctuaries should be just that – research shows that over-flying can be a real issue

50 **Helicopter safety**
Misjudgements and pilot error cause many accidents. Now there's work afoot to help...


A pilot who always waits for perfect conditions will find themselves frequently grounded – p13


FTEJerez
Flight Training Europe
LET US BRING OUT
THE BEST IN YOU
www.ftejerez.com
info@ftejerez.com - Tel. +34 956 317 800
www.facebook.com/ftejerez
BRITISH AIRWAYS
BA CITYFLYER
Aer Lingus
Emirates
flybe.
LOGANAIR
Thomson Airways
vueling
Thomas Cook
QATAR AIRWAYS
MEA
VOLOTEA
AFRIQIYAH
OMAN AIR
CITYJET
air astana

PICTURES BY KEITH WILSON/SFB PHOTOGRAPHIC

# New way to gain 90-day currency

**PILOTS WITH EITHER** a UK PPL (not an EASA one) or an NPPL who find themselves past 90 days without the required three take-offs and landings have a new way to regain their currency.

They can now fly as pilot in command with a single passenger, provided that the passenger is a suitably qualified pilot. To use the exemption, the pilot must:

- Be satisfied that the passenger is qualified to act as pilot in command on the intended flight, but that they understand that they are onboard only as a passenger.
- In order for a pilot to use the flight to regain currency, they must be the pilot in command for the flight. The pilot and passenger should be clear on this prior to the flight.
- Inform the intended passenger that they do not have the recency which, without this exemption, would be required to fly with a passenger.

Providing these criteria are met the exemption provides automatic approval with no need for any application to the CAA. Details of the full exemption are available on the CAA website at *caa.co.uk/ga*.

# 'Fill her up'... with the right fuel

**EVERYONE WANTS TO** reduce fuel bills and eyeing up different types of fuel or supplies can be one solution, but what can and can't be used might cause some confusion.

To help to clarify the options on fuel, including the use of petrol from a petrol station if it is approved for a particular aircraft, a webpage has been set up to provide guidance.

Its advice states that any type of fuel may be used in an aircraft providing that it meets the specification set out in the aircraft's approval documents and any operational limitations.

The guidance can be found on the CAA's website under Airworthiness, along with the responsibilities of aircraft and airfield operators in storing fuel and ensuring that it is of the correct specification.

# Forget your selfie

**CONCERNS ARE INCREASING** around pilots taking 'selfies' during critical phases of flight.

It has become more of an issue because pilots are trying to outdo each other on online forums with ever-more 'interesting' and exciting photos and videos. This has partly been fuelled by the growth in attachment devices and 'selfie sticks' being used to produce 'exciting' camera angles.

Worries are growing that a minority might take it too far and find themselves in a bad situation caused either by a camera coming off and endangering the aircraft or in an accident caused by lack of attention on flying.

While there hasn't been a direct example in the UK just yet, an NTSB report attributed a Cessna 150 crash (and two fatalities) to the pilot taking 'selfies' on his mobile. He had mounted a video camera on the windshield facing into the cockpit and it had recorded footage of him taking 'selfies' on his phone.

"Contributing to the accident was the pilot's distraction due to his cellphone use while manoeuvering at low altitude," the NTSB said.

The video camera did not capture the actual flight that resulted in the crash but the pilot and some of his passengers were seen taking pictures on their mobile phones and the pilot was texting on his phone in recordings of previous flights that day, the NTSB report said.

TO KEEP UP TO DATE WITH CAA NEWS, GO TO *CAA.CO.UK* OR FOLLOW US ON *TWITTER.COM/UK_CAA*

# No more five-year weight checks

**OWNERS OF MICROLIGHTS** no longer need to re-weigh their aircraft every five years.

The change follows a joint proposal made by the British Microlight Aircraft Association (BMAA) and the Light Aircraft Association (LAA).

The original rule to re-weigh every five years was introduced in the 1990s, but the CAA's GA Unit has decided that re-weighing is not necessary because all of the existing microlight manufacturers have confirmed that they now weigh every microlight coming out of their factories during initial production.

The CAA is working with the BMAA and LAA to agree an alternative policy for re-weighing microlights, so we should expect to see something new on this in the coming year. This will no doubt include a solution for those microlights that currently exceed the maximum empty weight limit.

# VOR, DME, ADF no longer must-haves for IFR

**GA AIRCRAFT FLYING** under Instrument Flight Rules (IFR) no longer need to have VOR, DME or ADF instruments fitted. However, they must be carried when the route or choice of airfields demand them.

Pilots taking advantage of this change need to ensure they still have a backup system of navigation should their primary system fail.

The rule change refers directly to a Red Tape Challenge posed by pilots last year saying that the CAA should: "Align national navigational equipage carriage requirements (Schedule 5 of the Air Navigation Order) for GA operators with those of the European Aviation Safety Agency's Part-NCO as soon as possible, limiting any 'airspace requirements' to performance-based navigation specifications."

The change doesn't affect requirements to have a radio and transponder in certain airspace or any other stipulations such as performance-based navigation requirements.

# Cardiff signs up to Strasser Scheme

**CARDIFF AIRPORT HAS** announced it has signed up to the Strasser Scheme.

It has taken Strasser nearly 17 years to get 207 UK Civil and Military airfields to participate and waive fees for genuine emergency and precautionary weather diversions.

The Scheme is a British initiative by Charles Strasser, a Vice-President of AOPA, which was set up so that pilots can make a timely precautionary weather diversion to an airport without having to worry about the potential cost of landing there. It has undoubtedly prevented pilots from 'pressing on' and instead make the right decision to land at the nearest airfield.

# Southend airspace cut for transits

**A CONTROL ZONE** (CTR) from the surface up to 3,500ft, and a larger control area (CTA) from 1,500ft to 3,500ft, has been put in place around London Southend Airport, but it will be Class D to allow GA aircraft to transit on request.

Some kind of measure was deemed necessary to enhance protection for commercial flights into and out of the airport but, while the extent of the controlled airspace requested originally was much higher, it was considered to be important that GA could still operate through the area.

The number of airprox incidents in the vicinity of the airport has increased in recent years – including two category A incidents (the most serious kind).

Alternatives to controlled airspace were looked at, such as establishing a Radio Mandatory Zone (RMZ), but a trial RMZ running since the second half of 2014 did not prove to be an appropriate long-term solution in this instance.

"The new arrangements at Southend will safely support the airport's increased commercial air transport operations, while minimising as far as possible the impact on other airspace users," said Mark Swan, Director of the CAA's Safety and Airspace Regulation Group.

The new airspace will be reviewed after six months (in September 2015) to ensure that it is working as anticipated.

# New squawk codes at Glasgow/Bristol

**PILOTS PLANNING TO** fly within 40nm of Glasgow can now squawk 2620 and monitor 119.1MHz on their radio.

The permanent 'listening out squawk' for Glasgow started on 2 April 2015 and is the 12th such code in operation.

Bristol also has a listening out squawk code of 5077; the radio frequency to monitor will be 125.650MHz. It is recommended that pilots flying anywhere within the vicinity of Bristol Airport use the code.

**TO KEEP UP TO DATE WITH CAA NEWS, GO TO *CAA.CO.UK* OR FOLLOW US ON *TWITTER.COM/UK_CAA***

# Fresh met – in your hands

**GETTING THE MET** on your phone or tablet is about to become easier with the launch of a new mobile-enabled service by the Met Office.

The new site will make information much easier to access, provide a wealth of content and specifically benefit pilots who might not live close to their take-off location – allowing them to check the latest weather information just before take-off.

The updated site, due to be officially released in June, forms a key part of the Met Office's mandate to provide accurate weather information to private pilots for pre-flight planning.

The Met Office has taken on board feedback from pilots to ensure the new site has all the functionality required. Key enhancements include the ability to view the last five Metars (allowing pilots to have an increased understanding of weather context and historic conditions) as well as save preferences to make it even easier to access information quickly. There is both a free and paid-for premium service available.

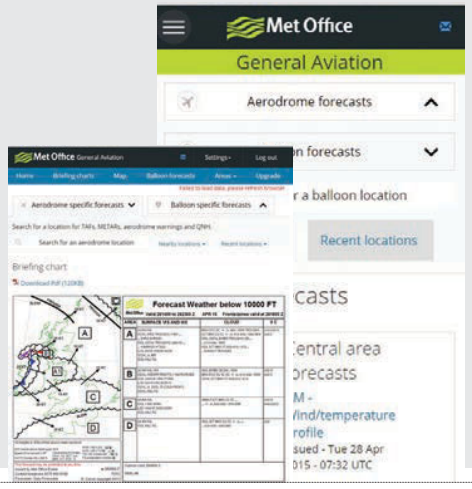
**Additional content provided by the premium product includes:**

- 'Near Europe' TAF and METAR bulletins
- Additional UK TAF and METAR bulletins
- 'Near Europe' SIGMETs
- 120-hour synoptic forecast
- UK high resolution rainfall radar
- 'Near Europe' rainfall radar
- European satellite coverage
- High resolution model precipitation type, cloud and visibility layers
- No advertising and sponsorship

In addition, the Met Office is changing its aerodrome warnings service, including freely accessible warnings for private pilots for the first time.

"The enhanced service brings together all the pre-flight weather information needed by UK pilots – all accessible through one, trusted source which uses up-to-date forecasts provided by our skilled meteorologists, high resolution model data and observations," said Jon Croome, Product Development Manager from the Met Office.

"It will provide the most comprehensive UK aviation weather source available for pilots, and will offer large benefits in terms of ease of use and access to the most up-to-the-minute information."




# Watch out for summer airspace snags

**WITH THE SUMMER** weather looming, there will be a number of airspace restrictions and some of the main ones are listed below. Full details can be found on the AIS website at *www.ais.org.uk*. Don't forget about airspace restrictions around the Red Arrows' summer displays too. Details of these are also available on the AIS website.

Restriction of flying regulations apply to: **RAF Cosford**, 12-14 June; **Stonehenge**, 20-21 June; **Glastonbury Festival**, 22-29 June; **National Armed Forces Day** (Guildford), 27 June; **Wimbledon Lawn Tennis Championships**, 29 June-12 July; **Jet Formation Display Teams Sites**, 23 May-26 July; **Her Majesty the Queen's Birthday Flypast Rehearsals**, 9-11 June; **Her Majesty the Queen's Birthday Flypast**, 13 June; **Trooping the Colour**, 13 June; **Silverstone**, 3-5 July; **T-in-the-Park**, **Strathallan Castle**, 9-13 July; **Royal Naval Air Station Yeovilton Air Show**, 11-12 July; **Flying Legends Air Show, Duxford**, 11-12 July; **Wales National Air Show**, **Swansea Bay**, 11-12 July; **RIAT**, **RAF Fairford**: 15-20 July; **Sunderland Air Show**, 24-26 July; **East Fortune Air Show**, 25 July; **Royal Naval Air Station Culdrose Air Show**, 29-30 July.

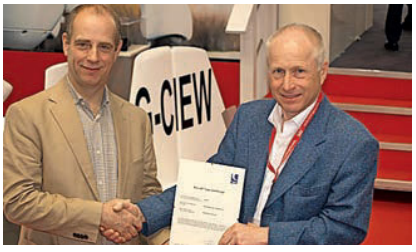
**THANKS FOR YOUR VIEWS** Many thanks to all of the people who took part in the online *Clued Up* survey in the previous edition of the magazine. It received a good response and produced some interesting statistics which we'll be making use of to develop how information is distributed in future. We have also taken note of your views, ideas and suggestions for articles which will be of interest and we will be following them up.

# 'Watch out' for wind farms

**AS A RESULT** of a study by Liverpool University, guidance now exists on the separation distances pilots should employ to avoid a 'wake encounter' with a wind turbine.

Light aircraft are vulnerable to wake turbulence near wind turbine developments, which are now increasingly common across the UK, and the study advises pilots flying downwind of a wind turbine to fly no closer than five times the rotor diameter (RD) of the structure; so, if the turbine RD is 30m, an aircraft needs to keep at least 150m away downwind.

For wind turbines with a rotor diameter greater than 30m, current CAA guidance of x16 RD applies. When overflying a wind turbine, an aircraft needs to remain clear by a distance equivalent to a single multiple of the RD-20m above if RD is 20m, regardless of the size of the turbine. In keeping with the report, however, this is largely academic as the Rules of the Air stipulate that aircraft must maintain 500ft (152.4m) separation from buildings and structures.



# Commercial gyro

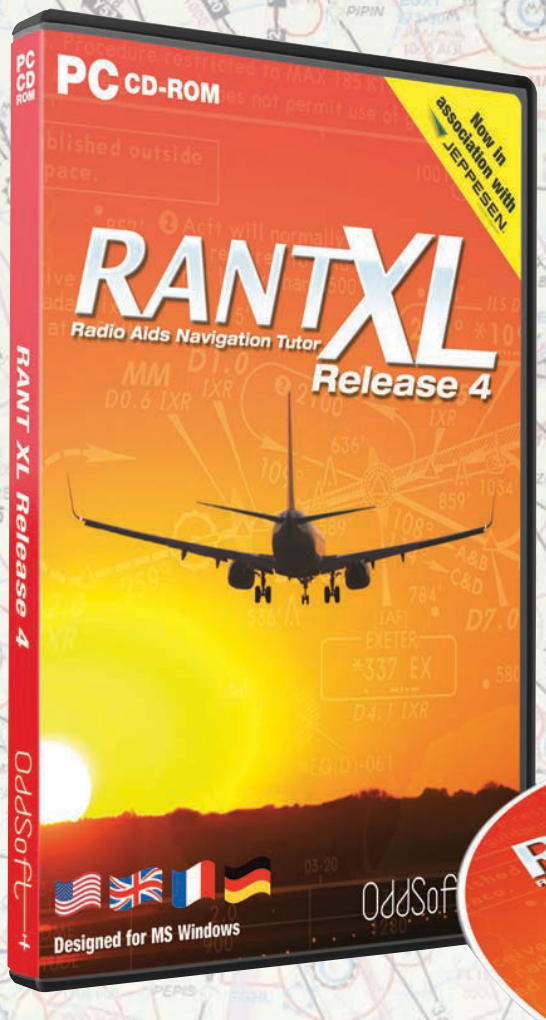
**THE ROTORSPORT CAVALON** Pro has been awarded a type certificate – the first gyroplane to benefit from new airworthiness rules. The move means it can have a Certificate of Airworthiness (CofA) rather than a Permit to Fly, enabling it to be used for commercial operations.

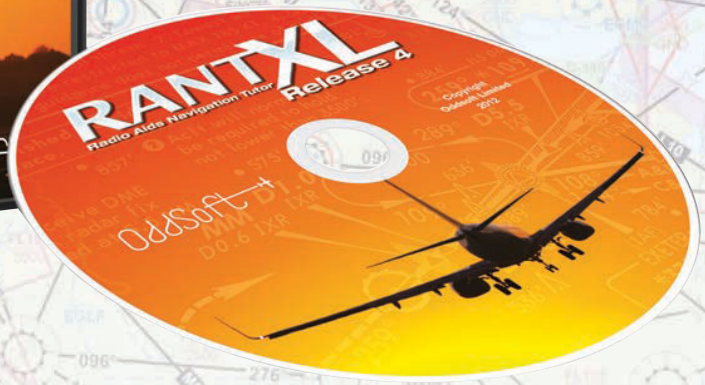
The award follows a regulatory change earlier in the year allowing type-certificated, factory-built non-EASA gyroplanes to qualify for CofAs rather than Permits. The type certificate was presented to Rotorsport's Managing Director Gerry Speich by Tony Rapson, Head of the CAA's General Aviation Unit at Aero 2015 in Friedrichshafen, Germany.

in association with

JEPPESEN
A BOEING COMPANY

OddSoft




Download a free trial version and see RANT "in action" videos at **www.oddsoft.co.uk**

# The Radio Aids Navigation Tutor

**RANT XL** - provides dozens of interactive lessons and testing challenges to help you learn the art of radio navigation – still a basic skill required even in the RNAV age. Our program will lead you through the basics of airways flying to beacon-holding and flying instrument approaches. Why pay to learn how to navigate in a simulator or aircraft when these skills can be mastered at home? OddSoft Ltd have developed RANT XL over the last 20 years and now you can monitor your progress over on-screen Jeppesen instrument and area charts.

Full or En-Route IR coming up? Fly your route in real or accelerated time. Go to our website and see the program in action. A series of videos shows how you can customize RANT XL to suit your aircraft and actually monitor/record your progress around the procedure on the approach plate. From steam-driven instruments to EFIS we have all bases covered all for less than about 30mins worth of flight time.

