CluedUp

WINTER 2016

Civil Aviation Authority

SAFETY MATTERS FOR GA PILOTS

INSIDE

Thrills and chills

Making the most of winter flying

PLUS / *FLY SOMETHING DIFFERENT* / ***LISTENING OUT SQUAWKS*** / *INCIDENT REPORTS* / ***LATEST NEWS***

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KEEP ON FLYING

Welcome to the Winter 2016 edition of *Clued Up*, the dedicated safety magazine for general aviation published by the UK Civil Aviation Authority (CAA).

It might still be winter and the weather hasn't been at its best, but that doesn't mean flying has to stop; indeed, these months can provide some superb days to get in the air. Fortunately, the days are slowly getting longer so spring isn't that far away and even better flying time is yet to come.

In the meantime, Irv Lee explores the challenges of cold weather flying in this issue, while David Rhys-Jones takes a look at the fascinating subject of Jump Rotor. Aircraft maintenance is, of course, something we need to think about whatever the weather, so we take a look at the current key issues and how to comply with the latest regulations.

Listening Out squawks have played a big part in cutting down accidental infringements of controlled airspace so, if you are not sure what they are, Claire Hatton explains how they work and where you can use them.

Also in this edition, Phil Mathews highlights the importance of differences training within some classes of aircraft and looks at the options available for PPLs seeking to improve their flying skills. Meanwhile, Aero Medical Examiner Dr Ollie Bird takes the temperature of the nation's private pilots and offers some top tips on staying fit to fly.

Last, but by no means least, we have produced a terrific new free phone and tablet app for both iOS and Android called *SkyWise* that will put all the CAA information that you need at your fingertips – no more hunting around to find what you need to know. Give it a try, and it will make your flying life much easier.

I hope this edition keeps you safety focused during any downtime this winter, and don't forget *Clued Up* is also available as a free app for iOS and Android devices.

Happy flying!

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

> Listening Out squawks have played a big part in cutting down accidental infringements of controlled airspace

To keep up to date on all airspace safety issues, follow **@airspacesafety** on Twitter
General Aviation Unit – ***ga@caa.co.uk, caa.co.uk/skywise***
Safety Regulation Group – CAA, Aviation House, Gatwick Airport South, West Sussex RH6 0YR ***caa.co.uk***

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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

Certain days in the colder half of the year can be the best time to fly in the UK – p13

more of the very best

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PICTURES BY KEITH WILSON/SFB PHOTOGRAPHIC

Testing new aircraft with a small E

SMALL-SCALE AIRCRAFT DESIGNERS and manufacturers are to get a boost from new, simple requirements for the initial testing of small 'experimental aircraft'.

Known as E-Conditions, the idea is to encourage the growth of design concepts by reducing red tape and the costs associated with securing airworthiness and operational approval for new designs.

The announcement was made at the Royal Aeronautical Society's light aircraft design conference in London, where an E-Conditions aircraft design competition was launched to encourage a broad spectrum of entries from private individuals, companies and schools. The society has worked closely with the CAA on the new testing proposal.

The requirements will allow aircraft designers to try out a new concept aircraft (up to a maximum take-off weight of 2,000kg) in the air without going through the costly and time-consuming procedures that currently exist to get a new design past the initial stage of prototype. If, after trying out a promising idea and it is thought to be viable, a full design approval programme can be planned and funded in the usual way.

Individuals and organisations conducting proof of concept flights will still be required to undertake a risk assessment to support the activity and, in particular, ensure that the risks to third parties are adequately addressed. For example, flights would not be allowed over congested areas, the pilot must be suitably qualified and no passengers or cargo can be carried.

"We've worked closely with the designers and manufacturers of light aircraft to develop these new requirements in the hope that they can be part of work to reverse the decline in the number of new aircraft designed and developed in the UK," said Tony Rapson, Head of the CAA's General Aviation Unit. "We will absolutely commit to making it as easy as possible for people to safely progress and test designs."

Details of the new process, including an application form, can be found at *caa.co.uk/ga* and the design competition can be found at *aerosociety.com.*

Charity flights now approved

BLANKET PERMISSION IS now in place for private pilots to offer flights for charities, if they meet certain basic requirements.

Thanks to simplification of the rules, pilots no longer have to apply for one-off permission to carry out an individual flight for charity.

Even better news is that pilots can also fly permit aircraft, hang gliders, paragliders, microlights, gyroplanes and powered parachutes and operate from unlicensed airfields.

To use the permission, pilots must not receive payment for the flight, the passenger must pay all money directly to the registered charity and the charity cannot be the operator of the aircraft. Pilots must also check their insurance cover is adequate and ask the passenger to check that their own life and any private health insurance covers the flight.

The new guidance has replaced the Aeronautical Information Circular (AIC W 104/201) on Charity Flights.

Pilots are being reminded about their responsibility to give a thorough explanation to passengers about the level of safety and risk prior to the flight going ahead. The full permission can be seen at ORS4 No. 1122 and the guidance is at *caa.co.uk/ga.*

'UK rules' to continue

SOME OF THE UK's existing exemptions from the Standardised European Rules of the Air, SERA, are to continue.

The existing exemption allowing arrangements for flying clear of cloud within Class D and E airspace will now continue until February 2016.

In a separate development, the UK's exemption from certain aspects of SERA's Special VFR requirements has been extended until June 2016.

Each of the renewed exemptions can be found on the CAA website at *caa.co.uk/ors4*. Detailed information concerning SERA can be found on the CAA's SERA webpages at *caa.co.uk/sera*. This includes links to the SERA regulations and supporting EASA material, which can also be found at *easa.europa.eu/regulations*.

Final ANO consultation closes

IF YOU DIDN'T know already, a new ANO is being planned for release in the autumn of 2016. The idea is to closely align this new ANO with the arrival of new European Aviation Safety Agency operational rules for private aircraft.

As such, a second (and final) consultation has just closed on what the GA elements of the Air Navigation Order (ANO) should be.

The first consultation has already set out some proposals and this second consultation is about coming up with the fine detail.

Where possible, some of the changes we expect to come in 2016 might actually be introduced sooner by using exemptions. The idea is that there might be benefit to the GA community if the changes are made now.

An independent GA challenge panel which is chaired by Julian Scarfe (who is also the Vice President of Europe Air Sports) has influenced all the proposed changes. The panel was originally put in place to act as a critical friend to the process.

Keeping new pilots feeling PROUD

ALL TOO OFTEN, student pilots achieve their licence but then give up flying too soon. This can be for a variety of reasons, but chief among them is not having enough goals.

Now there's a new initiative called PROUD (Pilot Recognition for Operational Up-skilling and Development) to tackle the high dropout rate of recently qualified PPLs. The idea is that GA associations and organisations can become endorsed by PROUD and start offering lifelong learning programmes.

"We know that pilots who continue to develop their flying skills are safer than those who do not," explained Tony Rapson, Head of the CAA's GA Unit. "That is not a surprising fact, so we really want to encourage all private pilots to find the time to acquire new skills and complete additional training after getting their licence, other than their biennial flight check. They will hopefully find that flying becomes more rewarding as a result."

So far, the LAA and AOPA are among those endorsed; pilots really should take a look at these two organisations' Wings Award Schemes. A low-hours private pilot can often feel unsure about what to do next with their flying, which is why being given a set of tasks (with oversight and encouragement from other pilots) is such a good way for them to gain the confidence they need.

Take the LAA's Wings Award Scheme, for example. Pilots can work towards Bronze, Silver and Gold Wings. Each level requires minimum flight hours, achievements, attendance at safety-focused events and extended navigational challenges. Bronze Wings are awarded when they have gained 100 hours' flight time and flown a cross-country flight of 200nm with two intermediate stops. Silver Wings requires 250 hours flight time (200 hours as P1) and a 400nm navigation challenge. Finally, Gold Wings are awarded for a minimum of 500 hours flying time and a 600nm navigation flight including four intermediate stops.

The first FTO to be endorsed as PROUD is Aberdeen-based Cabro Aviation. Cabro runs a Flight Achievement Recognition Scheme (FARS) that encourages pilots to develop their skills post-PPL in a structured way.

The CAA is keen for other GA organisations to join the PROUD initiative, so expect to see this promoted in due course. For more, go to *caa.co.uk/ga.*

Wake vortex on display

THERE'S A FASCINATING video that's well worth watching if very uncomfortable to view at the beginning. It concerns a wake vortex accident to a Robin DR400 in Germany in 2012 when the aircraft took off soon after an Antonov AN-2.

The relevant air authorities made a video explaining what happened, which was only available in German but has since been edited into a shorter version with English explanations by John Maxwell on YouTube. It's well worth watching and you can view it by simply putting 'Robin accident John Maxwell' in YouTube's search box.

More permit microlights on the way?

WE COULD BE on the verge of seeing more 'Permit to Fly' microlights come to market because the BMAA has been given 'A8-26' approval.

The approval means that the BMAA can provide design, construction, maintenance and continuing airworthiness management oversight of any microlight on a Permit to Fly.