Written by a current senior CAA examiner this software comes with a flight-planner for use with RANT and our databases cover most of Europe, USA, Australia, NZ and S Africa. Check us out at **www.pprune.org.uk.**

Garmin GPS Interface for playback
Used by the RAF; CTC and CAE Oxford Aviation Academy and over 4000 users worldwide
RANT requires MS Windows XP,Vista, Win 7 and 8

**www.oddsoft.co.uk**

# KEEPING A **WEATHER EYE**

*It's complex and always changing, but staying on top of what the weather might do isn't necessarily difficult*

WORDS AND PICTURES: DERRICK RYALL

**I am lucky enough to have enjoyed flying for 20 years now, passing the 1,000 hour mark last year. For the last 10 years, I have been flying out of Exeter in Devon with the well-run Robin Flying Group that operates a fleet of Robin DR400s and a Super Decathlon. The Robin is highly capable with outstanding visibility from which to observe the weather, something I particularly appreciate as a weatherman. I'm also fortunate to be able to fly a somewhat more weather-sensitive 1941 J-3C Cub from a small Devon grass strip.**

Last summer, I tried a completely different type of aviation with even greater weather sensitivity; learning to paraglide with my 17-year-old daughter Katherine in the Alps. Underneath a paragliding wing, you feel every lump and bump of turbulence and a gusting 15-20kt wind that wouldn't trouble you in a Robin would be a complete no-go.

Our flights in the Robins range from short locals and breakfast runs to overnight trips to northern France and occasional longer tours, with destinations including Scotland, Denmark, Italy, Spain and, the highlight, Morocco. These have been demanding yet rewarding, with weather often posing challenging decisions – often with limited meteorological information.

A pilot who always waits for perfect conditions will find themselves frequently grounded or missing the best weather and the wonder of a stunning cloudscape. They will lose currency and enter a spiral of declining confidence. Sadly, many new pilots give up flying soon after gaining their licence. There are various reasons, but I suspect a key one is a fear of the weather – possibly made worse by an unexpected weather challenge.

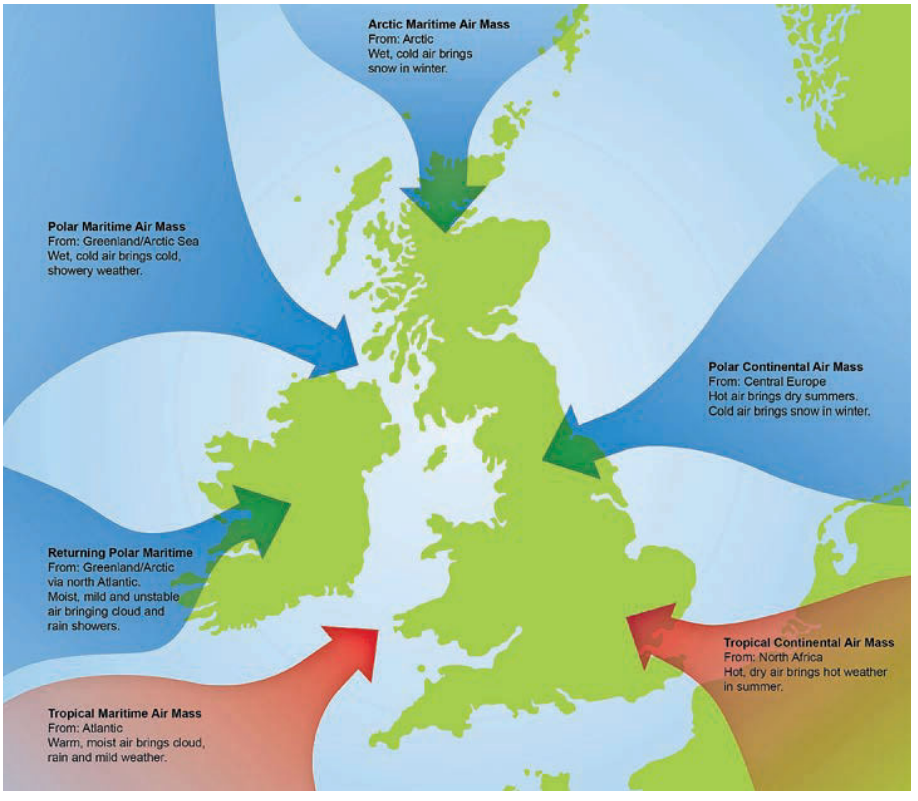
Weather is to be respected, not feared. Developing an understanding of it and how it might change can only help in developing confidence, so enabling pilots to expand their flying horizons safely and take to the air when many stay on the ground.

When it comes to weather, understanding the context is an invaluable tool. Air masses – essentially, where the weather has come from – are a good example of this. That which reaches the UK from the south over Europe is more likely to be dry, but might be hazy and polluted. Weather from the south-west is likely to contain moisture, bringing rain and low cloud, while weather from the north-west is likely to bring clear air following a cold front but with a higher risk of showers. This level of understanding will help pilots prepare, respond and react to conditions accordingly.

With advances in science, computing and satellite technology, forecasts have improved dramatically over the years. A four-day forecast now is as good as a one-day forecast was just 30 years ago and they contain far more local detail. However, our weather is extremely variable and changeable – both in time and geographically.

In training, we're taught the basics of weather and how to read and interpret standard aviation forecasts and charts including METARs, TAFs, 214 and 215s, and ASXX and FSXX charts. However, the age of the internet and mobile apps – such as the new Met Office General Aviation app – has brought ready access to a wealth of weather information. The challenge is to make the best of the information available to build a 'weather picture' that makes the go/no-go decisions more straightforward and weather changes en route less of a surprise.

While METARs and TAFS are an invaluable resource and should always be consulted before a flight, they cannot convey the full weather story with all its complex variations in time and space. It's our responsibility as pilots to build that picture, both through experience ➔




Knowing where the air mass has come from gives a pretty good guide as to what to expect, so here's a quick reminder of what the general air masses are likely to bring with them and what to expect from the weather

## LOWERING CLOUD

Either due to an approaching front, but also due to moist air being forced up over hills. METARs and TAFS reflect weather at or near an airfield, but do not capture the risks that a nearby range of hills may bring.

Taking off from Exeter for a short flight to Compton Abbas or Old Sarum, for example, it's not unusual to hit lowering cloud and poor visibility just 20 miles to the east as you approach the Blackdown Hills – particularly in a warm sector, behind a warm front and ahead of a cold front.

One tip I picked up from Sparky Imeson's excellent book *Mountain Flying* is to try to leave a good spacing between you and the cloudbase above.

If you 'scud run' just below cloud to try to maximise ground clearance, you run the risk of running into the cloud if it lowers further, visibility is reduced as humidity approaches 100% and the risk of carb icing rises. Drop just a couple of hundred feet and the view ahead can be much improved.

and by building an understanding of the weather and its many drivers. Watch the forecasts on TV, keep an eye on METARs and TAFs even when not flying, study radar and satellite imagery, talk to fellow pilots, share your weather experiences, read books and articles, attend courses and never, ever be afraid to ask questions.

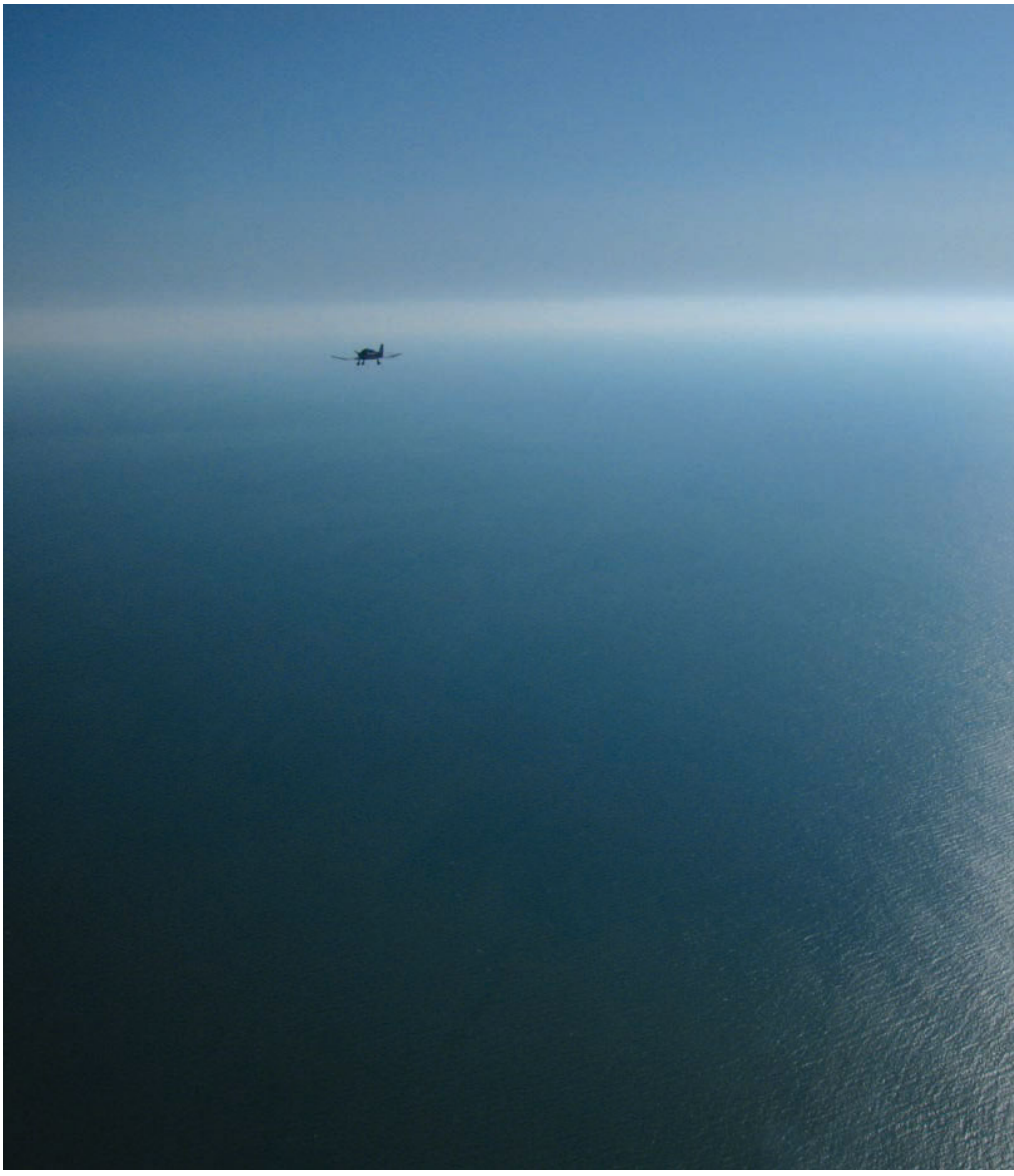
By consulting an array of information sources in the days leading up to a flight, pilots can achieve a greater understanding of how the weather is evolving. This reduces the chance of any surprises on the day or, worse, during the flight.

To give another example of the importance of this context, a TAF can only inform of the chance of a challenge developing. A Prob 40 reading (a 40% probability of rain) may not be hugely useful. However, consulting a rainfall map allows a pilot to see how showers are developing and to have a greater understanding of how rain might impact a flight. A TAF can also be lacking when it comes to understanding the intensity of showers and thunderstorms – and, therefore, how big the risk is. Again, looking at a rain radar can help build up a much more comprehensive picture.

Having worked at the Met Office for more than 20 years, I'm lucky to have been immersed in the weather and to have built up a reasonable understanding of its drivers. However, with all its complexity, it continues to surprise. I have made my fair share of mistakes and have been caught out by fast-changing situations, even when good forecast information has been available.

## WEATHER TRAPS

There are many potential traps that can catch pilots unaware – even those with significant flying time under their belt. Reflecting over the years, the weather challenges of note can be grouped into lowering cloud and reducing visibility, showers and thunderstorms, fog, wind and turbulence and performance.



There are many potential traps that can catch pilots unaware

**Top left:** This dreadful visibility could be down to a continental air mass, or possibly simply rising humidity as the day progresses.
**Bottom left:** Flying over the sea can bring its own visibility challenges, as any seasoned over-water pilot will know. First time out, it can be disconcerting.
**Right:** Paragliding is fun and provides a whole new appreciation of weather.

## HEAVY SHOWERS AND THUNDERSTORMS

One 'I learnt about weather and flying' moment was flying out of Madrid for Cordoba on our trip to Morocco. Six of us in three Robins had enjoyed perfect flying weather and fabulous views all the way down from Exeter. Madrid had proved a difficult arrival, with complex airspace, mountains to cross and poor radio reception controllers who were difficult to understand.

Having landed safely, we were keen to fuel up, deal with the 'please call the tower' request, complete the long list of paperwork needed and press on to our overnight stop in Cordoba. Lulled into a false sense of security by perfect weather, we departed over the Spanish mountains and were happy to be in the air again. Visibility unexpectedly deteriorated, the cloudbase lowered, and then a flash of lightning ahead and to our left focused our minds.

A tense flight followed as we routed around the weather, eventually landing in Cordoba with a beautiful hazy sunset. As we taxied in, the lady from air traffic ran out to say they had lost contact with one of our planes. An even tenser wait followed before we heard the welcome sound of a distant Robin approaching. It turned out that loss of contact had been due to transponder finger trouble and each of the aircraft had successfully weaved their way through the weather. In the rush to get airborne, I hadn't checked the weather properly. After all, what could go wrong? It was CAVOK...

Looking back, all the clues were there. Afternoon thunderstorms over the mountains are frequent and the thunderstorm risk was obvious from even the most basic inspection of charts and TAFS. A year on, this was definitely in the back of my mind when suggesting we stay on the ground in Albenga in northern Italy rather than press onto Sienna late in the day, over the mountains with limited weather information.

## WIND

I learned to fly at Compton Abbas and it remains a favourite destination, surrounded by the best of English scenery and not far from family. However, you soon learn that just 10kt from the south can result in challenging turbulence as air spills over woodland to the south, while 20kt+ from the north is far more manageable with much of the crosswind easing as you flare.

Learning to look at and read the terrain is a valuable skill for anticipating turbulence and local changes in wind direction, particularly in hilly and mountainous regions. I won't forget the turbulence immediately downwind of Ben More flying out of Glenforsa in a 20kt breeze, or the turbulence experienced crossing the ➔

Gibraltar Straights as the wind is funnelled through the Gap between Spain and Morocco.

Flying out of Exeter in the summer, a gentle into-runway wind can turn into a stiff crosswind from the south as an afternoon sea breeze cuts in. This shouldn't be a surprise on a warm summer day, but it might put you out of personal or aircraft limits.

## FOG

Either radiation fog forming as the sun goes down or banks of sea fog or low cloud being driven inland by a gentle breeze. It has caught me out approaching Le Touquet, necessitating a return to the UK, and it has caught me out approaching Brighton to clear customs from Kortrijk in Belgium. Just 20 miles out, it was CAVOK but rapidly turned into OVC002 approaching the field. The result was an initially tense diversion onto Exeter. Again, this should not have been a surprise with the charts showing the remnants of a weak occluded front with wind from the south.

Heading home late in the day, I'm sure many pilots will recognise that slight worry as the haze appears to thicken in the valleys and visibility into the sun all but disappears. The TAFS and forecast charts will help identify the risk, but there is nothing like having a back-up plan in your mind.

## PERFORMANCE

A short runway may rarely present a problem in winter, but a windless summer's day makes a huge difference to performance – sometimes doubling the take-off roll.

A friend and I once flew a 180hp Robin into Truro for a fly-in on a warm summer day. With 500m available, it is usually well within the Robin's capability. On the ground, we were asked if we minded giving a lift home to a couple of stranded passengers. The departure was slightly uphill with a hint of tailwind. The clearance from the fence at the end of the runway was less than we would have liked. With the benefit of hindsight, a quick calculation would have highlighted the risk and we should have insisted on a downhill-into-wind departure.

There is nothing like having a back-up plan in your mind

Whatever your flying habits, a sound understanding of the weather can only make it safer and more enjoyable. Just as flying currency is important to keep your flying skills up-to-date, so is 'weather' currency. CU

*Derrick Ryall is Head of the Public Weather Service at the Met Office.*

# TRANSAIR
## FLIGHT EQUIPMENT

FREE Catalogue!


**Bose A20**
ANR Headset

£770.00 Inc VAT
from £641.67 Exc VAT

**DC H10-13.4**
Passive Headset

£289.99 Inc VAT
£241.66 Exc VAT : 1721

**Piston & Turbine** Oils

AeroShell

**Pooley's 2015**
Flight Guides

from £26.99 Inc VAT

**mcmurdo**
Fastfind 220 PLB

£215.00 Inc VAT
£179.17 Inc VAT : 3181

**iPad** Accessories

GARMIN Glo GPS

RAM MOUNTS MADE IN USA

AVSTOR

**Aircraft**
Maintenance

- *Tyres*
- *Filters*
- *Batteries*
- *Spark Plugs*


CHAMPION TEMPEST Gill


Specialty Tires of America

...the heart of your aircraft®
CONCORDE


## Aircrew-Pro Lifejacket


NEW £129.00 4905

NEWTON 170 | Min. 40Kg | $CO_2$ 38. grm. | Manual | Light

NEW £99.95 4930

## Pilots Survival

Transair's range of aviation lifejackets have been designed specifically for the General Aviation pilot.

## Aircrew-Lite Lifejacket


NEW £69.99 8573


## Aircrew Lifejacket

NEWTON 150 | Min. 40Kg | $CO_2$ 38. grm. | Manual | Light

# KEEPING UP TO SCRATCH

*"Anyone who stops learning is old, whether at 20 or 80. Anyone who keeps learning stays young" – Henry Ford*

WORDS: SAM BROWNE
PICTURES: SIMON FINLAY

**Okay, so you have a valid licence, your medical is up to date and you do your biennial revalidation flight with an instructor. But can you, hand on heart, say that you are the best pilot you possibly can be?**

Even if you are an avid reader of the aviation media and keep up to speed with all the new gadgets and software on the market – not to mention all the changes to the rules and regs – there is always scope to improve flying skills and knowledge. That is why general aviation associations provide continuing flight training aimed at qualified pilots and strongly urge their members to partake. Here are some of the opportunities to help improve your flying.

**The AOPA (Aircraft Owners and Pilots Association) Wings Award Scheme** is aimed at encouraging PPLs to keep flying and adding skills. Participants are awarded a new set of Wings when key milestones have been achieved. There are four levels – Bronze, Silver, Gold and Platinum – and participants need to complete a set number of activities to achieve each set of Wings. Activities include acquiring new ratings, attending seminars and taking part in air races. The scheme is open to non-AOPA members, but pilots must have completed a certain number of hours before they can enrol. See *aopa.co.uk* for more.

Glider pilots with an SPL/LAPL(S), or the British Gliding Association's (BGA) long-established self-regulated equivalent, the BGA Bronze with cross-country endorsement, are strongly encouraged by BGA clubs to get involved with a number of loosely structured but clearly defined activities.

These are facilitated within the clubs and result in **BGA and Fédération Aéronautique Internationale (FAI) endorsements**, badges or diplomas. The emphasis is on flying excellence and personal achievement. Local, regional and national competitions, and a highly competitive British Gliding Team, are all designed to motivate, encourage and recognise improvement. Aerobatic training is popular (and extremely good for improving flying skills), and particularly so with newly qualified pilots.

A programme developed relatively recently, Aim Higher, focuses on providing coaching guidance and experience to clubs. In addition, clubs with unique soaring opportunities – mountain wave, ridges, etc – proactively market themselves to glider pilots and, in doing so, provide new experiences, training and education. More details can be found at *gliding.co.uk*.

A **'pilot coaching scheme' has been run by the LAA** (Light Aircraft Association) for a number of years. It has a network of approximately 50 coaches across the UK who are available to provide ground and flight training to LAA members. Training is available for aircraft owners or part-owners towards type conversions, differences training, strip flying, class rating revalidation, aerobatics, instrument flying and display authorisations, plus any refresher training. All LAA coaches are experienced and enthusiastic general aviation pilots who hold EASA Class Rating Instructor or Flight Instructor certificates. Full details are available at *lightaircraftassociation.co.uk.*

As the safety umbrella organisation for the GA sector, **GASCo** (General Aviation Safety Council) offers a comprehensive programme of activities to all pilots. This includes the popular Safety Evenings which are held every year throughout the UK, mainly during the winter months.

They are free to attend and cater for pilots of all types of GA aircraft, whatever their ability and level of experience. Supporting packs of useful information are distributed free of charge and logbooks are endorsed if desired.

Additional Safety Seminars support the AOPA Wings programme listed above. Topics included Loss of Control; Meteorology; Human Factors; New Technologies in the Cockpit; Decision Making; Small Helicopter Safety; and, Ditching and Sea Survival.

The **Military Civil Air Safety Days** (MCAS) take place at military air bases in the UK with CAA support. Attendance offers a great opportunity for GA pilots to increase their knowledge and benefit from the opportunity to visit a military airbase, possibly even flying in to the event. GASCo also publishes a magazine, *Flight Safety*, which is available on subscription or as a free app for smartphones and tablets. Further information can be found at *gasco.org.uk* or 01634 200203.

**The Honourable Company of Air Pilots** (formerly GAPAN) aims to promote education and training in all branches of aviation and in particular by the provision of scholarships, bursaries and similar grants.

These are provided through one of its registered charities, the Air Pilots Trust, and are designed to assist the training in aviation of citizens of the United Kingdom, Éire or the Commonwealth who intend to be or who are engaged professionally as pilots or navigators in commercial aviation.

The Company offers bursaries and scholarships for aspiring or already qualified flying instructors and is currently overseeing two apprenticeships for would-be flying instructors. CU

**Please see *airpilots.org* for further details.**

Whatever you fly, whether it's a glider, fixed-wing or rotary, GA associations have flight training courses and help to sharpen flying skills – what's more, it's just plain fun to do

# If you're a pilot read on...

## You've worked hard to get where you are and you deserve recognition!

## From the bronze to platinum the

# AOPA WINGS SCHEME

## charts your success.

## BE A BETTER, SAFER PILOT

### "Why should I take part in the scheme?"

**You** will achieve more and enjoy your flying more.
**You** will develop good airmanship and be a safer pilot.


AOPA Campaigns for GA and you can keep abreast of what the issues are by **Joining AOPA** and help us in the battle.

**Tel 020 7834 5631 www.joinaopa.com**

**Your Membership Counts!!**

AOPA

# CHANGE IS IN THE AIR

*The regulations are changing, so here's what you need to know about Europe's new Rules of the Air*

WORDS: DAVE DRAKE | PICTURES: SIMON FINLAY

**The Standardised European Rules of the Air (commonly referred to as SERA) took effect across Europe on 4 December 2014 and superseded most (but not all) of the UK Rules of the Air Regulations 2007 in the UK. Full details of the rules and the associated changes are contained in the CAA's SERA webpages at *caa.co.uk/sera*.**

SERA is based on the same international standards as the UK Rules of the Air so, in most respects, they are identical. However, there are a number of differences in what pilots in the UK are accustomed to and these are summarised below.

SERA is slightly different to other European Regulations because it applies to all aircraft in European airspace (not just 'EASA aircraft'). Also, SERA does not address all of the areas that UK Rules of the Air historically have (for example, certain aircraft lighting requirements) and, in some cases, it requires States to write their own 'enabling' measures to allow some activities to take place (for example, VFR at night).

It also allows for the retention of provisions that were already in place before SERA took effect, as long as these comply with and supplement SERA. The result is that the UK has retained a small number of domestic Rules of the Air and issued a number of General Permissions and General Exemptions, details of which can be found through *caa.co.uk/sera*.

There are a number of significant changes to some UK rules that anyone involved in the operation of aircraft needs to be aware of, but the CAA is seeking derogation to permit continuation of the current UK 'clear of cloud' requirement

## KEY CHANGES

### Air Navigation Order 2009 and Rules of the Air Regulations

A number of SERA-related changes to the Air Navigation Order (essentially minor in nature) were incorporated into the Order's amendment that took effect on 10 January 2015. The 'retained' Rules of the Air Regulations 2015 that were published on 17 March 2015 took effect on 30 April. Both have been combined in the CAA's CAP 393 'Air Navigation: The Order and Regulations', which is available at *caa.co.uk/CAP393*.

### Visual Meteorological Conditions

SERA requires aircraft flying VFR in controlled airspace to remain 1,500m horizontally and 1,000ft vertically from cloud and in a flight visibility of at least 5km at all times. The CAA is temporarily allowing aircraft flying VFR within Class C, D and E below 3,000ft AMSL by day at 140kt or less to continue to apply the 'clear of cloud and with the surface in sight' minima as they have always done. This temporary arrangement currently lasts until 4 August 2015 and a permanent arrangement has yet to be finalised. The CAA will keep industry informed of progress with this.

### Cruising levels

The quadrantal cruising levels system historically used in the UK does not exist in SERA. Instead, the semi-circular cruising level system applied throughout the rest of the world is used. The UK's transition to the semi-circular cruising level system was completed on 2 April 2015.

### Minimum heights by day

Although SERA changes the minimum height to a blanket 500ft above the surface, the CAA has used the flexibility provided in SERA to allow aircraft in the UK to fly below 500ft provided they are 500ft away from persons, vessels, vehicles and structures – in other words, no change from the UK's former '500ft Rule' that people flying in the UK are familiar with.

The CAA has also granted generic permissions to allow for all the long-standing exceptions to the old Rule 5 that were contained in the old Rule 6 – i.e. gliders hill-soaring, aircraft picking up and dropping articles at aerodromes, practising forced landings and flying displays/air races/contests – to continue unaffected. Otherwise, 1,000ft is the minimum height over cities, towns or settlements or over an open-air assembly of persons above the highest obstacle within a radius of 600m from the aircraft.

### VFR at night

Aircraft have been able to fly under VFR at night since June 2012. SERA introduced a small number of additional requirements for aircraft flying at night. These are:

- If the aircraft leaves the vicinity of an aerodrome, a flight plan must be filed. This can either be a 'paper' plan, an AFPEX plan or an abbreviated plan ('booking out') – see new guidance at *caa.co.uk/sera;*
- The cloud ceiling must be at least 1,500ft AMSL;
- The flight visibility must be at least 5km, or 3km for helicopters;
- When flying at 3,000ft AMSL or below, the surface must be in sight at all times and;
- The night VFR minimum height requirements are more stringent than the day requirements. At the time of writing, aircraft are to be flown at least 1,000ft above the highest fixed obstacle within 8km of the aircraft or 2,000ft when flying over high or mountainous terrain. The CAA is considering an alleviation from this requirement and will keep industry informed of progress with this.

### Special VFR (SVFR)

SERA introduced a speed limit of 140kt to aircraft flying under an SVFR clearance. The weather minima is now:

- Remain clear of cloud and with the surface in sight
- Maintain a flight visibility of 1,500m, or 800m for helicopters

### Rights of way on the ground

Rules on overtaking and giving way are now less specific. Aircraft and vehicles overtaking other aircraft and vehicles can now pass on either the left or the right.

### The Right-Hand Rule

The UK rule which required aircraft to be flown along the right-hand side of line features ceases to be a legal requirement. However, it is still considered to be good practice as a means of avoiding collisions with aircraft coming the other way, and so is strongly recommended.

SERA does not makes any changes to pilot licences or their conditions and limitations. Some licences include limitations such as visibility minima which may be greater than the minimum specified in the Visual Flight Rules. Therefore, pilots are recommended to remind themselves of the applicable minima for their licence. You can find this on the personnel licensing pages of the CAA website. CJ

**More detailed information regarding SERA can be found on the CAA's SERA webpages by visiting *caa.co.uk/sera*.**


**THE REAL ALTERNATIVE TO AIRCRAFT OWNERSHIP**

# FUEL'S **GOLD**

*You can't do without it, but you might well wish that you could.* ***Claire Hatton*** *explores how fuel management works in practice instead of in theory*

WORDS: CLAIRE HATTON | PICTURES: SIMON FINLAY

**Let's face it; fuel is expensive, smells bad and is sometimes a nuisance to put in. I'm thinking back to balancing precariously on the step of a Cessna 172, in the wind and with the weight of the fuel hose over my shoulder trying to pull me off backwards every time I fuelled it up. Surely there must have been a better way?**

At the same time, however, it is what keeps our props turning and thus keeps us smiling. We always want plenty of fuel because no one wants to run out, but simply filling it to the gunnels every time isn't always an option. Light singles are famous for their lack of ability to hold full fuel tanks plus as many people as there are seats. Surprisingly, some light twins aren't much better and can also be very restrictive on fuel once you have a few people plus their sandwiches on board.

If we're honest, circumstances can also sometimes lead to people taking off with less fuel than they'd ideally like; the pressures of time, a big queue at the pumps, the bowser can't get over to you when you need it, daylight running out or bad weather moving in.

Flying instructors in particular have a responsibility to their students to send them off on solo flights with sufficient fuel for the trip; I once heard a spine-chilling tale from a refueller who had filled up a Tomahawk after a student had returned from their Qualifying Cross-Country – he put more fuel in it than the tanks were even supposed to hold. Now *that* is the definition of empty...

The fact is we have the power to choose how much fuel to take before we go flying; once we're up there, we are stuck with what we've got. No one wants to be thinking: "Have I got enough?". It's a very uncomfortable feeling. So come to a compromise: if full-to-the-brim isn't an option, we still need enough and especially so if we come up against hold-ups and problems. And there will always be hold-ups and problems – this is aviation... ➔

Fuelling up can be awkward, especially where high wings are involved and you can't always put it in yourself. If someone does it for you, it's worth watching and making sure the correct amount goes in – and in the right places

# MENDELSSOHN PILOT SUPPLIES

EUROPE'S LARGEST STOCKIST OF QUALITY NEW, USED & OVERHAULED AVIONICS

As our inventory changes daily, please call to discuss your requirements

**t. 0131 447 7777 f. 0131 452 9004 w. WWW.GPS.CO.UK**

## GARMIN

**G3X** Touch Screen Systems
**7"** Single system with EIS ..... **£3830**
**10"** Single system with EIS ..... **£4475**
**7"** and **10"** Dual system with EIS **£6549**
**10"** Dual system with EIS ..... **£6895**
**GTR 225A** Com 8.33 kHz ..... **£1895**
**GNC 255A** Nav/Com ..... **£2895**
**GNS 430** (recertified) from ..... **£4250**
**GTX 328** Mode S transponder ..... **£1895**
**GMA 340** Audio panel ..... **£995**

- WAAS GPS
- Altimeter
- Go To function
- Ground speed
- Track
- Distance

**GARMIN D2** Pilot watch **£325**

**Virb Elite Action Camera**

With GPS Aviation Bundle ..... **£287**
With D2 Aviation Bundle ..... **£499**

ÆRA 795

**ÆRA 500** touch screen GPS ... **£429**
**ÆRA 795** touch screen GPS **£1225**
**GPSMAP 695** GPS ..... **£1095**

**Portable ADS-B with Attitude**

**GDL 39 3D** unit only ..... **£525**
**GDL 39 3D** with DC cable ..... **£555**
**GDL 39 3D** w/cable and battery **£595**
Interface cable ..... **£40**

## DYNON AVIONICS

**EUROPEAN DISTRIBUTOR FOR DYNON AVIONICS**

SKYVIEW Touch

SKYVIEW

The latest touch screen display
**SV-D1000T/B** 10" display **£2759**
**SV-AP-PANEL** A/Pilot control **£395**
**SV-KNOB-PANEL** ..... **£175**
**SV-INTERCOM-2S** ..... **£210**
**SV-COM-X83** VHF 8.33 .... **£1450**
Video Input adaptor ..... **£139**

**SV-D700** 7" display .... **£1865**
**SV-D1000** 10" display **£2485**
**SV-ADAHRS-200** ..... **£830**
**SV-EMS-220/A** ..... **£420**
**SV-XNPDR-262** Mode S **£1249**
**SV-GPS-250** GPS receiver **£140**
**SV-32** Auto Pilot servo .. **£520**

**D2** Pocket Panel .. **£795**
Portable attitude indicator. The perfect emergency flight display.
**EFIS-D6** ..... **£1110**
**EFIS-D10A** ..... **£1520**
**EFIS-D100** ..... **£1795**
**EMS-D120** ..... **£1520**
**FlightDEK-D180** **£2350**