Welcoming the approval, Geoff Weighell, chief executive of the BMAA, said: "We are extremely proud to be the first organisation to be approved to the new standard, which allows us the potential to expand our areas of activity, particularly in respect to working with the microlight manufacturing industry to help them reduce the cost of regulatory oversight and strengthen the viability of British microlight aircraft design and production."

The approval comes after two years of work since the CAA announced a policy change in November 2013 that would allow organisations such as the BMAA to expand their oversight powers.

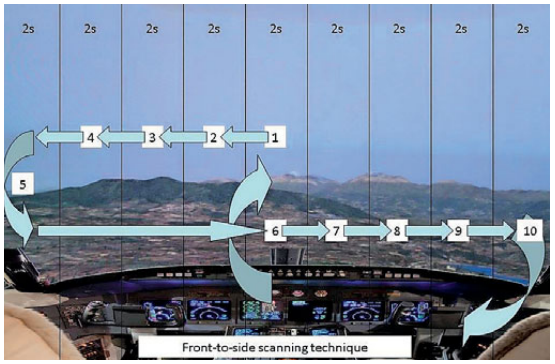
Tony Rapson, Head of the CAA's General Aviation Unit, handed over the approval certificate to the BMAA at the CAA's Gatwick headquarters, saying that: "We are delighted to be able to grant this approval to the BMAA. The CAA has an excellent working relationship with the BMAA and we look forward to continuing that."

Just 100ft from tragedy

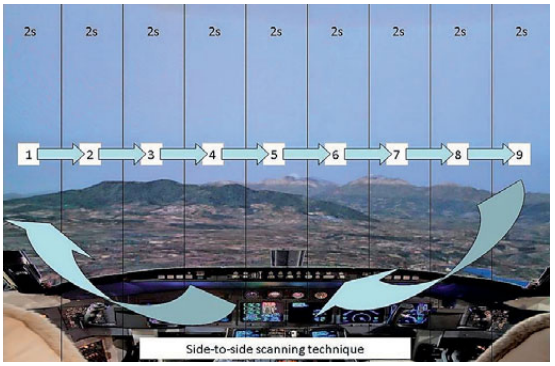
THE IMPORTANCE OF keeping a good lookout in the circuit was reinforced in a recent UK Airprox Board (UKAB) report into a serious incident at Denham in May 2015. A Pilatus PC-12 and Cessna 152 came within 100ft of colliding as a result of failures by both pilots to achieve respective situational awareness. Both aircraft were attempting to enter Denham's circuit, which had heavy traffic at the time.

The importance of developing an effective visual scanning method cannot be overemphasised and pilots have the ultimate responsibility to maintain separation with other aircraft in Class G airspace. As a general rule, you should keep your eyes focused on anything inside the aircraft for no more than four-five seconds for every 16 seconds spent scanning outside.

Assigning the Denham Airprox the highest risk category, UKAB noted that 'chance had played a major part in events'. Highly trained PPLs flying increasingly sophisticated aircraft should not be leaving collision avoidance to chance. For more tips on scanning patterns, download the Infringement Prevention Guide from *airspacesafety.com*. For more details of the Denham Airprox (No. 2015079), go to *ukairproxboard.org.uk*



Front-to-side scanning technique



Side-to-side scanning technique

New syllabus for helicopter training

YOU MIGHT HAVE heard there's a new PPL theoretical training syllabus for planes, but there are now also new alternative ones for the helicopter PPL and helicopter LAPL.

The CAA consulted with all helicopter training organisations offering such training and their resulting feedback has led to these new theoretical knowledge syllabi. The idea is that this theoretical training is more relevant to today's 'complex aviation environment'. Plans to introduce online examinations for the alternative syllabi are underway.

You can see the PPL(H) syllabus at *caa.co.uk/cap1340* and the LAPL(H) at *caa.co.uk/cap1341*.

The cost of busting Heathrow's airspace

A HELICOPTER PILOT has been fined after causing delays at Heathrow by infringing the airport's Class D airspace.

The pilot was flying from Wycombe Air Park to Cliveden House in Buckinghamshire when he entered the London Control Zone just after 1pm on April 30 2015. ATC at NATS, Swanwick, spotted his infringement and all northbound departures at London Heathrow Airport were temporarily stopped.

The pilot, who pleaded guilty via post to one count of entering Class D airspace in the vicinity of London Heathrow Airport without ATC clearance, told the CAA he had been to Wycombe for a flight test before deciding to fly to Cliveden House for lunch.

He said he had been given directions to Cliveden House but did not have co-ordinates. He said he had been listening to air traffic control but it was extremely busy and, as the landing area was in view, he decided to land his helicopter. He further admitted that he should have waited for clearance and apologised for his misjudgement.

He was fined £1,700, given an order to pay costs of £600, a victim surcharge of £120 and a court user charge of £150, totalling £2,570. Uxbridge Magistrates also heard that the pilot had two previous convictions for aviation offences.

"When a pilot infringes controlled airspace, the CAA has a number of options it can use including further training. However, in the most serious cases, we can and do prosecute," said CAA prosecutor Alison Slater. "Airspace infringements, no matter how short-lived, can cause significant disruption and the knock-on effects could means hours of delays to thousands of people."

Help for 8.33 kHz changeover

UK PILOTS MIGHT get assistance in the form of European funding to ease the transition to the fitting of 8.33 kHz radios. All radios will need to be able to transmit and receive on both 8.33 kHz and 25 kHz by January 1 2018, although there might be a few exemptions.

To help the transition, the CAA is working on a number of initiatives. The first is to apply for European Union funding to assist with the cost of new radio equipage. The second is to try and get rid of the regulatory fee to change a panel-mounted radio, and the hope is that radio manufacturers can assist with a minor modification approval process instead. Thirdly, the CAA is also asking the European Commission if a small number of dedicated 25 kHz frequencies can be retained for a limited period of time after the conversion deadline of December 31 2017.

Finally, the CAA is also pushing for UK-registered balloons and gliders being able to use certain handheld 8.33 kHz transceivers.

As each of these initiatives progresses, information will be available at *caa.co.uk/ga*

New maintenance rules

OWNERS OF CERTIFIED EASA aircraft are being advised of changes to maintenance rules because the existing UK Light Aircraft Maintenance Programme (LAMP) does not comply with EASA requirements and will be phased out.

In future, owners of these aircraft not being flown commercially will have a number of maintenance options. The initial phase out of LAMP, covering EASA certificated aircraft with a maximum take off mass of 1,200kg or less, will begin in 2016. Owners have a choice of moving to:

- Existing EASA Part M requirements
- The new Minimum Inspection Programme (MIP), where owners can self-declare their aircraft maintenance programme, or
- A programme based on manufacturer's recommendations.

Regardless of the option chosen, it must be specific to the aircraft and include a declaration signed by the owner accepting full responsibility for the programme. The move should be completed by January 31 2017.

Before making any decision, maintenance organisations and engineers should be consulted on the best option. The CAA is in the process of briefing all Part M maintenance organisations on the changes.

As a result of the changes, an aircraft's annual inspection and the issue of its Airworthiness Review Certificate can be done at the same time and by the same engineer. The maintenance programme itself will also be subject to a review by the engineering organisation to ensure it is appropriate.

A second phase out of LAMP covering EASA certificated aircraft with a maximum take off mass between 1,200kg and 2,730kg will start in 2017, with a year to transfer.

The CAA has also committed to review the UK-specific rules for Annex II aircraft. The Light Aircraft Maintenance Schedule used by microlights, kit-builds etc may also be aligned to Part M rules as a result.

GASCo Safety Evenings 2016

THIS SEASON'S PRESENTATION will be in three parts: Human Performance and Limitations, Conflict and Loss of Control. The evenings will contain the usual mix of interesting safety information, tips and the opportunity for discussion, and the experienced team of presenters aim to make the evenings enjoyable while making serious and thought-provoking safety points. If you'd like to attend, please contact the venue concerned.