## iPad GPS

**Bad-Elf Pro+** GPS ..... **£ 199**
**Bad Elf Pro** GPS ..... **£135**
**Bad Elf 1000** GPS ..... **£ 89**
**Bad Elf 1008** GPS ..... **£ 95**
**Garmin GLO** GPS ..... **£ 80**
**Garmin GLO** Aviation ..... **£ 90**
**GNS 2000** GPS ..... **£ 65**
**DUAL XGPS150E** GPS ..... **£89**
**DUAL XGPS160** GPS ..... **£125**

## TRAFFIC SYSTEM

**MONROY Traffic Watch + Traffic Avoidance System**
**ATD-300** Traffic Watch+ ... **£ 595**
**ATD-300** with ANT300 ..... **£ 795**
**ATD-300** w/ ARINC & ANT **£ 995**

## PLB's and ELT's

**Prices include programming**
**AMERI-KING AK-451-21** ELT JTSO approved 406 MHz ELT ..... **£650**
**AMERI-KING AK-451-15** ELT JTSO HELICOPTER version ..... **£795**
**FASTFIND 220** PLB ..... **£189**
**GME MT410G** PLB ..... **£249**

## VERTICAL POWER

**Electronic Circuit Breaker**
**VP-X SPORT** ..... **£950**
**VP-X PRO** ..... **£1330**

## AVMAP

**EKP-V** EFIS System ..... **£1895**
**ULTRA** EFIS GPS ..... **£ 825**

## BENDIX/KING

**KX165A-02** Nav/Com 8.33 kHz **£3950**
**KRA10A** Rad Alt (recertified) from **£3500**
**KT74** Mode S transponder ..... **£1895**
**KR87** ADF (OHC) system ... **£1595**
**KN64** DME (OHC) ..... **£1195**
**KA44B** ADF antennna ..... **£1350**
**KX155** Nav/Com 28v (OHC) .... **£995**
**KI209** CDI (recertified) ..... **£595**

## BECKER

**AR6201** Com 8.33 kHz 2.25" **£1175**
**BXP6401** Mode S transponder 2.25" **£1495**
**BXP6401** Mode S transponder module **£1495**
**CU6401** Transponder control unit **£395**
**RT6201** Remote transceiver module **£995**
**RCU6201** Transceiver control ... **£350**
**AR6203** Com 8.33 kHz 6" VHF ... **£1350**
**BXP6403** Mode S transponder 6" **£1595**

## TRIG

**TT21** Mode S transponder .. **£1495**
**TT22** Mode S transponder .. **£1675**
**TT31** Mode S transponder .. **£1695**
**TY91** VHF Com 8.33 kHz ..... **£1175**

## F.U.N.K.E.

**ATR833** transceiver ..... **£1000**
**ATR833** with LCD display .. **£900**
**TRT800H** transponder .... **£1615**

## TRANSCEIVERS


**Icom**
**IC-A6E** Sports pk .. **£208**
**IC-A6E** Pro pack ... **£308**
**IC-A24E** Sports pk .. **£275**
**IC-A24E** Pro pack .. **£375**
**IC-A110** ..... **£625**
We stock a full range of Icom Accessories

**IC-A6E** and **IC-A24E** transceivers now have 8.33 kHz channel spacing

**Receivers**
**Intek AR109** ..... **£ 58**
**Icom IC-R6** ..... **£179**
**Icom IC-RX20** ..... **£339**

## LIGHTSPEED

The revolution continues with **ZULU PFX**
Improved comfort and noise attenuation
blue tooth connectivity and auto shut off

**NEW ZULU PFX** ANR Headset **£765**
**ZULU.2** ANR GA version ..... **£600**
**ZULU.2** ANR Helicopter ..... **£600**
**ZULU.2** ANR Lemo panel version **£600**
**Sierra** ANR GA version ..... **£475**
with blue tooth and music input

## HEADSETS

**HM51** child headset ..... **£ 89**
**Peltor 8006** GA headset **£199**
**Peltor** Helicopter headset .. **£225**
**David Clark** H10-30 ..... **£204**
**David Clark** H10-13.4 ..... **£242**
**David Clark** H10-13H ..... **£259**
**David Clark** H10-60 ..... **£279**
**NEW David Clark ProX** ENC **£495**
**Sennheiser HME 110** ..... **£204**
**Sennheiser HMEC 250** ..... **£330**
**Sennheiser HMEC 26BK-2** .. **£495**
**Sennheiser S1** passive ..... **£249**
**Sennheiser S1** noise guard **£465**
**Sennheiser S1** Digital ANR **£665**

## BOSE

**A20** GA twin plug ..... **£642**
**A20** GA twin plug w/bluetooth **£708**
**A20** Helicopter w/bluetooth ... **£708**
**A20** Lemo installed version .... **£642**
**A20** Lemo w/bluetooth ..... **£708**
Installed wiring harness ..... **£ 40**

## HARRY'S HM40

STAR BUY

**Harry's HM40** ..... **£99**
**NEW HM40** ANR ..... **£259**

## AIR GIZMO

Panel dock **ÆRA 500** ..... **£99**
Panel dock **ÆRA 795** ..... **£149**
Panel dock **GPS 695** ..... **£149**
Panel dock **296/495** ..... **£75**
**iPad** knee dock ..... **£99**

## GO PRO VIDEO CAMERAS

**Hero 4** Black ..... **£299**
**Hero 4** Silver ..... **£240**
All accessories available on line

## INTERCOMS

**HM 2** place portable ..... **£99**
**HM 2** place for Icom w/PTT **£119**
**HM 4** place portable ..... **£119**
**Sigtronics SPA 400** ..... **£169**
**PS Engineering**
**PM 500EX** panel mount 4 place **£199**
**PM 1000** 4 place prices from .. **£249**
**PM 3000** stereo 4 place ..... **£329**
**PMA 4000** Audio Panel ..... **£549**

## INSTRUMENTS

**RC ALLEN**
(TSO approved)

**RCA2600-3** electric horizon .... **£2095**
**RCA2600-2** electric horizon .... **£2095**
**RCA22-7** vacuum horizon ..... **£650**
**RCA15** series from ..... **£1695**
**RCA11A-8** vacuum D.G. ..... **£595**
**RCA82A** electric turn coordinator **£650**

**JP INSTRUMENTS** (TSO approved)
**FS450** fuel flow ..... **£495**
**EDM 700** series engine management system for most engines from **£1250**

**PRECISION**
**MD90-1** Quartz Clock ..... **£199**
**MD90L** Quartz Clock lighted ..... **£240**
**TA102** dual USB charging port ..... **£250**
**7000C.31** Vertical Speed Indicator **£530**
**1394T100-3Z** Turn Coordinator ..... **£699**
**5934PM-3A.84** Altimeter 20k ..... **£949**
**MD200-306** CDI ..... **£1350**

**NON TSO INSTRUMENTS**
**MINGDA**
**GH030** vacuum horizon ..... **£375**
**GH025** electric horizon 14volt **£850**
**GD031** D.G. vacuum ..... **£375**
**GD023** D.G. electric ..... **£850**
**BC2A** Vertical Speed Indicator **£129**
**BZW-4B** Turn Coordinator ..... **£295**
**BG-3E** Altimeter 20,000' 3 pointer **£250**
**BG-15** A.S.I. 20-160 knots ..... **£119**
**BK13A** A.S.I. 20-100 knots ..... **£119**
For other A.S.I. please see our web site
**MC022** Vertical card compass **£149**

## ENCODERS

**Ameri-King AK350-30** ..... **£159**
**ACK-A30** Mod 5 ..... **£199**
**ACK-A30** Mod 9 ..... **£239**

## SURVIVAL EQUIPMENT

**Survival Products**
**4-6 Person Rafts**


**The Lightest most compact raft in the World**
Raft with canopy ..... **£1299**
Raft with equipment ... **£1499**
HM Survivor Slim line lifejacket with whistle and light ..... **£65**

**REVERE**
**Aero Compact Raft**

**2 Person Rafts**
Raft ..... **£799**
Raft with canopy ..... **£899**
**4 Person Rafts**
Raft with canopy ..... **£999**
Raft with std equipment **£1099**
Raft with deluxe equip. .. **£1595**

**FAMILY RUN BUSINESS FOR OVER 25 YEARS**

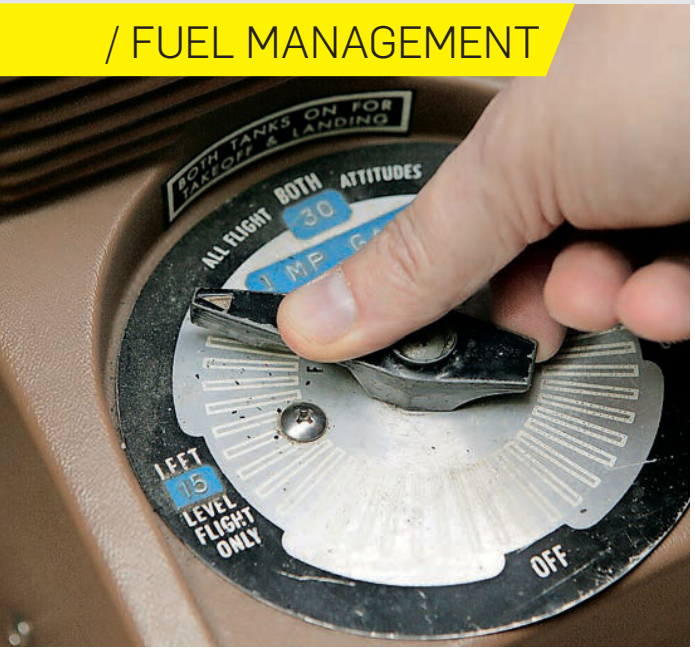
**ADD 20% VAT - UK & EU ONLY**

OPEN MON-FRI 9am-5.30pm—BULK ORDERS AND TRADE ENQUIRIES WELCOME
If you are not completely satisfied with your purchase, please return the goods in original condition within 28 days for replacement, exchange or a full no quibble refund. **All prices subject to change.**

**CAA/EASA APPROVED**
**RUN BY PILOTS FOR PILOTS**

49-51 Colinton Road • Edinburgh EH10 5DH

# / FUEL MANAGEMENT




Which tank was I on again? It's surprising just how many aircraft find themselves caught short. Having a 'both' feed makes life easier but, if you don't have it, keep a log of which tank has been used and for how long. Fuel gauges? It makes life so much more reassuring if you can dip the tanks to know what you've actually got in there



If you hire from a flying club or school, they will no doubt have a Flying Order Book or Operations Manual which they ask their members to read, digest and then sign to say they have done so every 12 months. This will contain a section on fuel calculations, such as the list below, and it should be used as a guide to how much fuel to take on any given flight. The exact fuel consumption figures can be found in the aircraft's Flight Manual, but here's an example:

**TO CALCULATE FUEL REQUIRED, ADD:**
FLIGHT TIME (at 5.5 Imperial gallons/hour)
ALTERNATE (30 minutes at 5.5 Imperial gallons/hour)
UNUSABLE (two Imperial gallons)
TAXI/CLIMB/TRANSIT TO START OF NAV LEG (two Imperial gallons)
HOLD (30 minutes at 5.5 Imperial gallons/hour)
**PLUS:** CONTINGENCY (10% of total)

**= TOTAL FUEL REQUIRED**

This is based on the kind of rules that apply to commercial operators who have much stricter requirements for fuel quantities than apply to private flying, but it is still very useful for GA pilots to use as a guide.

Another factor when carrying out fuel calculations is the high risk of mixing up and confusing different units. For example, fuel could be uplifted in litres but you do your calculations in Imperial gallons. You then complete the aircraft tech log showing fuel in pounds but, once inside the aircraft, the gauges and fuel flows are all in US gallons. Talk about the potential for confusion and mistakes. It's worth being extremely careful and very clear on the units when discussing fuel uplifts or quantities and making sure you know what units other people are referring to.

It's prudent, too, to watch the refuelling if someone else is doing it for you so that you can ensure the correct grade and quantity of fuel is being uplifted. It's also worth checking that it is being put in the right place (the correct tanks) because some aircraft will have various tanks in addition to the usual left and right, and fuel in these tanks can have a big effect on the centre of gravity. Having fuelled up, you may be able to see the fuel in your tanks or you may not – so, having watched the fuel go in, at least you know that the right amount is there.

On this point, it's traditional for light aircraft fuel gauges to be utterly useless. We know that, so we don't trust them. It can be difficult, however, to ascertain how much fuel is in the aircraft if you have just gone out to do the walk around on it. You can't even really trust the last person's fuel entry in the tech log – it might be wrong.

On some aircraft (such as PA-28s), it's easy; 'tabs' inside the tank which you can see relate to a specific quantity of fuel in the tank, as stated in the Flight Manual/Pilot's Operating Handbook. Other types don't have these, though, and a dipstick can help give an accurate reading of how much fuel is on board. If your flying club or school doesn't have dipsticks, consider buying your own to keep in your flight bag – pilot shops will have a range available that cover most types.

Once airborne, there's the task of managing the fuel, knowing how much there is at any given time and which tank it's in. That sounds simple, but there have been accidents where engine failure was attributed to fuel starvation and yet there was plenty of fuel on board – just in the wrong place.

The straightforward way is to keep a fuel log on your kneeboard so you know when you have changed tanks (perhaps every 30 minutes). That way, if you suddenly experience a problem with one tank and are forced to stop using it, or perhaps have to divert and need to know how much fuel you have left at that moment, you should have a good idea how much you have left in each specific tank.

But, most importantly, know the aircraft's fuel system. Take time to study the Flight Manual/Pilot's Operating Handbook to fully understand which tank should be selected for specific phases of flight, when to use fuel pumps, the process for changing between tanks and anything else appropriate such as cross-feed procedures.

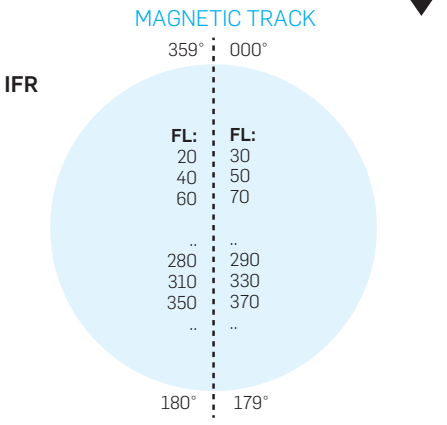
Check whether the fuel consumption figures stated take leaning into account, how you should be leaning and when. It's worth noting that there can be quite significant differences even between the same types where one has had a modification along the way, so know the aircraft you are flying. Ultimately, up there flying solo there's nobody to check the fuel quantity with – you're on your own. CU

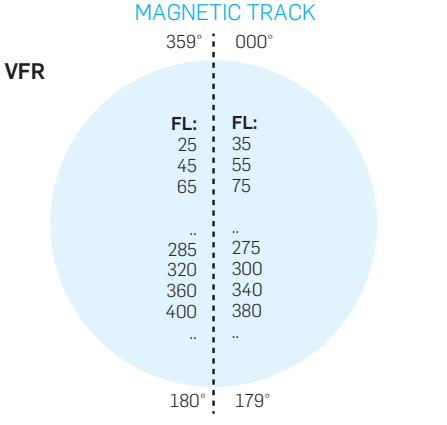
***Quadrantals?*** *They're old hat. It's time to think semi-circulars and Transition Altitude*

WORDS: IRV LEE
PICTURES: SIMON FINLAY

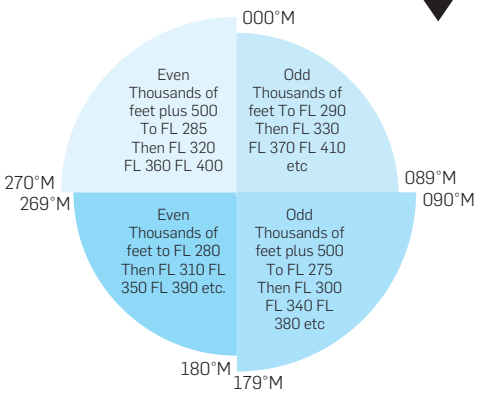
# LET'S GO **HALVES**

## THE NEW




## THE OLD




**Let's start this piece with an odd question. Do you remember when you last 'flew Quadrantals'? The answers around the UK General Aviation VFR community would be quite revealing.**

Certainly at my airfield in central southern England, Popham, a very busy microlight and grassroots 'SEP' base, I suspect the majority answer wouldn't be a date, it would simply be 'No'. This is not necessarily typical of the whole country's GA community, but neither would it be a rare response. I'm sure a few pilots I know would reply with "Remind me..."

Well, as far as 'Quadrantals' are concerned, 'reminding' is now akin to 'nostalgia'. Since April 2015, whatever 'UK Quadrantals' were, they aren't any more. It was a British way to try to separate traffic, irrespective of being VFR or IFR, into levels which, among other things, maximised the time a pilot might have of spotting another aircraft and tried to reduce collision risk in Class G.

The choice of levels for the pilot changed every 90° of sustained magnetic track, hence the name 'Quadrantals', as the choices of level fell into four groups around the compass rose. This scheme separated aircraft tracking towards each other at relatively high closing speeds by vertically separating them by 1,000ft. Aircraft crossing each others' tracks in a major way rather than 'head on' had separation of 500ft.

Because of the little subtleties introduced by the phrase 'magnetic track over the ground', the Quadrantal rule was also a much-loved topic for setters of examination questions because this is not instantly the value in a pilot's mind unless tracking on radio navigation. 'Quadrantals' were very much a British thing and were not even compulsory for VFR traffic. The rest of the world had, and has, a different system; the 'semi-circular' rule, which the UK has now adopted although it is still not mandatory for VFR traffic. With the new rule, it now matters whether an aircraft is flying IFR or VFR because that is where a 500ft separation is applied to separate the two. Secondly, the magnetic tracks are grouped in two halves rather than four quarters, specifically 000°-179° and 180°-359°.

Looking at Annex 3 of SERA, Standardised European Rules of the Air, which contains the semi-circular rule for traffic (and the reason the UK is changing), it looks something like the illustration below, which should bring out the question: "Why does it quote both Flight Levels and Altitude for a particular range of magnetic tracks?".

The answer is, of course, that flight levels should be used once Transition Altitude is reached in the climb, when standard pressure setting (1013.25hPa) can be set on the altimeter, producing Flight Levels.

The very mention of transition and flight levels leads to the expectation that the Transition Altitude is moving to 18,000ft throughout all UK airspace by Easter 2018, which will effectively takes flight levels out of the scene for the recreational GA community. *Clued Up* will no doubt report and explain announcements and guidance in this area in due course, particularly the associated altimeter setting procedures. CU

| MAGNETIC TRACK 000°-179° | | MAGNETIC TRACK 180°-359° | |
|---|---|---|---|
| IFR* | VFR* | IFR* | VFR* |
| 3,000ft or FL030 | 3,500ft or FL035 | 4,000ft or FL040 | 4,500ft or FL045 |
| 5,000ft or FL050 | 5,500ft or FL055 | 6,000ft or FL060 | 6,500ft or FL065 |
| 7,000ft or FL070 | 7,500ft or FL075 | 8,000ft or FL080 | 8,500ft or FL085 |
| etc | etc | etc | etc |

*Flight Levels used instead of altitude if aircraft has reached or above transition altitude

# SO, WHO'S **REALLY** OUT THERE?

*Getting audio traffic warnings is a real comfort and low cost systems could soon be a reality for light aircraft*

WORDS: BOB DARBY (AOPA), ADRIAN PRICE (NATS) AND MARK WATSON (NATS)

**Electronic Conspicuity – it's a heck of a clumsy phrase and difficult enough to say out loud without tripping over your tongue, but it's an important concept to aid 'see-and-avoid'. In essence, it simply means being detectable via a radio signal – the questions are – how, and at what cost?**

To examine the possibility of increasing safety for GA via some electronic means, a CAA working group, consisting of representatives from aircraft, microlight, glider, hang-glider, paraglider and balloon associations, together with NATS and the MoD, was set up between mid-2013 and Autumn 2014 with Martin Robinson (AOPA) as the nominated chair.

It looked at the general requirements in relation to the needs of each of the various groups and then at different ways of implementing such an electronic capability. Its conclusion was that Automatic Dependent Surveillance – Broadcast (ADS-B) was the most promising. The risks of GA airborne collisions were presented to the group by the LAA, who looked at statistics from the last 37 years.

In summary, it found that the main threat to powered aircraft was powered aircraft, the main threat to gliders was gliders and the risk was 10 times greater at the airfield or glider launch site than in the cruise.

The problem was that ADS-B implementation would be expensive in the GA world. The equipment is strongly regulated for all the usual aviation safety reasons and certification costs, especially for the aviation GPS component, are high.

Then there was the 'known traffic environment' question. In controlled airspace, air navigation service providers require a complete 'known traffic environment' for safe traffic management and aircraft are usually required to operate a transponder.

In Class G airspace, this isn't required although using a transponder where fitted is strongly recommended. However, a transponder is not mandatory, nor is it possible for some airspace users to carry one for physical reasons and/or because they have no electrical power. Problems arise

While they don't replace see-and-avoid, traffic alert systems do provide the comfort of early warnings of potential conflicts with similarly equipped aircraft; glider pilots have been installing a system called FLARM for some time

when Class G airspace users without a transponder inadvertently stray into controlled airspace. If they are detected by primary radar, this can cause major disruption, leading to go-arounds which can cost several thousands pounds for a civil airliner, let alone the ATC burden of managing the following arrival sequence and the knock-on effect on airline scheduling. If not detected, there is the risk of an airprox and its consequences.

Minimising such infringements and managing them when they occur is a continuing problem for NATS. Earlier NATS' initiatives such as the Airspace Aware can help reduce the likelihood of some airspace users entering controlled airspace but, once the infringement has occurred, the situation is different.

Three years ago, NATS came up with the idea for a device to help this situation for all GA – not only those who might be expected to carry a transponder. Most importantly, it recognised that there was an opportunity to offer real and significant benefits to GA pilots as well by using the 'ADS-B-in' function to indicate the presence and position of nearby aircraft and so assist 'see and avoid'.

This is the Low Power ADS-B Transceiver (LPAT). The basic notion is to transmit and receive ADS-B signals and to display received signals on a small traffic display with audio warnings. But how is this different from the existing and expensive ADS-B and GPS units already available to commercial aircraft? The main differences are:

Most importantly, it recognised there was an opportunity to offer real and significant benefits to GA pilots

- **Transponder vs Transceiver:** Transponders respond to interrogations from secondary radars and have to meet stringent requirements on reception, transmission and timing of 1030/1090MHz radio signals. A transceiver is a simpler device that transmits and receives autonomously.
- **Portability:** LPAT is designed as 'carry on' equipment rather than being panel-mounted, reducing both certification requirements and installation costs.
- **Low power:** Benefits of reducing the transmission power are:
  - Enabling the device to be battery powered – the lower the power, the longer the battery will last.
  - Reducing the possibility of radio interference to other airspace users by reducing the range at which the signal will be detected. A balance has to be struck here so the reception range is still enough to enable timely detection by others and of others.
  - Enabling the device to be used safely close to the human body. This is valuable for hang-glider and paraglider pilots who may have little or no structure to which the device can be fixed and who, instead, can carry it on their person.
- **GPS unit:** Using a non-certified and, therefore, less expensive GPS unit that does not have to meet all the stringent requirements to support ATC separation.
- **Type of usage:** The LPAT is explicitly not used for ATC separation but to indicate the presence and position of another aircraft as an aid to visual acquisition for see-and-avoid. For ATC infringement management, it positively distinguishes a real aircraft from background clutter, which greatly reduces the probability of a CAS infringement being undetected compared to primary radar alone. ➔

# Will **you** go to **serve**?

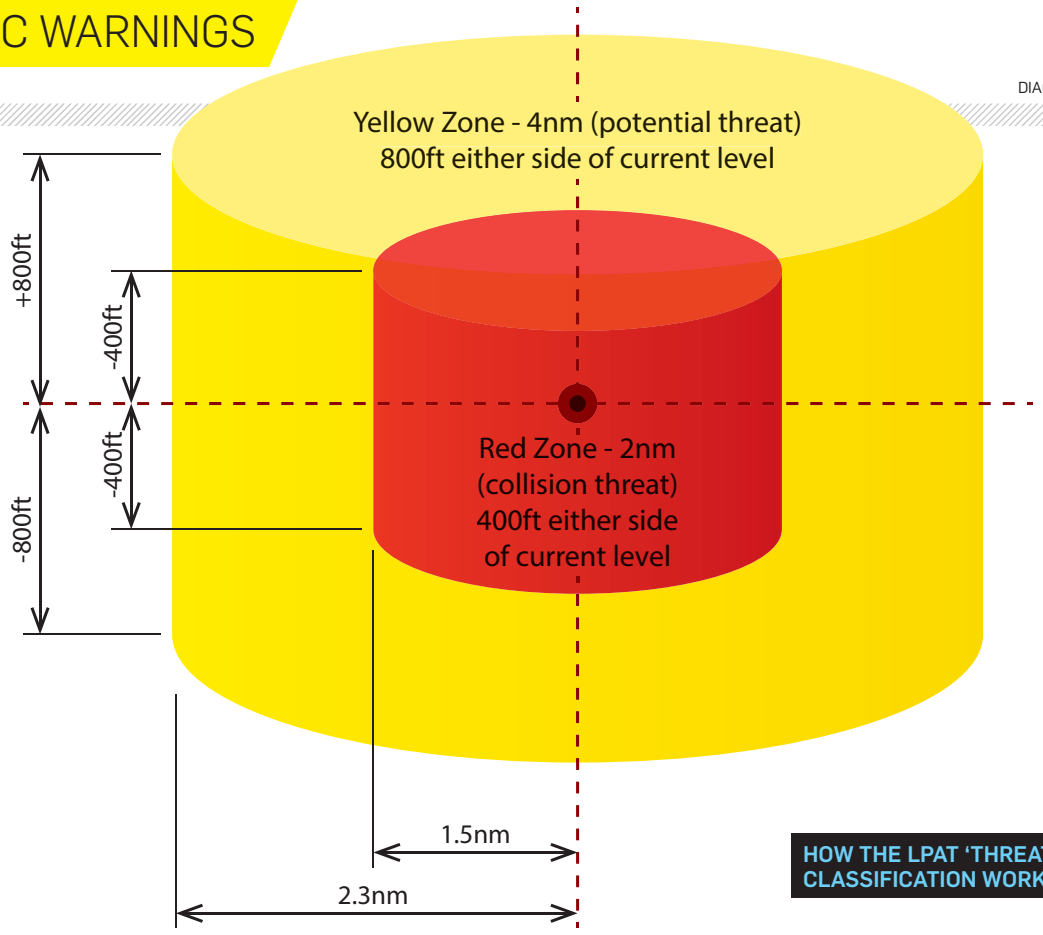
**Find out more** about MAF's vacancies for **pilots** at www.maf-uk.org/**jobs**



MAF Flying for Life

## We go the extra miles

DIAGRAM: PETER LIDDIARD




**HOW THE LPAT 'THREAT' CLASSIFICATION WORKS**

- **Cost:** Simplification of the device and using a less expensive GPS unit reduces the cost.

NATS has developed the LPAT through a contract with Funke Avionics (FAV) and prototype units are being used for flight trials that have just started with GA pilots from both within NATS and AOPA members.

### ELECTRONIC VISIBILITY VIA ADS-B – PROJECT EVA

Project EVA is a large-scale demonstration project, co-funded by the Single European Sky ATM Research programme (SESAR) in Brussels, which runs until early autumn 2016. The focus is to fly prototype ADS-B equipment in a GA VFR environment to see how well it performs and what pilots think of it, as well as to look into all the issues surrounding bringing such equipment to market as an affordable device for GA pilots.

Project EVA is led by NATS with AOPA (UK), FAV and Trig Avionics as partners. FAV have developed the LPAT prototype and Trig are developing a similar device that is panel mounted, based on their existing Mode S transponder.

AOPA is managing much of the flight activities using volunteer pilot members. Pilots will use both LPAT and the Trig device as well as taking advantage of the NATS' ADS-B Transponder Evaluation Trial.

This trial asks pilots to connect uncertified GPS receivers to their existing installed Mode S transponders to transmit ADS-B. The CAA has waived the minor modification fee for Annex II aircraft, for approval of the installation.




How LPAT looks in operation. It's designed to be 'carry on' equipment rather than being panel-mounted, reducing both certification requirements and installation costs. The Trig version interacts with another screen.

Any installation must be carried out by a licensed engineer or under the supervision of the LAA, according to the aircraft.

At a later stage, EVA flights will include multi-device trials when LPAT, the Trig device and ADS-B/transponder devices will all fly together to ensure interoperability and effectively assist 'see-and-avoid'. As LPAT has an optional input for FLARM signals, compatibility with FLARM will also be evaluated. The final EVA flight activity is ➔

the NATS' ATM Display Demonstration to demonstrate the integration of all the equipment's position information into an air traffic management display.

### INTERNATIONAL ADS-B FOR GA

EVA doesn't stop in the UK. LPAT devices will be flown in Germany under the same sort of arrangements as in the UK, subject to approval from the German authorities. This is seen as a step towards full European approval of GA ADS-B equipage along the lines pioneered by NATS.

The FAA is also very active on ADS-B development. As well as worldwide 1090ES ADS-B, ADS-B equipment and services are also available on another frequency of 978MHz.

### WHERE ARE WE GOING AND WHAT CAN WE EXPECT?

By mid-2016, both LPAT and the Trig TABS/TSAA device should have been flown extensively and their performance verified, evaluated and assessed for GA pilot usability. Use by NATS' air traffic management to display the ADS-B data should also have been demonstrated. Both LPAT and Trig devices should be available on the market for GA pilots to buy and use in the UK and steps towards use throughout Europe should have been taken.

The skies will be just a bit safer for all GA pilots who depend on 'see and avoid'.

### WHY IS GPS SO EXPENSIVE?

GPS devices used for aviation have multiple self-checking and error reporting capabilities that are unnecessary for use in other applications. The position data that an aviation GPS delivers is accompanied by quality indicators that indicate the accuracy and integrity of every measurement. The surveillance integrity level of the unit is also indicated.

All this data is transmitted together with the position data so that receivers of the data know what degree of trust they can place in the data. When the data is used for aircraft separation, the quality requirements are very high and it is the development and rigorous testing of GPS units that can meet these criteria to support the ADS-B-out function that drives up the cost.

### ADS-B

ADS-B was first conceived in the early 1990s as an add-on to Mode S transponders, initially called 'GPS squitter'. Today, the broadcast technique is more formally called 1090MHz Extended Squitter or '1090ES'.

The basic notion is that aircraft regularly and automatically broadcast their GPS position for use by anyone who can receive the signal, airborne or on the ground. This capability to transmit is known as 'ADS-B-out' and is the basis of Electronic Conspicuity.

ADS-B offers an alternative means of surveillance for ATC purposes, either instead of, or as a complement to, radar. Ground receiver stations are being implemented throughout Europe, usually together with Wide Area Multilateration (WAM) systems, which is another surveillance technique. NATS in the UK has an extensive ADS-B and WAM trial infrastructure covering a large part of southern England.

For the pilot, reception of information in the cockpit about the position of another aircraft makes it possible to know where the other aircraft is and prompt your lookout. This is known as 'ADS-B-in'. Importantly, if the other aircraft is in a position where you cannot see it, you're alerted to its presence.

ADS-B-in equipment is reasonably available, but it's no use at all unless other aircraft are transmitting 'ADS-B-out'.

As indicated by its original, and continuing, link with Mode S, the ADS-B-out signal is broadcast on 1090MHz, the worldwide surveillance frequency, also used by the Airborne Collision Avoidance System (ACAS) fitted to all commercial passenger-carrying aircraft above a certain weight and speed capability.

The 1090MHz frequency is very heavily utilised and cannot carry anything other than essential surveillance information.

### FLARM

'Flight ALARM' – FLARM – was developed specifically for glider pilots and the particular problems of 'see-and-avoid' between gliders flying in the same region of thermal activity. It embodies the same ADS-B principles, namely transmission and reception of positions and cockpit indication of nearby traffic, on its own frequency. It has since been extended as 'Power FLARM' to receive 1090ES ADS-B as well.

### TRIG AVIONICS TABS/TSAA ADS-B

Trig is developing an ADS-B capable Mode S transponder based on use of a lower certification and therefore less expensive GPS device. The device will conform to an FAA standard (TSO C-199) and is known as TABS – Traffic Awareness Beacon System. This provides the ADS-B-out component.

Trig is also developing the complementary ADS-B-in equipment that will receive and display the relative position of other ADS-B-out aircraft. This is following the TSAA – Traffic Situation Awareness with Alerts – standard developed by EUROCAE and RTCA.

The use of these two devices together provides a panel-mounted capability that is functionally almost identical to LPAT.

### ADS-B IN THE U.S.

As well as ADS-B on 1090MHz, ADS-B is also available on a separate frequency of 978MHz. This is only in the U.S. and is known as the Universal Access Transceiver (UAT).