January 20 2016, 8pm
Innsworth, Gloucester
C/O Severn Valley Microlight Club (SVMC)
Sergeants Mess, Imjin Barracks, Innsworth
Gloucester, GL3 1HW Jon Ingram
Email: hplgloucester@gmail.com

January 23 2016, 7.30pm
Talgarth (Black Mountains Gliding Club)
Gwernyfed RFC, The Malthouse, Trefecca
Road, Talgarth, Powys, LD3 0PL
Email: gordon.b.dennis@gmail.com

January 27 2016, 7.30pm
Leicester Aero Club
Leicester Airport
Contact: Club Reception
Tel: 0116 2592360
Email: info@leicesterairport.com

January 30 2016, 7pm
Southdown Gliding Club
Parham Airfield Geoff Stilgoe (Club Safety Officer) **Email:** Geoff.Stilgoe@tiscali.co.uk

February 1 2016, 7pm
Compton Abbas Airfield
Tel: 01747 811767
Email: michelle@abbasair.com

February 2 2016, 7.30pm
York Gliding Centre
CFI Andy Marvin/Pat White
Email: office@yorkglidingcentre.co.uk

February 3 2016, 10am
Institute of Health and Safety, Hull
Country Park Inn, Cliff Road
Hessle, HU13 0HB
Colin Henery
Email: chenery@abports.co.uk

February 11 2016, 7.30pm
Bourn Aerodrome
Trevor Gilpin or Richard Francis
Email: rfcbourn@btconnect.com

February 13 2016, 7.30pm
Norfolk Gliding Club
Tibenham Airfield
Email: stevebrownlow@me.com

March 10 2016, 7.30pm
Halfpenny Green
Bobbington Village Hall, Six Ashes Road,
Bobbington, Nr Stourbridge, DY7 5BZ
Email: anthony.dring@yahoo.co.uk

March 10 2016, 7pm
Boscombe Down Aviation Collection and GoFly!
Hangar 1, Old Sarum Airfield
Tel: 01722 212077
Email: enquiries@goflyuk.com

March 16 2016, 7.30pm
Cambridge Aero Club
Terry Holloway
Tel: 07785 316763
Email: th@marcamb.co.uk

April 5 2016, 7.30pm
West London Aero Club
White Waltham Airfield, SL6 3NJ
Tel: 07979 781261 (West London Aero Club Ops is 01628 823272)
Email: cm_royle@hotmail.com

April 7 2016, 7.30pm
Lydd Airport, Biggles Bar
Roy Panniers
Tel: 01797 320734
Email: lyddaero@btconnect.com

April 11 2016, 8pm
Popham Airfield
Alan Lovejoy
Email: alan.lovejoy18@gmail.com

April 26 2016, 7:30pm
Lincoln Aero Club
Sturgate Airfield
John Bailey
Email: info@lincolnaeroclub.co.uk

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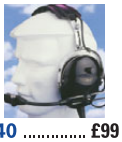

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WHAT TO DO IN WINTER?

WORDS: IRV LEE | PICTURES: SIMON FINLAY/BRIAN BARR

This time of year can offer terrific flying days, so here are a few thoughts to help you make the most of them

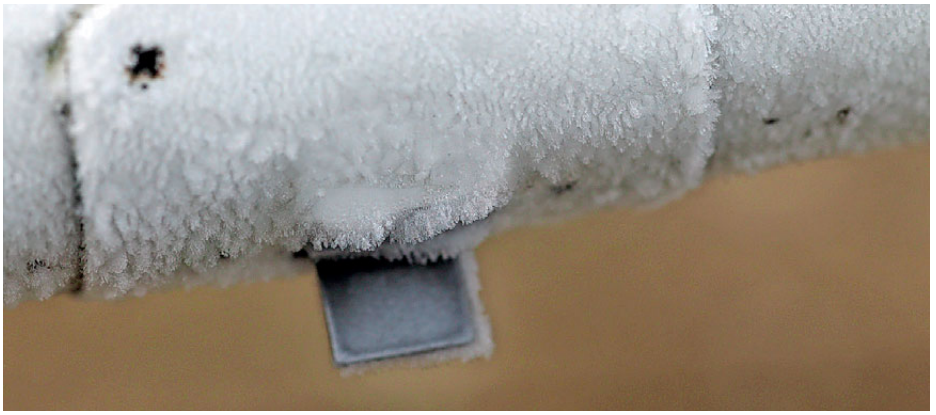
Winter is upon us and the so-called 'flying season' of main events for aviation is over with the exception of a small number of airfields with fly-ins. But, rather than retreat from the air to re-emerge with rusty skills sometime around Easter, certain days in the colder half of the year can be the best time to fly in the UK and offer fabulous views and conditions. However, there are some different issues to consider.

IT'S NOT ALL ABOUT THE WEATHER

The trouble is that those great cold, clear and sunny winter flying days are notably shorter without a night rating or night capable aircraft (or airfield!). Stating the obvious? Not really. It's not simply that there are fewer hours between sunrise to sunset; the time available for fun flying gets even shorter if you have to wait for a temperature rise to melt overnight hoar frost from wings, or for hangared aircraft if you have to spend the morning sitting in a clubhouse waiting for radiation fog to burn off.

The worst weather days, of course, shouldn't be challenged by getting airborne at all. However, that gives spare time to catch up on building the knowledge reserves – often a worthwhile self-preservation investment. The CAA's Safety Sense (and Handling) library at *caa.co.uk/safetysense* is handy reading and, among other advice, you will find 'Winter Flying' as Safety Leaflet No 3. The content is wide-ranging and ordered through a winter's flying day from preparation to post-flight actions. Rather than repeating or copying a leaflet which is so easily accessible, it might be more interesting to look at actual incidents that my colleagues and I have experienced over the years in a typical club or syndicate environment at the end and start of the year.

It's not simply all about weather, but a vital message is that a proper aviation Met forecast is needed more than ever at this time of year. Sadly, during biennial preflight discussions, many GA pilots have difficulty with the Metform 215 in preparation for flight. Some are so unfamiliar with this low-level synoptic forecast that, when asked to provide the freezing level from it, they don't even notice that it has a column all on its own – such is its importance. Couple that with a common misunderstanding of the cloud base/tops ➔



notation and some pilots are clearly not fully prepared before a winter's flight.

FEELING THE CHILL

The safety leaflet has a lot to say about ice of one form or another at different stages of flight. Take overnight ice on the airframe. If aircraft took off and climbed better with the extra mass and aerodynamic effects of feathered hoar frost crystals on their skin, they'd probably have been designed and built with pseudo-ice already on them...

There can't be many pilots who haven't heard that all ice must be removed before flight. However, you should also be wary of leaving wings, control surfaces and hinges clearly wet because the freezing level at this time of year will be very low in altitude.

A very wet but defrosted Rutan LongEz I had a share in once surprised a fellow syndicate member when the rudder cables froze solid very soon after take-off. The freezing level that day was almost at ground level, giving no chance of de-icing by flying in non-freezing temperatures (which is sometimes a possibility if airframe ice forms when airborne).

Above the freezing level at any time of year, one of the most dangerous places for light aircraft to be without de-icing equipment is in any moisture – however light or 'see-through' the precipitation might be. The smaller the droplets, the more likely they are to be supercooled liquid just waiting for something to freeze on to extremely rapidly. A cold aircraft is good for that.

The extra winter risk is, of course, that the freezing level comes down to, or often below, normal GA flying altitudes. Normally, the advice if airframe ice forms en route would be to get below the freezing level quickly. This might not, of course, be possible. Preflight planning needs to include the expected zero degree level and regular en route checks should keep an eye on actual Outside Air Temperature. However, no moisture means no real airframe icing risk, so don't be tempted to fly through even fine precipitation.

INSIDE STORY

What about airframe ice you can't see? There might actually be some, as demonstrated by a little incident with a Cessna that had been left tied down outside for a few days. During the pre-flight inspection, a tiny bit of waxy dirt was seen to be blocking a small airframe drain hole underneath the tail unit. A little cleaning and probing with a sharp stick produced a long-lasting stream of water. Overnight temperatures were just above freezing but, had they been below zero, we might have had what can only be assumed to be a weighty block of ice well displaced from the centre of gravity – an unknown factor in mass and balance calculations.

You know what's coming next: carburettor icing. If you remember the ubiquitous and famous graph so beloved by air accident report writers, you'll know that, as threatening as it is, theorists (who often theorise from the ground) might try to convince you that carb ice does not form quite as quickly on a cold day compared to a summer's day. However, having had engine failure and a field landing due to heavy and rapid carburettor icing well towards the end of the year, this author prefers to stick to assuming that carb ice is *always* a potential threat in UK flying, whatever the season. This needs dealing with in the traditional way: with extra hot air applications when near cloud or on lower power settings.

If you fly with a carburettor and don't know what the traditional way is, try Safety Sense leaflet No 14 on 'Piston Engine Icing'. You might want to read it as soon as you put this article down and certainly before you next go flying.

GOOD IDEAS AND GOOD FORM

More on icing? I'm afraid so. It's worth being extra careful, through the autumn to spring, when taxiing over grass soon after the sun starts to warm the airfield a little if a heavy dew (or melted frost) is evident. You should know the theory; a rise in air temperature is caused by conduction after the sun has heated the ground and more water vapour content is now possible in the slightly warmer air. When this starts to happen with dew-laden or frosty grass, and especially with aircraft wheels and propellers throwing minute droplets of water around while taxiing, the air at engine-intake height can be very laden with moisture.

I have experienced a near-engine failure in a Cessna by taxiing a mere 150 metres from parking to the power check area, soon after the sun started to have a minor heating effect after a heavy dew on a grass airfield in December. An engine failure before power checks has probably never killed anyone, but the really dangerous case would be the next taxi phase towards the runway over similarly wet grass if the take-off were to be rushed and attempted without further application of carburettor heat once lined up.

Remember that grass taxiways and runways cut up easily in winter, so you can preserve them for longer for yourself and others with wider radius turns. The same applies to grass landings.

A French pilot was killed trying to fly through the arch of the Eiffel Tower and the accident was blamed on the low sun

It's extremely bad form to brake to make an early exit point when the runway can be preserved for longer by letting the landing roll safely run out with minimum braking.

COLD DAYS IN THE SUN

So where to go? Hopefully everyone checks destinations at any time of year, but you will learn a lot more detail about airfield conditions in winter by speaking to a person who is actually there rather than merely using the internet for 'PPR' and current conditions. But, if you have no definite destination to reach and, like many of us, the objective is a safe enjoyable flight 'somewhere for a bacon sandwich' (other foodstuffs may be available), there is something to consider for winter flying trips. On sunny winter days, you can have a much safer flight heading somewhere in a vaguely westerly direction (in wide 'semicircular' terms) on the way out to come back vaguely easterly later. The reason, of course, is the apparent height of the sun above the horizon – giving lookout problems when flying towards it.

If my arithmetic is correct, anyone flying in Yorkshire in the second half of December is never going to see the sun more than 15 degrees above the horizon. We might get it a few degrees higher down south, but that's really no better for dazzle when flying generally towards it – especially with anything but a perfect windscreen, or below the inversion, in haze. Airprox and infringements have cited low sun as the cause. Major doglegs (planned for in time and fuel) and perhaps radar-based services (if possible) are the order of the day when the direct track to destination is flying towards a low winter sun.

What about the end of a good flying day in winter and the landing issues of the sun setting further south on the western horizon, especially when our runways are often numbered 24, 25 and 26? Landing on such runways towards a sunset can be a serious issue. It might be possible to choose a different runway and powered pilots at least have the option of staying airborne a few more minutes to allow the sun to set. It is surprising that some pilots will land while blinded; a club aircraft lost the front wheel at a Dorset airfield, with the pilot's excuse being that he couldn't see the runway due to the sun at the far end but he landed anyway. He certainly isn't the only one to have done this.

The earliest fatality that I can find related to sun dazzle is a report from March 1925. A French pilot, Leon Collet, was killed trying to fly through the arch of the Eiffel Tower and the accident was blamed on the low sun meaning a cable was probably not seen by the pilot. However, such accidents still happen today. It only took seconds to find these extracts from AAIB reports from the past couple of years:

"On the approach to an airstrip, and while flying into the sun, the aircraft flew through the top of a tree."

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

So the basic message is: consider the threats of winter flying properly, manage them and see how enjoyable it can be – plus, your skills won't have deteriorated as much when the next flying season starts. CU

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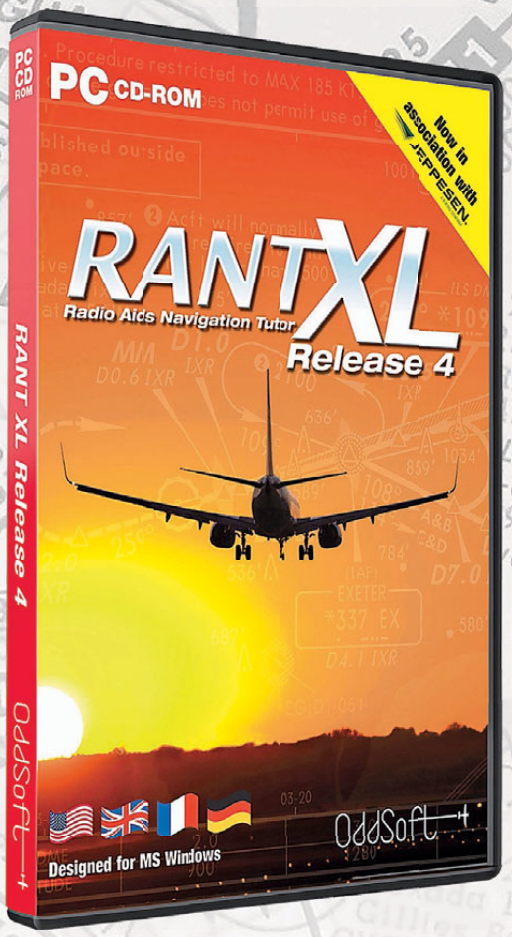

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WHAT'S THE DIFFERENCE?

WORDS: PHIL MATHEWS | PICTURES: KEITH WILSON

Is it worth doing differences training? What's really in it for you?

Passing 1,500ft in the climb after take-off in a Glassair II fitted with a 200hp Lycoming and a constant-speed propeller, the revs started to increase without any of the controls being moved. As we passed the engine red line of 2,700rpm and headed towards 3,000rpm, the throttle and propeller lever needed pulling back to keep things within limits and a hasty return to base was completed. We found that the propeller governor had run away and failed to control the revs.

If that was your first flight behind a constant-speed propeller, would you have realised what was happening if you only had experience of fixed-pitch propellers and had not been through a differences training course for constant-speed propellers?

IT'S JUST COMMON SENSE

PPL aeroplane training is invariably completed on Single-Engine Piston (Land) aircraft with simple systems or features. The SEP Class rating attached to the PPL, or SSEA if it's an NPPL, covers a wide variety of aircraft and these can vary considerably in the complexity of equipment and systems fitted.

Common sense should dictate that, if you are only used to one engine, a fixed-pitch propeller, fixed undercarriage, traditional instruments and radio fit, you should seek training in the extra systems you wish to deal with before flying as pilot in command. In fact, EASA and UK legislation require that the following items need formal training and logbook signoff from a suitable instructor

before you can act as pilot in command in any aircraft with the specific difference:

- Retractable Undercarriage
- Variable-Pitch Propeller (Constant-Speed Propeller)
- Cabin Pressurisation
- Turbo or Super-Charging
- Tailwheel
- Single Power Lever Control
- Electronic Flight Information Systems (Glass Cockpit), though not in the list for NPPL (SSEA)
- For NPPL (SSEA) – Cruise Speed of greater than 140kt.

TRAIN TO GAIN

Regulators have brought about the need for differences training, but what benefits can we as pilots get from going through the additional training?

Learning something new takes brainpower and doesn't always leave enough spare brain capacity to cope with other, sometimes routine, things at the same time – for example, flying and learning about a Garmin 650 at the same time. Trying to assimilate a new skill by teaching yourself in the air can be fraught with difficulty. This is amply illustrated by an old wartime rhyme: ten little Spitfires taking off in a line, one was in coarse pitch, and then there were nine!

> Flying these aircraft will improve your landing technique and make you much more aware of the effect of the wind on take-off and landing

If you don't fully understand what you are doing and why, things can and do go wrong very quickly. The sensible thing, of course, is to undertake the appropriate training for the 'difference' you are interested in. Once you have demonstrated an acceptable level of skill and are signed off, you are free to act as pilot in command in any aircraft of the class which is equipped with that difference. It's worth noting that differences training does not have to be repeated once it has been completed. However, if you have not flown using that particular 'difference' for some time, then it might be wise to undergo a refresher, even if it's not legally compulsory.

You might undergo differences training because it's there and like the buzz of learning something new. Great – that's given you a challenge that you will need to work at to get up to speed and will no doubt give a heightened sense of achievement once the training is completed. Alternatively, you might be in need of differences training because you wish to fly more complex aircraft. Therefore, you're now obeying the requirement of the regulator to ensure that you are equipped with

the relevant knowledge and skill to operate the aircraft safely. Either way, this now opens the way to flying a greater range of aircraft within the Class. Let's consider some examples.

1. You have been flying a SEP (Land) with fixed-gear and prop, but you fancy something a bit faster to extend your touring. A retractable undercarriage and variable-pitch propeller (constant-speed) will allow you to fly a range of aircraft that will be 20-40kt faster than most of the fixed-propeller two- and four-seat aircraft. Also, load carrying will probably improve somewhat.

2. Fancy farm strip flying? Tailwheels are better suited to grass strips. If you've only flown nosewheel aircraft, then differences training will be required before going solo in a tailwheel aircraft. Flying these aircraft will improve your landing technique and make you much more aware of the effect of the wind on take-off and landing.

3. Here's an interesting thought: if you have only ever flown a tailwheel aircraft, should you undergo differences training before flying a nosewheel aircraft? It's not mentioned in the legislation, but what do you think?

TIME AND MOTION

As we go up the scale of complexity, we come across the new generation of engine controls and cockpit systems. We're now very much in the area where ground training and study will be required before going flying. Teaching yourself is not really an option here because you won't be able to safely divide your time between learning about the systems and operating them while trying to fly as well. Having someone with you to impart knowledge and to help fly should keep the stress level down and make the learning experience more enjoyable.

The amount of time needed to assimilate the appropriate knowledge for the differences training being undertaken will vary from difference to difference and to some extent from person to person. There is no set time for each item. However, the AMC to Part FCL gives some guidance as to theoretical knowledge requirements. As a rough guide, something straightforward such as a retractable undercarriage might take an hour of briefing and an hour in the air to cover all aspects. However, getting used to a glass cockpit could well take ten or more hours of study, plus several hours of flying.

Many talk of a tailwheel 'rating', but it doesn't exist. It is simply differences training signed off in your logbook once training is complete. The amount of flying required will vary. Some might solo in a couple of hours, while others may take several hours. Beyond this, it will take a few more hours to be really proficient in varying winds and weather.

Did you know that the UK has legislated to allow pilots qualified for SEP (Land) aircraft to fly G-registered microlights, providing the pilot undergoes differences training for microlight aircraft and has this training signed off in their logbook by a suitably qualified instructor? In this context, differences training is used to permit flight of a category of aircraft rather than simply a feature within an aircraft.