UAT is GA focused and dedicated to ADS-B. It has enough capacity to transmit other types of information, such as weather and terrain information, under the general heading of Flight Information Service Broadcast (FIS-B). This feature provides added value to UAT equipage for GA aircraft that do not fly above 18,000ft, as well as reducing congestion on the 1090MHz frequency.

ADS-B is a fundamental element of the FAA 'NextGen' or next generation ATC system. There is already a nationwide infrastructure of ADS-B surveillance stations, operating on both 1090MHz and 978MHz. Because of the dual frequency implementation, aircraft using 978MHz ADS-B cannot receive signals from aircraft using 1090ES ADS-B and vice-versa. This has meant that a network of stations that receive on one frequency and transmit on the other frequency has been constructed to enable 1090ES and UAT interoperability. This capability is known as ADS-R, or Automatic Dependent Surveillance Rebroadcast.

To further support interoperability between aircraft of all different types of equipage, a capability known as Traffic Information Service Broadcast (TIS-B) is also available. This is where the aircraft is detected by Secondary Surveillance Radar, the information on its position is translated into an ADS-B format and broadcast for reception by ADS-B-in-equipped aircraft.

ADS-B and ADS-R together with TIS-B provide complete information about aircraft known to the ATC system.

### ABBREVIATIONS AND GLOSSARY

**1090ES/1090MHz Extended Squitter** (ADS-B transmission technique)
**ACAS** Airborne Collision Avoidance System
**ADS-B** Automatic Dependent Surveillance Broadcast
**ADS-B-in** ADS-B reception
**ADS-B-out** ADS-B transmission
**ADS-R** Automatic Dependent Surveillance Rebroadcast
**AOPA** Aircraft Owners and Pilots Association
**ASI** Airspace Safety Initiative
**ATC** Air Traffic Control
**ATSOCAS** Air Traffic Services Outside Controlled Air Space
**CAA** Civil Aviation Authority
**ECWG** Electronic Conspicuity Working Group
**FAV** Funke Avionics. Developers of the LPAT under contract to NATS
**FIS-B** Flight Information Service Broadcast
**FLARM** Flight Alarm. Traffic Awareness and Warning system originally designed only for glider use but now capable (Power FLARM) of receiving 1090ES ADS-B
**GA** General Aviation
**GPS** Global Positioning System
**IAOPA** International Council of Aircraft Owners and Pilots Associations
**LAA** Light Aviation Association
**LPAT** Low Power ADS-B Transceiver
**MHz** Megahertz
**NATS** National Air Traffic Services Power FLARM
**SESAR** Single European Sky ATM Research. Research programme for the future of ATM in Europe
**SJU** SESAR Joint Undertaking. Manages the SESAR Programme
**TIS-B** Traffic Information Service Broadcast
**UAT** Universal Access Transceiver (ADS-B transmission device/technique)
**VFR** Visual Flying Rules
**WAM** Wide Area Multilateration

flybright™

Trust. Relationships. Commitment.

For more information visit:
**www.flybright.co.uk**

# Interior. Exterior. Your Choice.

Fly Bright proudly offer a full range of Aircraft care services that cater for your requirements and fit into your busy schedule. From simple and basic post flight wipe downs to preparing your aircraft for sale, we are ready to serve your needs no matter where you happen to land in the United Kingdom.

Or call us: **+44 (0) 7900 806 933**

# DON'T GIVE THEM THE BIRD

*While the consequences of a birdstrike are understood, the effect of disturbance might be less well appreciated*

**f you've been flying for any length of time, you'll have noticed that birds are getting more prevalent and braver – especially if you've flown gliders.**

If a soaring bird saw an aircraft a couple of decades ago, its wings would fold in to its body and it would dive off like a dart – but not now. More and more, they seem to be accepting of human flight and perhaps perceive we're not the danger that they once thought we were. If anything, they're even more of a risk to aircraft. But, in case you think this article is about the risk of birdstrikes, it isn't; it's about the birds.

The UK attracts great numbers of wintering, breeding and migrating birds. In particular, many estuaries, coastal marshes, coastal cliffs and islands are home to large numbers of waterfowl and seabirds. While a number of specific sites such as bird sanctuaries are notified and charted for aviation – with requested avoidance criteria – many other areas are also important to the bird population.

Notification of a bird sanctuary in the UK AIP asks pilots to avoid overflight of specific portions of airspace, but flight through a bird sanctuary is not, in itself, a breach of regulations. As such, the appearance of a bird sanctuary on a chart is not a mandated restriction but merely information that advises pilots of all classes of aircraft to avoid disturbing birds and, by implication, provide a warning of a potential flight safety hazard.

ABOVE PICTURE: RSPB

Low-flying aircraft can have a serious effect on breeding birds at bird sanctuaries and a single flight over a seabird colony has been known to result in the loss of many eggs. The map (right) shows areas to avoid being low if possible

Sites important for birds are designated as Sites of Special Scientific Interest (SSSI) under the Wildlife and Countryside Act (1981) to preserve their special wildlife or geology. Additional provisions under this Act provide protection to vulnerable breeding birds.

Two hundred and forty-two of these SSSIs have also been designated as Special Protection Areas (SPAs) or Ramsar sites (wetlands of international importance), and these cover more than one million hectares of land which is protected under EU law.

SPAs are classified under the EU Birds Directive for the protection of threatened, vulnerable and migratory species of birds. Within these areas, Member States 'must take appropriate steps... to avoid any significant disturbances affecting birds'.

What many people might not realise is that it is, for example, an offence under the Act to 'intentionally or recklessly' disturb a wide variety of nesting wild bird species or to disturb dependent young of such species. Disturbance can include any activity which changes or disrupts a bird's natural behaviour, and offences may result in prosecution.

A full list of the UK sites can be found on the Joint Nature Conservation Committee Website at: *jncc.defra.gov.uk/page-1400* and a visual representation of these sites can be seen in the map.

It's not ideal for all such sites to feature on VFR charts as areas for pilots to avoid overflying because:

- The sheer number of important areas for birds would make this impractical.
- There would be a reticence to chart sites where there is no aviation or ornithological record of any existing problem regarding the interaction of birds and aircraft.
- Charting of all such sites would clutter aviation maps to the extent of generating a potential flight safety issue in itself.

The police can investigate offences involving Schedule 1 breeding birds and Natural England is able to regulate activities on

protected sites, using enforcement as necessary in situations where bird populations are being adversely affected.

While the safety consequences of a birdstrike are understood by all in aviation, the potential effect of disturbance caused by overflying areas of high bird concentrations might be less well appreciated.

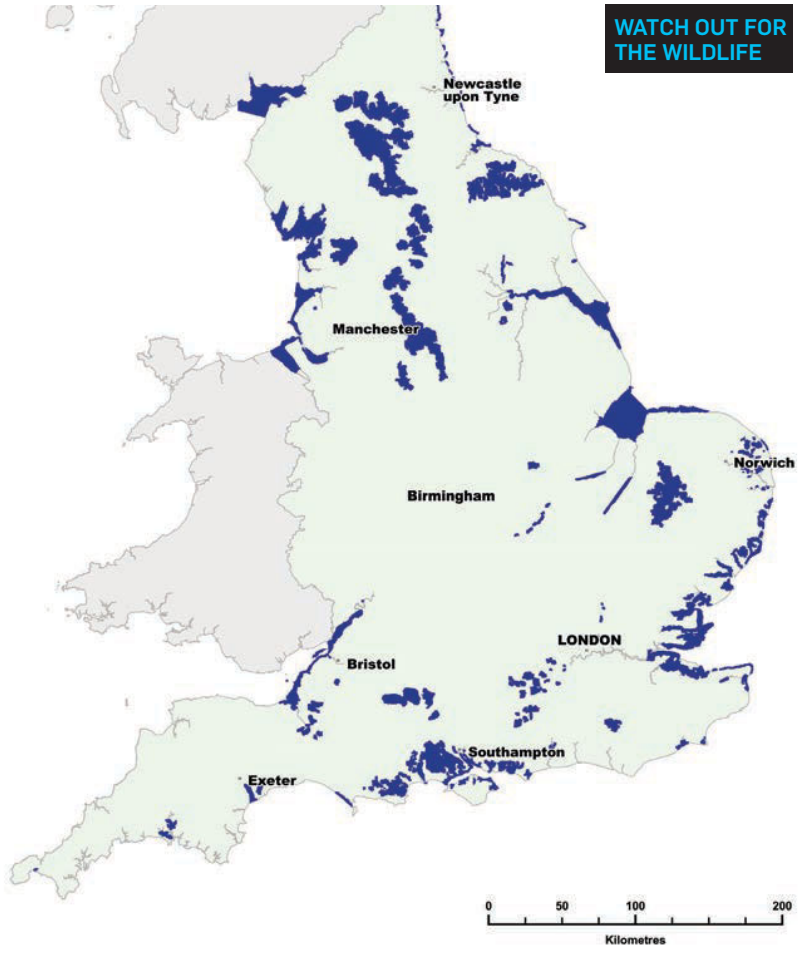
Although the precise response of birds to aircraft disturbance, and the impact upon them, is difficult to predict accurately, there is no doubt that disturbance can have serious consequences for bird populations in certain circumstances. Though all sites are important, some are particularly sensitive because of their location and the important concentrations of birds they support.

As detailed in AIC P/016 2011, flocks of waterfowl and seabirds are susceptible to disturbance and the presence of even a single low-flying aircraft may cause significant numbers of birds to take to the air. As well as increasing the birdstrike risk, this can also reduce the feeding time which, during periods of hard winter weather, can lead to malnourishment and increased risk of starvation. Another consequence of birds taking off repeatedly is an increase in their energy expenditure, possibly depleting fat reserves and, perhaps, their chances of survival.

Low-flying aircraft may have an equally serious effect on breeding birds. A single flight over a seabird colony has been known to result in the loss of many eggs. Each time the adult birds take flight, the eggs are liable to damage, exposure to the elements, an increased threat from predators and potential desertion by the adult birds. Given that bird and aviation activity occurs throughout the UK, it's clearly impossible to completely prevent birds and aircraft coming into close proximity. However, while there are no firm rules to prevent aviation activities causing disturbance to birds and minimise the associated birdstrike risk, some general principles should help reduce impacts in most circumstances:

- Where possible, avoid flying below 1,500ft above the surface, particularly over areas known or seen to support large concentrations of birds;
- Given that water attracts birds, avoid overflight of areas of water or wetlands below 2,000ft. Many of the most important concentrations of birds are at coastal sites, especially around estuaries. Overflight of these should be avoided wherever possible.
- It is especially important to avoid disturbing important bird feeding and roosting grounds in the winter and during cold conditions.
- Birds appear to be particularly sensitive to overflights by slow-moving aircraft such as helicopters, microlights and paramotors. Pilots of such aircraft should, wherever possible, avoid areas known to support large concentrations of wintering or breeding birds.
- It has been reported that birds are more likely to take flight if aircraft move erratically so, where overflight of known areas of bird concentration is unavoidable, it's worth avoiding unpredictable flight paths. CU

## WATCH OUT FOR THE WILDLIFE




## FURTHER INFO

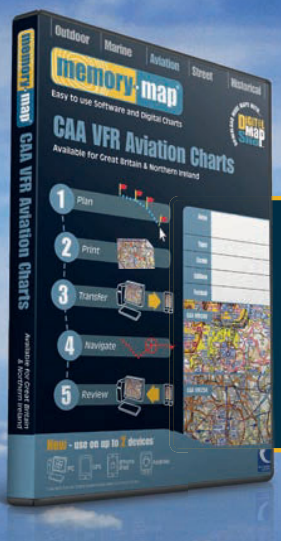
**More information on** the location of areas of bird concentrations can be obtained by contacting local Natural England, Scottish Natural Heritage, Natural Resources Wales or Department of the Environment Northern Ireland Offices. Their contact details are:

**Natural England Enquiries:** 0300 060 3900
**Scottish Natural Heritage:** 01463 725000
**Natural Resources Wales:** 0300 065 3000
**Department of the Environment Northern Ireland Offices:** 028 9054 0540

memory-map®

**As used by thousands of aviators including Queens Flight, Police and Rescue helicopters**

www.memory-map.co.uk




## VFR 500k & 250k charts £20.00*

**Plan flights and print charts with just a click of a mouse**

Use Memory-Map on your PC to plan flights and print CAA VFR charts. Then transfer charts and navigate on your laptop, mobile or tablet. Record your GPS tracklogs and review your flights back at base.

*download £20.00, DVD £25.00

## Turn your mobile or tablet into a GPS

**iPhone, iPad and Android compatible***

Download direct or buy charts on disk and transfer them to your iPhone, iPad or Android device for a real-time GPS chart plotter with DigitalGPS nav data.

*apps available separately

Available on the App Store | Google play

## NEW

## Waterproof, rugged smartphone GPS with CAA charts £329*

**Our most feature packed and powerful GPS to date**

Pre-loaded with CAA VFR 500k South, North and Scotland plus space to add VFR 250k charts or OS maps. Use just as a GPS or take advantage of the Android smartphone features on WiFi, or by adding a SIM card, for calls, mail, messaging and internet.

*Price shown with GPS Trade In saving £50

**1 Plan**
Simple tools let you create and manage routes, tracks and waypoints.

**2 Print**
Print unlimited chart sections with your own routes and notes.

**3 Transfer**
Copy charts and routes to your iPhone, iPad or Android device.

**4 Navigate**
A complete navigation system with moving chart and DigitalGPS™ nav data.

**5 Review**
Record tracklogs to see where you've been, altitude, speed and distance.

Civil Aviation Authority

**Order online at www.memory-map.co.uk or call 0118 906 2600**

# DROP IN ON THE MILITARY

WORDS: SQUADRON LEADER GARY COLEMAN, OFFICER COMMANDING OPERATIONS SQUADRON, RAF HALTON | PICTURES: CROWN COPYRIGHT

***Looking for a different destination?*** *GA is to have easier access to MoD airfields*

**Flying into new airfields is always interesting and a good reason for taking a trip. The question is: where to go that's new? Some military airfields have been available to GA for a while but, in its new strategic plan for GA, the Government has committed to making sure that GA has as much access to military aerodromes as possible. So, how to make the most of this offer?**

Obviously, the prime reason these airfields exist is to support the military, so the first thing is to have a chat with air operations or air traffic control at the airfield. They'll need at least 24hrs advance notice to make sure they can fit you into their other operations and all MoD airfields are 24hr prior permission required (PPR). They can then discuss the possibilities of a visit and any special procedures they may have.

Every airfield will try its best to fit you in, but remember that they may have a priority military reason, such as an exercise, which means that isn't always possible.

## SO WHAT DO YOU NEED TO FLY INTO A MoD AIRFIELD?

The most important requirement is to have Crown Indemnity Insurance, without which you would be uninsured. Depending on your aircraft size, this is normally for £7.5m and most aircraft insurers include this for free. You will need to have read either the *Defence Aerodrome Manual* for your chosen airfield or any PPR briefs that the airfield might have. You can get these direct from Air Operations at the relevant airfield and/or many airfields will have their *Defence Aerodrome Manual* available on their website. You'll need to confirm that you've seen this information before you will be issued PPR.

## SO WHAT CHARGES WOULD I INCUR TO FLY INTO A MoD AIRFIELD?

The charges are available online at *tinyurl.com/o2js8o5* and will vary. For example, a Cessna 152 would cost the minimum landing charge of £18 (plus VAT) plus the £10 civil user indemnity administrative charge, making a total of £31.60. Keeping with the Cessna example, if you wanted to stay for more than two hours then there is a 24hr parking charge of £16.50 (plus VAT), making a total charge of £51.40. For regular users and training flights, there are some reductions. The charges also vary depending on the location. For example, airfields within 40 miles of London (deemed to be the south east) are in a higher price band.

The runways might have been built for fast jets and other exotic aircraft, but now even more are open to GA pilots looking for somewhere new

The MoD is committed to supporting GA and is a signatory to the Aircraft Owners and Pilots Association's Strasser Scheme (*tinyurl.com/nl8qv2v*). That means GA aircraft under three tonnes having a genuine emergency or weather diversion won't be charged.