Whichever way you want to take your aviation, consider differences training as a means of opening doors to different areas of aviation as well as allowing you to fly different aircraft within the SEP or TMG class. CU

SOMETHING TO BE PROUD ABOUT

Many recreational pilots lose motivation and purpose after achieving their licence, leading to them giving up flying altogether within a few years. Some lack the confidence or incentive to gain more benefit from their licences and never take further training apart from their biennial instructional check flight.

However, add-ons such as the IMC, night rating, aerobatics, tailwheel training and instructor ratings develop not only greater proficiency, but they also bring far greater levels of personal confidence – and, importantly, encourage pilots to stay flying.

Which is what the PROUD (Pilot Recognition for Operational Up-skilling and Development) initiative is all about, and it has been designed by the CAA to encourage aviation organisations to create their own schemes to stimulate pilots to develop flying skills. Several organisations such as AOPA and the LAA, with their Wings Award Schemes, have already received recognition as 'good training providers'.

Such schemes should have a logical hierarchical progression through clearly defined steps which, if completed, would lead to a formal recognition within the scheme of the achievement at that level. Schemes should include a minimum of three levels and there should be requirements within each level to fulfil targets in each of the following areas:

FLYING EXPERIENCE

The hours required for qualification at each level should be set at levels appropriate for the award, taking into account minimum total flight time and hours acting as aircraft commander.

RATINGS AND QUALIFICATIONS

Simply flying more hours doesn't necessarily mean pilots have a greater depth of knowledge or breadth of experience, so schemes should require additional training or achievements leading to the addition of ratings or certificates.

To qualify for each level of award, there could be a requirement to add a further two flying achievements. The following list gives examples of the scope for pilots to select a combination of achievements that suit their personal choices: IMC rating; Night Rating; Instrument Rating; Flight Instructor Rating; Multi-engine Rating, Seaplane Rating.

DIFFERENCES TRAINING

Training that doesn't lead to a specific rating is also considered, and this could include differences training such as a tailwheel conversion, variable-pitch propeller or glass cockpit training.

ACTIVITIES

There are also many organised flying activities that encourage pilots to challenge themselves, such as competing in a Royal Institute of Navigation challenge, a Royal Aero Club air race or a British Aerobatics Association competition.

SAFETY EVENT ATTENDANCE

At least one seminar should be attended to qualify at the lower entry level, two attendances at an intermediate level and three or more for the advanced level. Safety events include a GASCo safety evening, military civil air safety days, aircraft maintenance engineering courses, flight instructor seminars and PPL master classes.

EXTENDED NAVIGATIONAL CHALLENGES

Because many pilots never venture out of their 'local' area, which limits both enjoyment and fulfilment, as well as stifling development and confidence, the schemes include an element of longer navigational flights which become increasingly more demanding.

A basic profile could be completing a cross-country flight which is more challenging in terms of distance or navigation skills required than the nav-ex undertaken for the issue of a pilot's licence. Flights should include landings and take-offs from at least two airfields en route. The route could also include a sea crossing of more than 20nm.

For a higher level, more challenging cross-country flights would include at least three intermediate landings and take-offs and could include a sea crossing of more than 20nm.

For the highest award, the flights for the lower awards need to have been completed and then a much more demanding cross-country with at least four intermediate landings must be flown, again perhaps including a sea crossing of more than 20nm.

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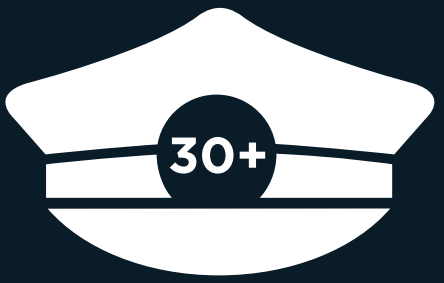

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OKAY, LISTEN UP

Listening squawks have grown in popularity – and not just with those who fly

WORDS: CLAIRE HATTON | PICTURES: SIMON FINLAY/BRIAN BARR

A few years ago, some aviation specialists sat around a table eating sandwiches in a control tower in the north of England. They all had an interest in trying to help GA pilots navigate around Manchester's Class D CTR, and along the Low Level Route between the Manchester and Liverpool zones.

The small group consisted of Air Traffic Control Officers from Manchester Airport, Flight Information Service Officers from Manchester Barton and flying instructors from nearby clubs and schools – collectively called the Local Airspace Safety Team. After polishing off the sandwiches, numerous cups of tea and a biscuit, the concept of Frequency Monitoring Codes (otherwise known as listening squawks) was born.

Martin Hatton, Chief Flying Instructor at Ravenair, was there. He explains: "The Manchester controllers were often called on by light aircraft to provide a Flight Information Service, equivalent to today's Basic Service, which was not ideal on a very busy frequency. It became apparent that pilots expected more from the service than it actually provided and they assumed they were being 'looked after' to a greater extent than they really were.

"The idea of having a dedicated squawk for pilots to use while just listening out on the frequency gave two benefits. First, it reduced pilots' reliance upon ATC because they now knew they were not receiving any kind of service, which hopefully improved their own lookout and situational awareness. Second, ATC could call a pilot who might have been straying towards the edge of controlled airspace and divert them away before it became a zone infringement."

Several years after the introduction of the 'listening squawks', Martin still attends the Local Airspace Safety Team meetings where the last few months' worth of local airspace matters are discussed. "Since the 7366 squawk was brought in, there have been countless occasions when it has proved to be effective; the controllers will see a listening watch aircraft drifting towards the edge of controlled airspace and, because the pilot is listening out, they can be contacted and advised of the situation before it becomes a problem."➔

AND HERE'S WHERE TO FIND THEM

Enter the appropriate listening squawk for the area, with Mode C if you have it. Tune into the appropriate frequency and listen out, without transmitting. Change back to 7000 with Mode C when leaving the area or changing frequency

Any aircraft fitted with a Mode A/C or Mode S transponder can use these codes. By entering the relevant four-digit code into the transponder and listening to the published radio frequency, a pilot signifies to air traffic control that he/she is actively monitoring radio transmissions on that frequency and their aircraft position is visible on radar.

Remember that listening squawks do not clear you into controlled airspace or mean you are receiving any ATC service. If you need a service from ATC, contact either the appropriate LARS frequency or London/Scottish Information as required.

FREQUENCY MONITORING CODE – RADIO FREQUENCIES

Birmingham 0010 – 118.050 MHz

Southampton/Bournemouth 0011 – 120.225 MHz (SOU)/119.475 MHz (BOH)

Gatwick/London City 0012 – 126.825 MHz (LGW)/132.700 MHz (LCY)

Luton/Stansted 0013 – 129.550 MHz (LTN)/120.625 MHz (STD)

Edinburgh 0440 – 121.200 MHz

Glasgow 2620 – 119.100 MHz

Leeds Bradford 2677 – 133.125 MHz

East Midlands 4572 – 134.175 MHz

Farnborough 4572 – 125.250 MHz

Bristol 5077 – 125.650 MHz

Doncaster Sheffield 6170 – 126.225 MHz

Belfast Aldergrove 7045 – 128.500 MHz

Manchester 7366 – 118.575 MHz

The success of the system relies on pilots actually using it. My flying since the introduction of frequency monitoring codes has mostly been teaching Instrument Ratings, so I haven't had a need to use the facility. That's why I asked a good friend and former student Duncan Falconer for his opinion. Duncan has flown as a PPL for several years, has recently obtained his CPL and is now in the middle of his Multi-Engine Instrument Rating (the poor soul – as anyone who has undertaken the Multi-Engine Instrument Rating will understand!). Given a few minutes, he was able to recollect happier times when he used to go flying for fun and used listening squawks on many occasions during navigation trips around the country. These are his top tips from his first-hand experience of using listening squawks:

1. It's easy to use – tune in the transponder and tune in the radio. Done.
2. It provides reassurance that, if you make a nav error without realising it (which can easily be done, even by the most experienced pilots), you know that they have a means of contacting you before you end up causing major delays at an international airport.
3. I had first-hand experience of the benefit of listening squawks as a passenger in the back of a Cherokee flying on a leg from Nottingham to Wellesbourne. We were southeast of Birmingham and ATC made a call requesting the aircraft with the listening squawk to make contact – which was us. Once they were informed of our intentions, they were happy – but we were very close to the edge of controlled airspace. The pilot was able to adjust the heading, knowing that we were making life more comfortable for that controller and potentially avoiding an infringement.
4. It's a great reassurance that, in the event of an emergency, a pilot would be able to make a Mayday call and have the ability to get help instantly if it were needed.
5. It is such a simple thing to do and I would encourage any pilot to use it in circumstances where they are unable to get any greater service from ATC.

THE LUCKY 13

Since their initial introduction, there are now 13 airports that have published Frequency Monitoring Codes. One is Robin Hood Airport Doncaster Sheffield (RHADS), where there are a huge number of GA aircraft operating from nearby airfields and transiting through the area. The Air Traffic Control for Doncaster Radar is actually provided from Liverpool by a company called ATC Services Limited; the Doncaster Radar controllers sit along one side of the room and the Liverpool Radar controllers sit along the other side.

ATC Watch Supervisor Marc Hill, who controls both Liverpool and Doncaster

(although not at the same time), gave his opinion on the Doncaster listening watch squawk of 6170. His advice is that unless pilots are looking to transit the Doncaster CAS or are inbound to Robin Hood Airport Doncaster Sheffield itself, the controllers appreciate it when aircraft use the listening watch squawk.

"As anyone who's been on the frequency knows, it can get very busy on a nice weekend," he says. "The primary job of the Doncaster Radar Controller is to control traffic in and out of RHADS. While we are happy to provide services to anyone, pilots who are on a listening watch can really help to reduce our workload. Even when the frequency sounds quiet, it doesn't mean we aren't doing anything; quite often we will be on the landline coordinating with the Tower, Prestwick Centre (Scottish Control) or an adjacent unit."

No doubt this ATC perspective could apply to any of the airports who have a frequency monitoring code. On a busy frequency, it helps the controllers out because those pilots who are happy to not receive a service can still be contacted if necessary. It also helps the pilots out, because they can immediately be contacted if ATC can see a reason to call them. Hopefully it is helping to reduce the number of zone infringements too.

So a good idea that is now helping both pilots and controllers was born after a chat over sandwiches and a cuppa – more tea, anyone? CU

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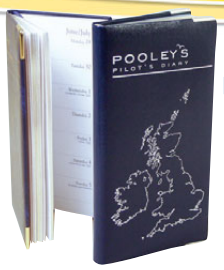

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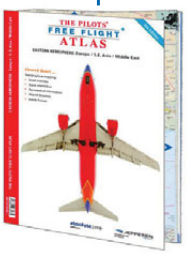

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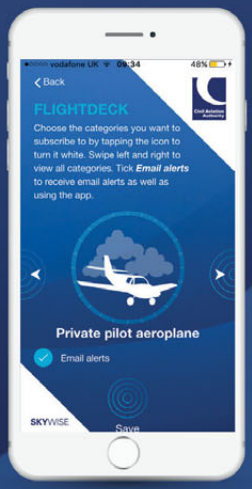

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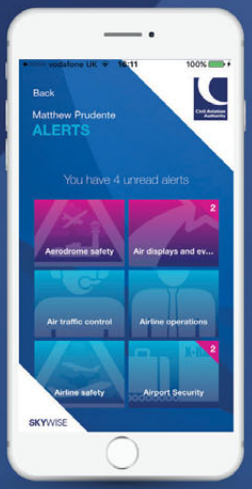

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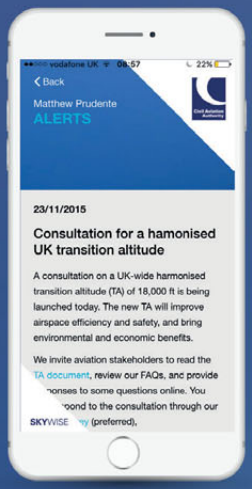

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KEEPING ALERT JUST GOT EASIER

A new web tool and app aims to make staying up to speed even quicker

WORDS: MARK BROWN | PICTURES: KEITH WILSON

Few can argue that everyone is now better informed than ever before thanks to technology. Smartphones and tablets are providing a world of information at our fingertips, quickly and simply – and, with aviation being particularly information-dependent, it's not surprising that pilots of all ages have embraced the rapidly moving digital age.

From checking the weather to filing a flight plan, 3G and 4G technology is enabling everyone to carry out a whole range of actions on the go and is helping to save huge amounts of time and effort. To help even more, the CAA has just launched a free web tool and app to make staying up to speed even easier.

A TOOL IN YOUR HAND

Called SkyWise, it allows users to proactively choose to receive news and notifications relevant to their particular flying activity. So if, for example, you fly microlights and also have an FI rating, you could select to receive the appropriate airworthiness, airspace and licensing notifications that affect you.

The idea behind SkyWise is to make the process of ploughing through Safety and Information Notices until you find something of relevance redundant. Likewise, there should be no need to rely on word-of-mouth at a local club or on the web to stay informed of changes to rules and regs. SkyWise brings the information you need straight to your device, either as an email or as a notification through the app.

The new app hasn't just been aimed at general aviation; it's for the whole aviation industry, from airline pilots to air traffic controllers and baggage handlers, from flight training to maintenance. Whether people are involved in commercial or recreational aviation, it is essential that they can access and understand rule changes and updates, as well as the latest safety information and advice.

SAFETY FIRST

It's said that knowledge is a vital building block of a successful safety culture, and safety can be compromised if individuals do not have the required knowledge to make the correct decision in a given situation.

By registering with Skywise – either at *skywise.caa.co.uk* or through the free app for iOS or Android – users can set up alerts to ensure they receive news, safety alerts, consultations, rule changes, airspace amendments and more from the CAA and the European Aviation Safety Agency (EASA). Once registered, a 'flight deck' can be configured by selecting as few or as many alert categories as the user requires.

Technology does not just have the ability to make life easier; it can also make life safer – take a look. CU

For more information on SkyWise, including a guide on how to use the service, go to *caa.co.uk/skywise*. Users can view all current alerts at any time at *skywise.caa.co.uk*.

By registering on the site, users will receive all new alerts by email for those categories they have subscribed to. An app version of the system can also be downloaded from the site or directly from both the App Store and Google Play.

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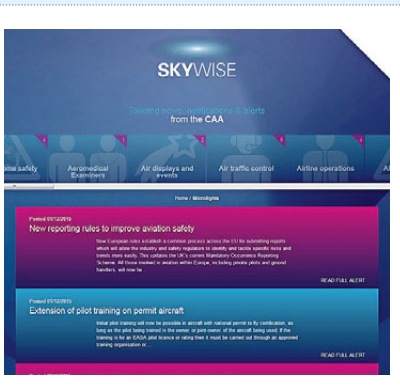

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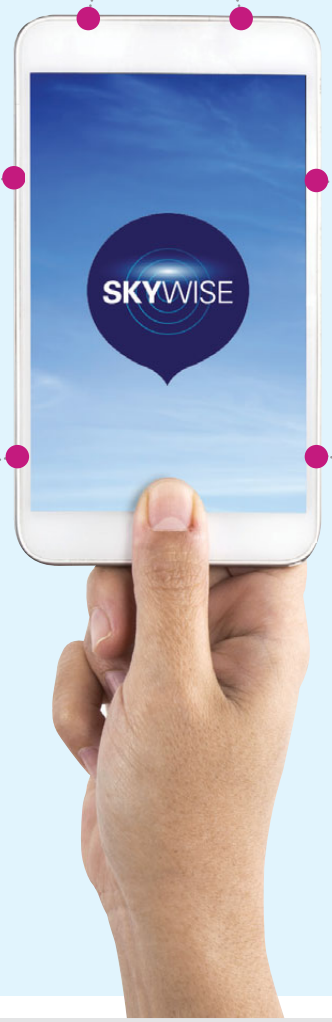

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WHEN THE *WIND BLOWS*

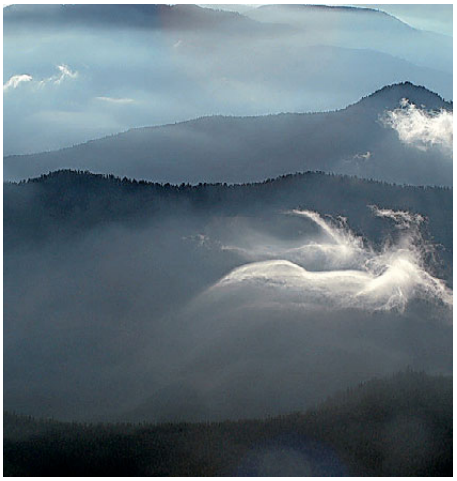
Mountain lee wave is a fascinating phenomenon – but have you ever heard of Jump Rotor?

SCPHOTOS/ALAMY STOCK PHOTO

Look at any old textbook about mountain lee waves and the diagrams will probably show rotating air masses under neat sinusoidal wave patterns. However, anyone who has stood in the lee of a mountain in a gale will know this is not true. There will be screeching gusts followed by periods of absolute stillness. The wind can blow in any direction and does not necessarily blow against the prevailing wind as the old model suggests.

Waves occur in the smooth laminar air above the inversion and can propel a glider to tens of thousands of feet. Rotor is the turbulent air below the inversion which can, in the worst case, rip the wings off an aeroplane.

The inversion is the layer of atmosphere where the air temperature increases or remains the same with height. The air above it has considerable mass and, if pushed up by a mountain range, will bounce up and down as it goes downwind. As an analogy, consider a bag of shopping suspended on a bungee from the handlebars of a bicycle. Go over a bump and the motion of the bag will be similar to the air in the wave. Mathematically, it is easy to simulate and there are numerous papers on the subject.