## WHAT ELSE SHOULD I READ TO FLY INTO A MoD AIRFIELD?

The CAA's Safety Sense leaflet *26 – Visiting Military Aerodromes* (*tinyurl.com/ncage8r*) contains a wealth of good information. Also, chapter 10 of the UK's *Radiotelephony Guide CAP413* (*tinyurl.com/qhcmfyh*) describes the difference in military radio calls and also the oval circuits used at MoD airfields (which are similar to the bad-weather circuit taught in the CAA/EASA PPL syllabus). The *Defence Aerodrome Manual* (DAM) for the airfield is a must-read as it is the master reference document. You should ask for a redacted copy if the DAM is not available on the airfield's website. Also, if the airfield you would like to fly into has a service flying club, give them a call. They will be able to offer lots of advice to a fellow GA pilot before you speak to the aerodrome itself.

## ANYTHING ELSE?

The military want flights to be as trouble-free and enjoyable as possible. People who work at these airfields understand that to fly in for the first time can be very different to usual GA flying so, if you have a question or if something is unclear to you, please ask. Remember: as always in flying, there are no stupid questions.

## FINALLY...

If able and safe to do so, the MoD makes a commitment to welcome any UK GA flight. However, they don't want to disappoint potential visitors, so do remember they are at least 24hr PPR. CU

## SO WHERE MIGHT I GO?

**RAF Cosford and its RAF Museum**
*www.rafmuseum.org.uk/cosford*

**RAF Coningsby and the Battle of Britain Flight Visitors' Centre**
*raf.mod.uk/bbmf/visitorscentre*

**RAF Halton and its Trenchard Museum**
*raf.mod.uk/rafhalton/aboutus/trenchardmuseum.cfm*

**RNAS Yeovilton and the Fleet Air Arm Museum** *fleetairarm.com*

**Middle Wallop Airfield and the Museum of Army Flying**
*armyflying.com*

Crete2Cape
VINTAGE AIR RALLY

**NOW IS YOUR CHANCE TO SIGN UP FOR ONE OF THE MOST REWARDING EXPERIENCES IN AVIATION**

# CRETE TO CAPE VINTAGE AIR RALLY


**A flying rally across Africa, from Crete to Cape Town, for aircrafts built before the 31st December 1949.**

**The rally starts on the 9th January 2016 and will arrive in Cape Town five weeks later.**

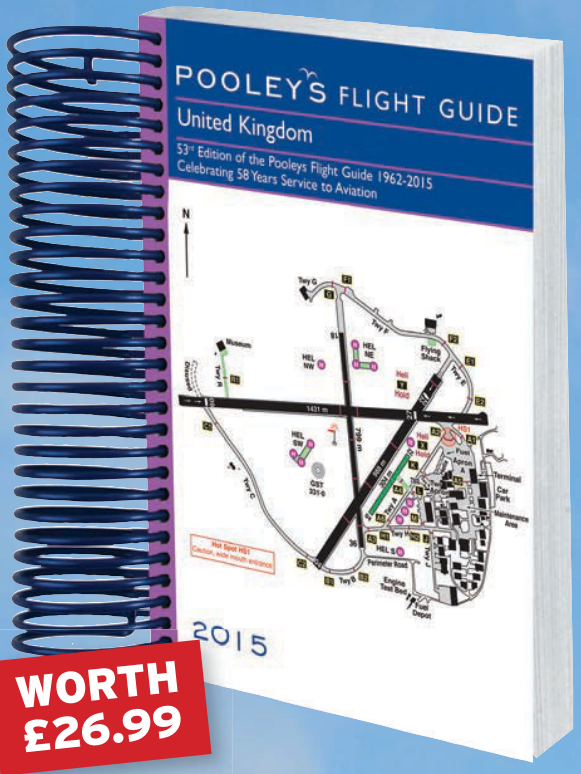
Following in the footsteps of the pioneering flights in the 1920s we'll connect some of the most beautiful and evocative points in Africa. Flying low along the Nile from Cairo to Khartoum, past the highlands of Ethiopia before the plains of Kenya and the home of African aviation in Nairobi. Then off again past Kilimanjaro into the Serengeti and on to the spice island of Zanzibar. After a short pause to enjoy the Indian ocean we continue, crossing Zambia to Victoria Falls, before continuing to Bulawayo in Zimbabwe. Our final days take us into, and across, stunning South Africa to the Cape, journey's end.

**www.crete2cape.com**

# Pilot


## SPECIAL *Pilot* SUBSCRIPTION OFFER

# Don't miss out on your Pooleys Flight Guide today




WORTH £26.99

*Pilot* is packed with flight tests, travel articles, news, technique features and much more to inspire, inform and entertain, including stunning photographs.


13 issues a year

Subscribe to *Pilot* for just **£33.50 – SAVING 35%** by Direct Debit or **£38.50 – SAVING 25%** by credit/debit card and receive a *2015 Pooleys Flight Guide - UK*

## Subscribing is simple

**www.subscriptionsave.co.uk/CLUED**

**0844 848 8049** and quote NPICLD5A

Lines are open 8am-9.30pm Mon-Fri, 8am-4pm Saturdays. BT calls to 0844 cost no more than 5p/minute, calls from mobiles usually cost more. T&Cs: Direct Debit is a UK offer only. Details of Direct Debit Guarantee are available on request. Pilot magazine is published 13 times a year. Savings are based on the cover price of £3.99. Gift is available whilst stocks last. Please allow up to 28 days to receive your free gift. For overseas subscription rates, please visit www.subscriptionsave.co.uk. Offer ends 31/10/15.

# HAVE YOUR OWN
# FLORIDA FLYING HOLIDAY

YOUR ONE-STOP SHOP FOR USA FLYING


USE YOUR EASA PPL TO FLY IN THE USA

We will provide everything you need:

- FAA licence
- Aircraft rental
- Fly-in holiday homes
- Aircraft check-out
- Instructor advice on USA flying

Based from our fly-in holiday homes near Vero Beach, Florida, you can take family and friends flying around some of the most exciting holiday destinations in the world, with exclusive PA-28 aircraft use.

*For free FAA and USA flying guide go to*

**www.pilots-paradise.com**

**Call Oli on 07740 922316**

Discover... Pilots Paradise

01

ALL PICTURES BY KEITH WILSON/SFB PHOTOGRAPHIC

# Yak-52 stall/spin into field

**AN AAIB investigation** has looked into the circumstances around the Yak-52 that crashed in to a field near North Weald in March 2014.

It tried to establish why the pilot was flying low and has decided that the flight 'may not have been proceeding normally'. It is possible that a problem led the pilot to choose to descend to a low height. There was evidence that the engine was running at the moment the aircraft struck the ground, so the possibility of a significant loss of engine power could not be discounted.

The aircraft was seen flying low five minutes after take-off and witnesses said it made a level turn but then watched it climb sharply, entering what the board thinks was either a stall or spin; it did not have sufficient height to recover and struck the ground. Both occupants received fatal injuries and there was a fire. The reason for the final manoeuvre (the sharp climb) cannot be determined.

The pilot was extremely well qualified, with more than 15,000 hours of RAF/airline experience. He was also proficient in flying the Yak-52, usually taking it up for aerobatics or to tutor civilian pilots in formation flying. He held a Class One medical, which equated to a Class Two medical for private flying. While he was diabetic, a toxicological investigation revealed nothing that could have contributed to the accident.

He had passed a Single Pilot Aircraft skills test, which included incipient spin recoveries and aerobatic manoeuvres, in the aircraft on 1 December 2013; the examiner reported they were "carried out with a high degree of competence". Therefore, he had spin/stall awareness and the skills to recover.

The AFISO on the day saw the Yak climb away from the airfield, above 1,000ft. In his final communication at 14:48hrs, the pilot reported he was "vacating to the east". Primary radar returns show a predominantly easterly track, but the aircraft was low.

It was fitted with a transponder but no secondary radar responses were recorded and the investigation didn't have height information to work with. The aircraft track included a left and then a right turn, which were coincident with the position of a small airfield, but no other flight track details came about until more than 20 eye-witnesses observed the aircraft flying near Highwood, Essex.

Although some of their accounts differed in detail, there was general consensus about the flight profile. The aircraft was first seen flying at a 'normal speed' more-or-less straight and level, south-easterly at a height estimated to be between 100 and 200ft. The aircraft then flew a level turn. Some witnesses recalled that this was through only a few tens of degrees, while others perceived it to be more significant.

The Yak then climbed relatively abruptly to approximately twice its earlier height, to 200-400ft, and some witnesses then described it entering an incipient spin before descending into the ground. A few others said the aircraft pitched dramatically nose-down and struck the ground.

Although a number of people reached the crash site soon after impact, they were unable to approach because of the severe fire.

The aircraft had crashed into oilseed rape approximately 300m north of the A414 between Chelmsford and Stansted. There was no ground slide and the impact was steeply nose-down.

The pitot probe, attached to the left wing leading edge, was found buried to a depth of approximately 0.5m, inclined at an angle of 80° to the horizontal, and was considered to be indicative of the flight path angle.

Despite the steep impact angle, the structure aft of the wing spar had remained substantially intact. The right wing's leading edge had made an impression in the ground and the wing had come to rest immediately above it.

A similar impression had been made by the left wing, although it was clear that the aircraft and wing had subsequently rotated some 15° anti-clockwise before coming to rest.

This suggested that the aircraft was rotating at the time of impact which, together with the steep, low-speed impact and witness evidence, was indicative of the aircraft striking the ground following a stall-spin. CU

## INCIDENT DETAILS

**Aircraft Type**
Yak-52

**Date and Time**
29 March 2014 at 14:53

**Pilot's Flying Experience**
ATPL, 50 years old, in excess of 15,000 hours, 40 on type
Last 90 days – 1 hour
Last 28 days – 1 hour

FOR FURTHER INFORMATION ON INCIDENT REPORTS, VISIT *AAIB.GOV.UK*

02

# Commuters collide

**BOTH PILOTS WERE** using their aircraft to commute to work and were experienced and current when they collided in visual meteorological conditions near St Neots early in the morning.

The Kitfox had taken off from the pilot's private strip and was heading south for Sandy Airfield, while the Cessna had left from Fowlmere and was heading (from east to west) to Sywell. The investigation concluded that the accident occurred because neither saw the other in time to take effective avoiding action.

The pilot of the Kitfox died, but the pilot of the Cessna managed to land his damaged aircraft at Bedford Aerodrome. Most of the Kitfox's wreckage was in a small area in a stubble field, but several parts of the right wing were more than 250m away. The right wingtip fairing, which was red, had white scuffmarks on it.

On the Cessna, there was a 12cm-wide scuffmark on one blade of the propeller and a 50cm-long dent with red witness marks in the left lower part of the cowling. Several small pieces from the Kitfox were removed from the nose gear door of the Cessna. There were also some scuffmarks along the fuselage underside.

The landing gear was down, with no evidence of any witness marks that might have occurred had the gear been down during the collision. There was extensive damage to approximately 75 percent of the underside of the left horizontal tailplane and a piece of the horizontal tailplane tip fairing was found approximately 500m from the main wreckage of the Kitfox.

An assessment was made of the likely views that each pilot would have had when looking in the direction of the other aircraft. The Cessna had a large doorframe to the right side of the cockpit, while the high-winged Kitfox had a wingstrut outside the left window.

Recorded information indicates that the aircraft approached each other in steady flight and there was no evidence to indicate that either was in difficulty. The accident occurred in Class G airspace with neither aircraft in receipt of an ATC service, so the only way to avoid a collision was see-and-avoid. The following factors may have contributed to neither pilot seeing the other until too late:

- Each aircraft had little or no relative movement when viewed from the cockpit of the other, making them difficult for each pilot to detect.
- Both pilots were navigating visually, so their lookout would have been focused primarily in the direction they were travelling. The pilot of the Kitfox was 3.6nm north of Sandy Airfield and so it's likely his attention was focused on his arrival into the circuit pattern.
- Airframe structure in both aircraft may have prevented the pilots from seeing each other.
- The position of the sun, low in the sky to the south-east, could have made detection of the Cessna more difficult for the pilot of the Kitfox.

Regulation 9 of the Rules of the Air would have required the pilot of the Cessna to give way in this case, but this could only have been complied with if the pilot had seen the Kitfox in sufficient time for him to take appropriate avoiding action.

'See-and-avoid' is not perfect for preventing mid-air collisions due to the limitations of the human eye and technology might provide an affordable enhancement that could reduce the number of collisions. Until then, whenever possible, pilots should be encouraged to make use of transponders in conjunction with a radar service and to maintain an active lookout.

The report noted that NATS is conducting a trial with AOPA, Trig Avionics and Funke Avionics to use a non-certified GPS source connected to a transponder (see page 26). The aim of the trial is to understand whether the performance of uncertified GPS devices, in conjunction with ADS-B, can be used to deliver safety benefits. Possible applications include collision avoidance warnings in the cockpit, enhanced situational awareness and advanced functions such as synthetic traffic information spoken directly into the pilot's headset.

A supplementary initiative is to introduce a low powered ADS-B transceiver called LPAT (Low Powered ADS-B Transceiver). It is intended that this will be an affordable, lightweight, carry-on device to provide enhanced awareness of other aircraft. CJ

## INCIDENT DETAILS

- **Aircraft Type**
  Kitfox and Cessna F177RG
- **Date and Time**
  23 September 2014 at 07:28
- **Pilots' Flying Experience**
  *KITFOX*
  PPL (medical declaration),
  46 years old, 990 hours,
  200 on type
  Last 90 days – 36 hours
  Last 28 days – 4 hours

  *CESSNA F177RG*
  PPL (JAA Class 2), 56 years old,
  1,038 hours, 604 on type
  Last 90 days – 11 hours
  Last 28 days – 7 hours

# Safer by Design.

Evolution 2000 is the only GA EFIS display that provides total system redundancy - at less fly-away cost than any competing system. Now the EASA AML-STC list includes over 40 aircraft manufacturers representing over 700 individual aircraft models.

ASPEN AVIONICS

Bournemouth Avionics Limited

bournemouth-avionics.co.uk

For further details call:
Brian Cook
Tel: 07969 512017
bcookbal@aol.com

blackbushe aviation
flying club and school


IR(R), Night, IR, Multi, CPL
IR(R) flight cost from £2,580
Call us for more details
**01252 877727**

Blackbushe Aviation | Blackbushe Airport | Camberley | Surrey GU17 9LB
www.blackbusheaviation.com | e: info@blackbusheaviation.com

# The Independent Pilots Association

**If you are a professional pilot then you need a professional association and trade union to support and represent you. The IPA is your professional body.**

- The most competitive membership fees.
- Free to students.
- Legal Advice from in house team.
- Membership gives automatic £20,000 of legal cover.
- Financial advice from IPFS.
- Membership fees are tax deductable.

## *Join Before Flight!*

The Independent Pilots Association. The Priory, Haywards Heath, Sussex RH16 3LB
**www.ipapilot.com** Tel: 01444 441149

03

# Chieftain's double engine failure

**THIS IS AN** interesting accident because it involved flying a twin-engined Piper Chieftain from Greenland that had previously had low oil pressure, caused by the use of an incorrect grade of oil for cold weather operations.

The original flight crew (two pilots normally employed by an Asian airline) had abandoned the aircraft in Greenland in December 2013 after flying it there from Seattle. It remained there until 28 February 2014, when a ferry pilot was appointed to recover it.

The engine oil couldn't be changed prior to departing Greenland, but the aircraft made it to Wick in Scotland where it had some maintenance on the right engine. It then departed for Le Touquet. However, approximately 25 minutes after take-off, the pilot suffered a double engine failure and carried out a forced landing in a ploughed field.

**INCIDENT DETAILS**

- **Aircraft Type**
  Piper PA-31-350
- **Date and Time**
  9 April 2014 at 14:47
- **Pilot's Flying Experience**
  ATPL, 60 years old, 3,188 hours
  (of which 19 hours were on type)
  Last 90 days – 16 hours
  Last 28 days – 1 hour

Examination of the engines revealed that one piston in each engine had suffered severe heat damage, consistent with combustion gases being forced past the piston and into the crankcase.

As the accident occurred to a private aircraft and did not result in any injuries, the AAIB initially dealt with it in the form of a correspondence investigation.

A 'Discussion' section in the AAIB's report said: "The aircraft began experiencing engine problems, leading to the forced landing approximately 25 minutes after departing Wick in Scotland. However, it is possible that these problems may have originated prior to the aircraft arriving in the UK.

"The low oil pressures in both engines, reported by the crew on the flight leg to Greenland, may have been due to the wrong grade of oil, W100, being used in what would have been very low temperatures experienced in December in Canada and Greenland.