FLYING INTO THE UNKNOWN

Below the inversion, the air movement is chaotic and, until recently, was well beyond theoretical analysis. Rotor was reckoned to be behind a number of aircraft crashes in America and funding was found to research it. In the 1950s, the only tools available were instrumented aircraft and gliders. An instrumented B-29 flying through rotor experienced 22 upward and downward gusts of up to 3,300fpm over a period of 50 seconds. Larry Edgar, the famous glider pilot, bailed out when his research glider disintegrated in rotor.

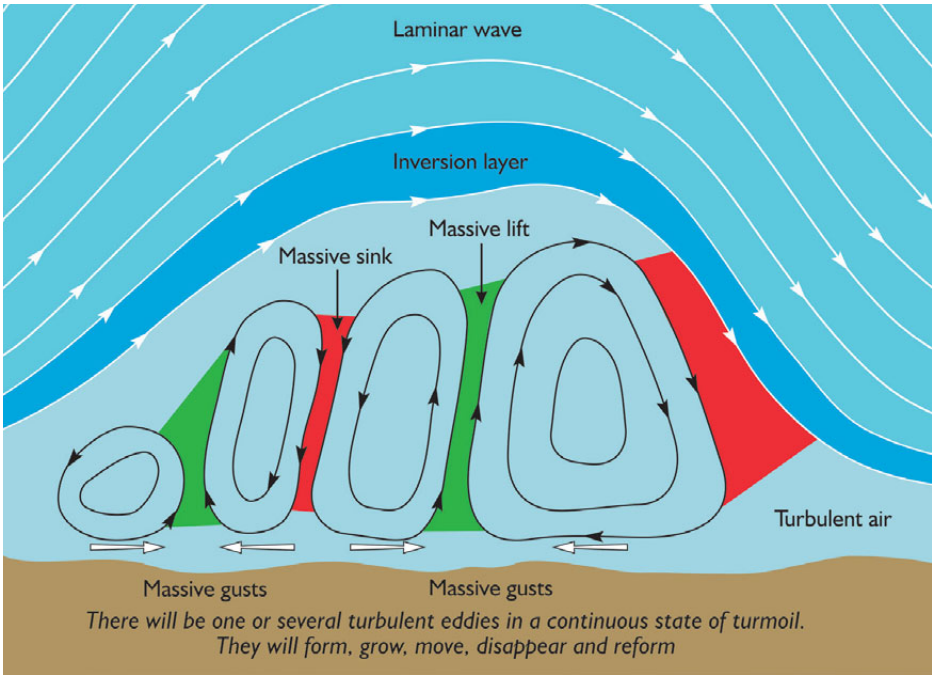
Later attempts used LIDAR (Light Detection and Ranging) to try to record what was happening, but nothing gave anything resembling a believable model of the rotor phenomenon. The only fact that did emerge was that there were two distinct forms of rotor.

➔

One was similar to the traditional concept while the other was far more dangerous and christened Jump Rotor, because it resembled the standing wave or 'hydraulic jump' that forms downstream of a weir in a river.

By 2004, computers had become sufficiently powerful to model the erratic behaviour of the atmosphere and produce reasonably accurate forecasts so two American researchers who were also glider pilots, Hertenstein and Kuettner, decided to model rotor. They took wind and temperature measurements of the air approaching a known mountain range where rotor conditions existed and fed them into a computer program. The program was run for some time and produced a dynamic model of the rotor that might exist in a number of atmospheric conditions.

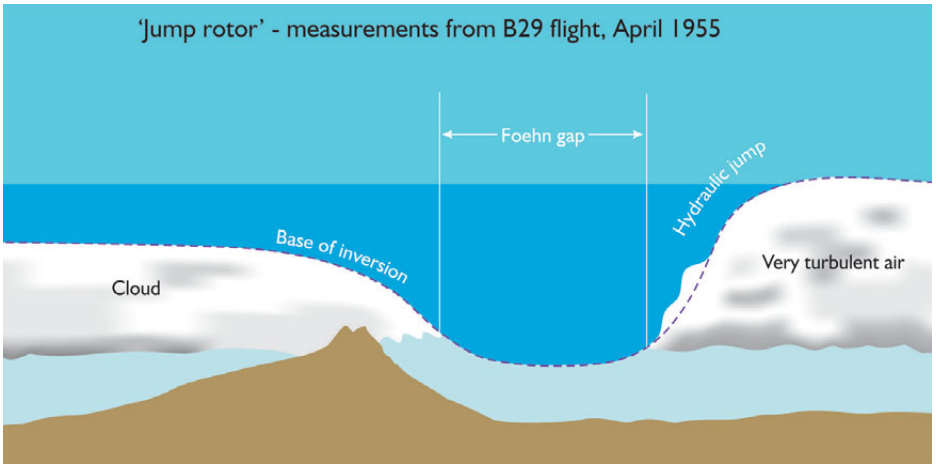
They were mainly interested in the Jump Rotor. They discovered that it was triggered when the wind speed across the inversion remained constant. In this condition, the inversion layer split, with the lower half being fed into the rotor area and producing a single mass of very turbulent air which could rise to two or three times the height of the mountains that triggered it. These conditions should be avoided at all costs by pilots. Fortunately, they are relatively rare.

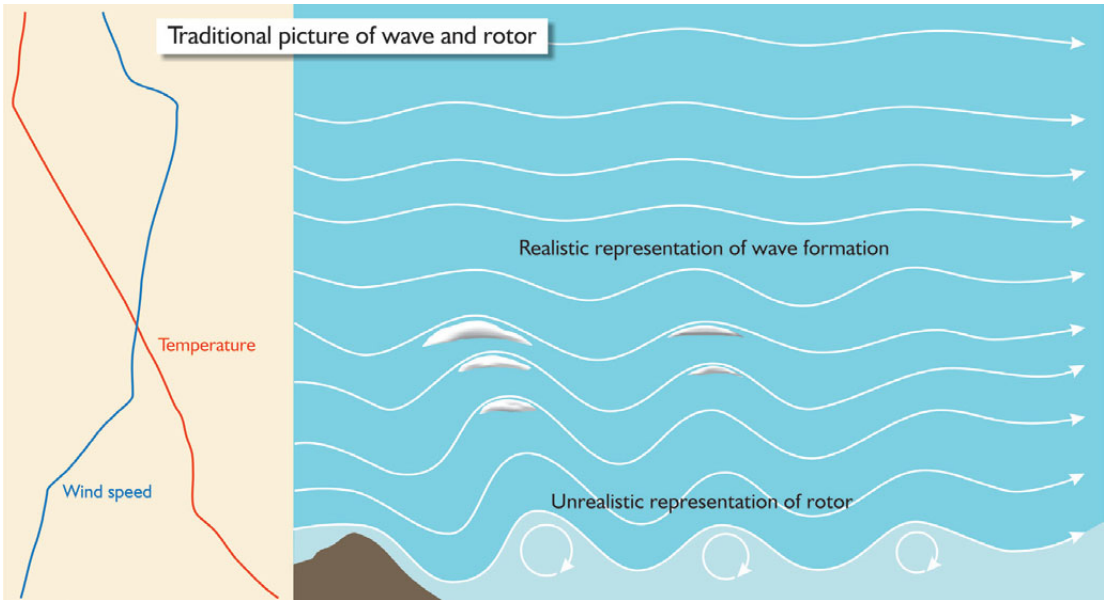


JUST WHAT IS THE AIR DOING?

Where the wind speed increases across the inversion, it produces the more traditional form of rotor – which they also modelled. As the model ran, it showed that there could be several eddies or rotating sausages of air forming under each wave bar. Generally, there was a large rotating air mass which was similar to the classical view rotor. However, there were several smaller eddies upwind which formed, moved, disappeared or merged with the main eddy. These explain the ear-popping pockets of rising air and violent gusts that can be found on wave days.

Between any two eddies – the position of which can be affected by the profile of the ground – one can expect to find air which is either moving up or down very rapidly. This also explains the sudden gusts that can rip through an airfield or change the wind direction in a matter of minutes.





So, if you are flying in strong wind conditions downwind of mountains, you could find extremely turbulent air. As there may be several waves, this turbulence may extend some distance downwind. You can expect to find that your landing approach is very rough and you may experience sudden height losses. The wind direction on the field may well go through very rapid changes of direction.

Anyone wishing to learn more should go to the excellent paper *Rotor Types associated with Steep Lee Topography* by Rolf Hertenstein and Joachim Kuettner, 2004. Thanks to *Sailplane & Gliding Magazine* for their help with this article.

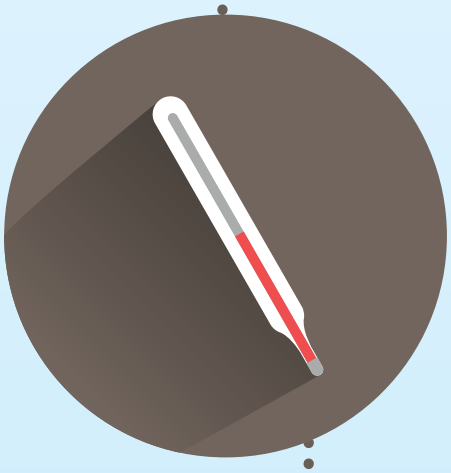
SO, HOW TOD

It's not just the aircraft that needs a 'pre-flight check' every day; how well the pilot is working matters too...