"Despite supplies of multigrade oil being sent to Greenland, the engine oil was not changed. This was due to the fact that the pilot noted normal engine indications combined with the lack of maintenance facilities. Thus, the aircraft continued its journey with the same oil in the engines with which it left Seattle; this was confirmed by the subsequent analysis of the oil. No further oil pressure problems were observed, although it is likely the aircraft would have been operating in warmer temperatures at the end of February in comparison with those in December.

"The engine manufacturer suggested that engine damage could have occurred as a result of operating the engines at low temperatures with the wrong grade of oil. While this may have been the case, it is surprising that any damage did not progress to the point where it became readily apparent during the subsequent flights via Iceland to Wick. In fact, the pilot did report rough running of the right-hand engine, but the investigation revealed a problem only with the No 4 cylinder compression, which led to replacement of this cylinder. Since the compressions in all the cylinders were presumably assessed during the diagnosis, it must be concluded that any damage in the No 3 cylinder of the right engine was not, at that stage, significant.

"Ultimately, it was not possible to establish why pistons in both engines had suffered virtually identical types of damage, although it is likely to have been a 'common mode' failure, which could include wrong fuel, incorrect mixture settings (running too lean) and existing damage arising from the use of incorrect oil in cold temperatures.

"The oil analysis excluded the possibility of the aircraft having been misfuelled with Jet A-1 at Wick.

"No conclusion can be drawn regarding the possibility of one of the pilots having leaned the mixtures to an excessive degree, although this would require that either high cylinder head temperature indications were ignored or that the temperature gauges (or sensors) on both engines were defective.

"The engines would have begun to fail when the combustion gases started to 'blow by' the pistons, causing progressive damage to the piston crowns, skirts and rings. This would have also caused pressurisation of the crankcases, which in turn would have tended to blow oil out of the crankcase breathers.

"In the case of the left engine, the pressurisation was such that the dipstick was blown out of its tube, resulting in more oil being lost overboard. This may have accounted for the more severe damage to the left engine, having lost more oil than the right. The detached No 1 cylinder base jet oil nozzle in the left engine may have contributed to a slight reduction in the oil pressure, but is otherwise considered to have played no part in the engine failure." CU

FOR FURTHER INFORMATION ON INCIDENT REPORTS, VISIT *AAIB.GOV.UK*

# / INCIDENT REPORTS IN BRIEF

**Ikarus C42 FB100**
**2 January 2015**
**Lower Upham Airfield, Hampshire**

**LOSS OF CONTROL ON TAKE-OFF**

The pilot started to take-off from the left side of the grass runway to avoid wetter ground on the right. There was a crosswind from the right and the aircraft deviated left early in the take-off roll. The pilot abandoned the attempt and tried to slow, but the wheel brakes were ineffective on the wet surface and the aircraft left the runway on the left where it hit a drainage ditch.

**Piper PA-28-161 Cherokee Warrior II**
**30 December 2014**
**Beverley Airfield, Yorkshire**

**HEAVY LANDING FOLLOWING ENGINE FAILURE**

The aircraft had force-landed two days previously without damage in a field just southeast of Beverley Airfield following an engine failure.

An engineer examined it with no faults found and the engine was successfully test run; it was concluded that the failure might have been due to carburettor icing. It was decided to fly the Warrior out of the field and the short distance back to the airfield.

At about 10:00hrs on the day of the accident, the pilot started the engine and ran it for 10 minutes, including a power check, before taxiing for take-off. A second power check was performed before the aircraft took off under full power and climbed away normally.

However, the engine again lost all power on final for Runway 30 and the pilot lowered the nose to maintain airspeed. Fearing that it might strike a ditch before the threshold, he raised the nose again just clearing the ditch but the aircraft stalled and landed heavily, detaching the nosewheel and right mainwheel before coming to a halt. No cause of the failure has been determined, although the pilot suspects that the second failure was not carburettor icing.

**Diamond DA42 TwinStar**
**2 December 2014**
**Bournemouth Airport**

**LANDING GEAR FAILURE**

The aircraft was on approach to Runway 08 at Bournemouth during an instruction exercise. The weather was fine but with a surface wind from 010° at 17kt, gusting to 27kt. The student pilot flew the approach well but did not fully remove the drift before landing so the touchdown was with a slight crab angle.

Immediately after landing and before the TwinStar had fully settled, the instructor felt that it did not appear to be responding as expected to the student's inputs. He took control and was immediately aware of the right wing dropping. He applied full left aileron and right rudder but was unable to stop the wing contacting the surface. The aircraft came to a stop on the grass to the left of the runway. No one was injured.

**Team Minimax**
**6 December 2014**
**Northrepps Airfield, Norfolk**

**FUEL STARVATION LED TO FORCED LANDING**

While overhead Northrepps Airfield after a local flight, the engine suddenly stopped. The pilot said he misjudged the glide performance with a stationary propeller and, while attempting to land on the runway, feared he would not be able to clear some power lines across the approach so he force-landed in a sugar beet field. As soon as a bar between the two wheels entered the crop, the aircraft flipped inverted. The pilot was uninjured but needed help from the local flying club to right the aircraft before he could get out.

The cause of the engine failure was found to be lack of fuel which manifested itself when the aircraft attitude changed. The pilot admitted that unfamiliarity with the type and its fuel consumption, combined with overestimating its glide performance with a stationary propeller by about 300fpm, were the main causal factors.

**Pegasus Quik**
**30 November 2014**
**Balado Airstrip, Kinross**

**HEAVY LANDING**

The aircraft arrived at Balado Airstrip after flying from the Isle of Bute. The wind was light from the west as the pilot made a normal approach to Runway 24. As he rounded out, he experienced sink in addition to being blinded by the glare from a low and bright winter sun. The Pegasus landed heavily on the right mainwheel followed by the nosewheel, which dug into the soft grass surface and bent the front forks back as it came to a halt.

The pilot believes that the unexpected encounter with sink, the low sun and soft ground were all causal factors.

**Denney Kitfox Mk 2**
**19 November 2014**
**Near Castle Bytham, Lincolnshire**

**COLLISION WITH BUILDING AFTER TAKE-OFF**

After touching down on a relatively short, wet grass runway, the pilot decided he would be unable to stop before hitting a boundary fence so applied full power to go-around. The Kitfox cleared the fence but failed to climb and hit the roof of a bungalow some 50m beyond the fence.

The pilot, who sustained a serious injury, believed the aircraft had most probably been placed in a high drag situation which had exceeded its performance capabilities.

**Pegasus XL-Q and P&M Aviation QUIK GT450**
**19 November 2014**
**Sywell Aerodrome, Northamptonshire**

**GROUND COLLISION AFTER ENGINE START**

The pilot had been asked by his instructor to start the engine of G-MWOY prior to his

# / INCIDENT REPORTS IN BRIEF

arrival in preparation for an instructional session. The pilot strapped himself into the forward seat and pulled the starter cord; the engine started after a few attempts and ran up to high power. The aircraft lurched forward, overpowering the footbrake, and the pilot found he could not close the throttle. In addition, his gloved hand could not operate the ignition switch in time to prevent the aircraft from striking G-CEGJ, which was parked approximately 8m away.

GJ was spun around and tipped onto its left wingtip while OY continued until it hit a concrete sleeper bordering the car park. The nosewheel bounced over it, but the aircraft stopped when the mainwheels contacted and the pilot finally managed to switch off the ignition.

The pilot reports that a kinked throttle cable, which he possibly damaged when he climbed in, and a weak throttle return spring were probably responsible for the stuck throttle. He noted that everything had appeared normal when he had started the engine earlier in the day.

**Cessna 152**
**13 November 2014**
**Defford, Worcestershire**

**WET WARNING**
After a short flight from Coventry to Croft Farm airstrip, the pilot landed on Runway 28 but touched down just before halfway on the 570m-grass strip. The grass was wet, which significantly reduced the effectiveness of the brakes, and he was unable to stop. To avoid hitting the trees and a ditch at the end, the pilot steered left into an adjacent field damaging the wingtip and propeller.

**Cirrus SR-20**
**12 November 2014**
**London Southend Airport**

**BOUNCED LANDING… (1)**
The pilot was landing on Runway 24 in fine weather with a surface wind from 190° at 14kt and the runway was damp. The Cirrus bounced after a firm touchdown and the pilot applied full power, intending to go-around. However, it rolled to the left and the wing struck the runway.

The aircraft deviated left onto the grass beyond the runway edge. It continued across taxiway 'B' before coming to a rest on the grass beyond, 380m from the threshold.

Neither occupant was injured but there was damage to its left wing, landing gear and propeller. The surface of the taxiway was also damaged, principally through propeller strikes and failing landing gear components.

**Piper PA-28-181 Cherokee Archer II**
**1 November 2014**
**Blackbushe Airport**

**BOUNCED LANDING… (2)**
The aircraft had been high on the approach and bounced a number of times before leaving the runaway. The pilot later discovered that the throttle had jammed slightly open as a result of nose leg damage sustained at some point during the landing. He assessed the cause of the accident as a pilot-induced-oscillation and he should have gone around at an early stage.

**Skyranger Swift 912S(1)**
**31 October 2014**
**London Colney Airstrip**

**BOUNCED LANDING… (3)**
The aircraft made an approach to Runway 23 at London Colney Airstrip with the wind reported by Elstree Airfield to be southerly at 8kt. On touchdown, the aircraft bounced twice before the nosewheel collapsed and it flipped inverted. The pilot said that another pilot had reported that the wind had been very variable but, while he believes this may have contributed to the bounce, he should have gone around after the first bounce.

**Piper PA-28-140**
**30 October 2014**
**Full Sutton Airfield**
**Yorkshire**

**MULTIPLE BIRD STRIKE**
The PA-28 had a multiple bird strike on final approach to Full Sutton. The pilot landed long and there was insufficient runway on which to stop. The aircraft overran onto unprepared ground and overturned. One passenger suffered a minor injury.

**Robinson R22 Beta**
**30 October 2014**
**Near West Chevington**

**ROLL OVER**
An instructor and student were practising circuits over a muddy stretch of open ground when the right skid dug into the surface and the helicopter rolled over, coming to rest on its left side. The instructor, who was in control, believes several factors led to him misjudging the helicopter's height above ground when transitioning from the hover to forward flight.

**PA-28-181**
**28 October 2014**
**Near RAF Henlow**

**CARB ICE… (1)**
The aircraft lost power in the circuit. Unable to restore it, the pilot landed in a nearby field during which the PA-28 struck an obstacle and was damaged. The uninjured pilot reported that the loss of power had been due to induction system icing; conditions at the time were conducive to such icing.

**Piper PA-28-161**
**17 October 2014**
**Near White Waltham**

**CARB ICE… (2)**
While the PA-28 was carrying out circuits, the engine lost power on base leg. The instructor took control and carried out a forced landing. As the aircraft descended, power cables were spotted on the approach path and, in avoiding them, the aircraft landed short of the intended field and collided with a hedge. The aircraft was severely damaged. Carburettor icing was considered the most likely cause of the power loss, given the number of risk factors present on the day.

**FOR FURTHER INFORMATION ON INCIDENT REPORTS, VISIT *AAIB.GOV.UK***

# TRIG — BETTER BY DESIGN

## Where innovation, quality and value stack up


TY91 – 8.33 VHF Radio – get ready for the mandate


TT21 – world's smallest GA Mode S Transponder (ADS-B Out)


TT31 – plug and play - Mode S Transponder (ADS-B Out)

Make Trig the perfect fit for your aircraft,
contact your Approved Dealer now.

www.trig-avionics.com

TRIG

- FI & FE Courses and Seminars
- Competency Based Modular IR
- En-Route IR
- Multi Engine Piston (Land) Class Ratings
- Commercial Pilots Licence

bookeraviation

t: 01494 443737
e: info@bookeraviation.aero

bookeraviation.aero

---

Leading UK flight training provider **Multiflight** is based at Leeds Bradford International Airport.

CPL/IR training available 7 days a week

multiflight


Ab-Initio ATPL £37,950 – 8 Day MCC £1,750 – 2 Day RT – MEP – CPL(A)(H) – IR – FIC – PPL(A)(H) – TRTO(H)

Tel: 0113 238 7130
**multiflight.com**

# SAFETY GETS A LIFT

*EHEST – it's not exactly a name or acronym that trips off the tongue, but its aim is to make helicopter flying safer*

WORDS: HELEN KRASNER
PICTURES: SIMON FINLAY

**Much work has been done over recent years to improve the global helicopter accident rate, and it appears these efforts are starting to bear fruit.**

Although data for some operations isn't available, the accident rate for civil helicopters worldwide is estimated to be around 0.80 per 100,000 hours. To try to reduce this, the International Helicopter Safety Team (IHST) was set up in the U.S. in 2006 and another branch, the European Helicopter Safety Team (EHEST), was established to focus on Europe.

So what exactly does it do? The fledgling organisation began by studying helicopter accidents and their causes between 2000 and 2005 and, in 2010, it published an analysis of 311 incidents in Europe over that period.

A large number were found to be due to crew misjudgements and errors so, realising that this was where work needed to begin, five teams were formed to address the issues of training, safety management systems, technology, maintenance and regulation.

However, identifying causes is one thing but actually preventing accidents is more of a challenge – that's where the hard work began. What could they actually do to prevent these same types of accidents re-occurring? The teams began by developing free training material and tools to help operators cut down on the risks, but that's not as easy as it sounds because there are so many different types of flying – from police work to commercial flying to general aviation pleasure flights. There are, however, core issues that remain common to all helicopter pilots and these have formed the basis of a series of leaflets and videos, which are available at *easa.europa.eu/essi/ehest/*.

The leaflets include Safety Considerations, Helicopter Airmanship, Off-Airfield Landing Site Operations, Single Pilot Decision Making, Risk Management in Training, the Advantages of Simulators, Mountain Operations and Principles of Threat and Error Management.

The leaflets and videos provide pilots with the relevant information for a variety of topics to allow a basic understanding of the causes, their prevention and recovery actions, so enabling pilots to make better and more informed decisions.

The initiative is ongoing, with the most recent publication having launched in December 2014. The leaflets are very comprehensive; I took a look at the one on Helicopter Airmanship and found 22 pages of detailed information covering factors such as careful pre-flight preparations, frequent flying practice and avoidance of complacency – useful stuff for any rotary pilot. Meanwhile, the Off-Airfield Landing Site leaflet covered Landing Site Identification, Landing Site Recce, Types of Approach, Manoeuvering, Departure and Pilot Errors. Some of these leaflets are published in languages other than English which is important for a Europe-wide initiative.

There are also training videos available on various topics, including Degraded Visual Environment and Loss of Helicopter Control, Passenger Management and Fuel Risk.

Of course, it's one thing to produce training information and other useful tools and quite another to disseminate it widely across all the countries of Europe where helicopters are used. This naturally presents quite a challenge, so the website plays a large part and the team also uses press releases, presentations and published articles whenever possible. Regulation may also have a part to play in reducing the accident rate, and a specialist team is looking at how EHEST can provide input.

The initiative can only benefit all those involved in rotary flying. However, it cannot provide a magic cure. Everyone knows that real change comes from raising awareness and getting people to alter the way they think and act. Improvements in safety will only come about when everyone in the helicopter world, from individuals to flying schools to larger commercial organisations, emphasises doing things differently in order to prevent accidents.

EHEST clearly has a part to play in this, and here's hoping that the next thing we hear from them is that the helicopter accident rate has significantly reduced.

A video of EHES's work can be found at *vimeo.com/125411545*. CU

Helicopter accident rates have not always compared favourably to those for fixed-wing aircraft

BOSE
Better sound through research

# Why I fly.

*"I fly because it's in my blood."*

*Michael Goulian, Champion Aerobatic // Air Race Pilot*

AeroExpo UK
THE UK'S FESTIVAL OF AVIATION 2015
Visit us in:
Hall B - Stand B16

## Why Michael flies with the Bose A20 headset.

For Michael, flying home after an airshow performance can be exhausting. That's why he relies on the Bose A20 Aviation Headset to reduce noise and the fatigue that comes with it. With 30% greater active noise reduction than conventional headsets, it helps turn a noisy airplane into a quiet one. And with 30% less clamping force,* Michael can relax and focus on flying to his favourite destination – home.

Bose® A20®
Aviation Headset

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.heliair.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

Connect with us @ BoseAviation #WhyIFly #BoseA20

# HAYWARD AVIATION LIMITED

## INSURANCE BROKERS


## ...but, just in case...


THE ST BOTOLPH BUILDING • 138 HOUNDSDITCH • LONDON EC3A 7AW
TELEPHONE: 020 7902 7800 • FAX: 020 7928 8040