Consider an analogy between the human body and an aircraft. The human body – the pilot – is the most complex system in the aircraft. Just like any flight-critical component, you need to be certain of its airworthiness before taking to the sky. So let's take the analogy a step further.

What sort of checks and documents does an aircraft need before you'd consider it airworthy? First, engineers will sign a maintenance schedule – such as a 150 hours certificate – to let you know everything is okay. Then, before each flight, you do a walk-round check to confirm the aircraft is serviceable. Well, think about your body in the same way. Just like the aircraft, there are two components to your airworthiness. There's the periodic medical examination – the human body's equivalent of the 150 hours maintenance sign-off, and then there's the 'on-the-day' self-assessment, performed by answering the question: "Am I truly fit to fly?"

Areas worthy of consideration in the all-important personal assessment of wellbeing on the day of flying include (but are by no means limited to) the potential impact of self-limiting ailments, the amount of sleep before flying and the possibility of fatigue. It's also worth considering any unfavourable effects of drugs and alcohol on performance and the influence of any recent medical procedures. As an experienced pilot, you'll have read a lot of this before but I believe it's helpful to adopt a systematic approach to assessing the state of body and mind before undertaking a flight. Let's use the useful mnemonic IMSAFEE.



ABOUT THE AUTHOR

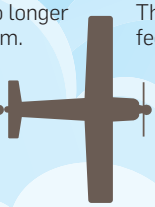
Dr Oliver Bird graduated in Medicine from the University of Sheffield in 1988 and joined the RAF the following year. Since 2002, he has worked as a Medical Officer Instructor at the RAF Centre of Aviation Medicine.

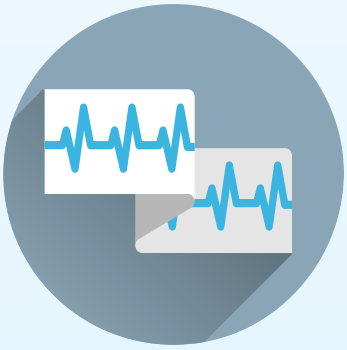
ILLNESS

Many medical conditions can affect a pilot's fitness to fly. A discussion of the particulars of each of these is outside the scope of this article, but some minor illnesses may have major implications when deciding whether or not you're fit to fly quite out of proportion to their medical significance. A simple cold or a minor gastrointestinal upset can both cause big problems for a pilot in the air.

So why does the common cold present such a problem? The air-filled middle ears and sinuses inside the bones of the face all connect to the back of the nose via small tubes. With a cold, these tubes can become blocked and air is no longer able to travel freely between them.

The pressure fluctuations associated with changes in cabin altitude – most commonly when descending – means a pressure difference can develop, causing significant discomfort (termed barotrauma) and distraction. The facial pain associated with sinus barotrauma can be incapacitating and blockage of the tube connecting the middle ears to the nose can result in a burst eardrum. You probably know the trick to confirm you can clear your ears before flying by pinching your nose and blowing out gently through it without releasing your fingers. If the tubes to your middle ears are functioning normally, you should feel a change in pressure or momentary fullness. The bottom line is always this: if you're not feeling fit and well, you shouldn't fly.





ARE WE AY?

STRESS

Stress is the body's response to physical and psychological demands placed upon it. These can include factors such as noise, vibration, fatigue or a difficult work or personal situation. Some stress can keep you on your toes, but unhealthy levels of stress can result in unwanted distraction in the air and lead to impaired performance and/or loss of situational awareness. So what are your stress levels before flying? Can you develop coping strategies to deal with them, such as hobbies, pastimes and exercise?

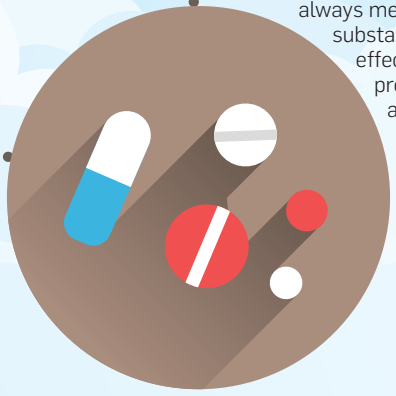
ALCOHOL

Alcohol and flying do not mix. We know it, but do we really know it? Alcohol affects judgement, co-ordination and reaction times, leading not only to loss of control but also masking the symptoms of hypoxia, aggravating the effects of G-forces on the body and increasing the likelihood of spatial disorientation. Did you know that, even when blood alcohol concentration has returned to normal, it hangs about in the fluid of the organs of balance? With this in mind, it's helpful to understand how much alcohol is present in drinks.

Units are, of course, the simple way to express the quantity of pure alcohol in a drink. One unit equals 10ml, so there are 50 millilitres in a litre of five percent beer or five units of pure alcohol. These days, many beers are much stronger than this and so is wine for that matter. You might not have noticed it, but everyday wines have risen from approximately 10.5 percent alcohol to, in some cases, 13.5 percent – a glass packs much more of a punch than it used to. So, whatever you fancy, vigilance is needed to ensure that you're not under the influence of alcohol when flying. ➔

MEDICATION

In the same way as a discussion about specific medical conditions is outside the reach of this article, so is advice about specific medications. But, when it comes to over-the-counter medication, the first thought should always be: "What's the ailment for which I'm taking this medication?" In the case of the common cold, it's not only the potentially sedating effect of a decongestant that's of concern but the cold itself too. Many other over-the-counter medications also have the potential for significant unpredictable side effects, making them incompatible with flying. Neither does natural always mean safe, with many other substances having unforeseen side effects too. When having a prescription dispensed by a doctor, always make certain he or she knows about your role as a pilot. Think: if you're unwell enough to need medication, should you really be thinking about flying in the first place?



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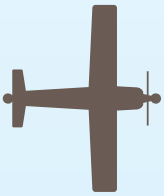
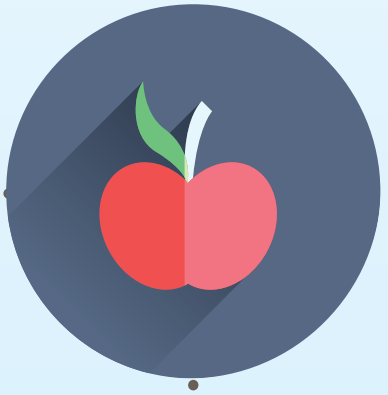
FATIGUE

Getting proper sleep is the only way to prevent fatigue, but how many of us fly without a full night's rest after working excessive hours and after especially exhausting or stressful days? Fatigue or tiredness significantly impacts the ability to fly. Studies show that, next to training and currency, it's the third biggest contributor to variability in performance – making it an important flight hazard. Not only that, but there are big individual differences in susceptibility to fatigue and individuals are poor at assessing their own level of performance when they start to get tired.

So how does it change your behaviour? How might fatigue affect the way you fly? Studies confirm that fatigue results in an increase in momentary lapses of attention and an unconscious lowering of personal standards, a reduced ability to multi-task and a failure to notice that a situation is changing for the worse.

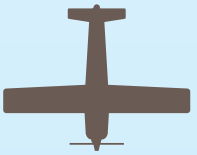




ENERGY LEVELS

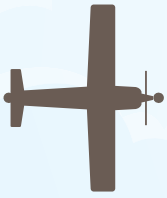
Anyone involved in any kind of sport at whatever level will know how their performance drops off as their energy levels deplete and it's worth remembering that flying is also physically and psychologically demanding. Therefore, it's important to set off well nourished.

A diet based on starchy foods such as potatoes, bread, rice and pasta; with plenty of fruit and vegetables; some protein-rich foods such as meat, fish and lentils; some milk and dairy foods; and not too much fat, salt or sugar, will give you all the nutrients you need.



EMOTIONAL STATUS

How often do you get angry in the car with other drivers, or perhaps have a bad morning at home or work? Let's be honest: emotions can sometimes get the best of anyone, so it's important to assess your feelings before flying. Is there anything bothering or upsetting you? Are you feeling angry, impatient or sad? Taking an emotional inventory can be uncomfortable, but it's an important part of gaining an overall picture of your health.



ARE YOU SAFE?

Health has a significant impact on flying and medical fitness to fly means more than just an in-date medical. Think of giving yourself a daily inspection (use the IMSAFEE mnemonic if you like) to assess your wellbeing. If you're feeling unwell, tired, hungover or under the influence of the unwanted side effects of medicine then, however much you want to fly, maybe another day would be better.

MAF's Africa incident rate has remained at zero for 8 years.

Larry Heintz [left], Africa Regional Safety Manager, Mission Aviation Fellowship, recently received a United Nations World Food Programme Award for his outstanding contribution to the humanitarian field. He said:

'This is an award for MAF. It would not happen without the programme staff buying into it and working so hard to make it a success.'

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TRIG

01

ALL PICTURES: KEITH WILSON/SFB PHOTOGRAPHIC

Kolb Twinstar troubles

THE LIGHT AIRCRAFT Association has had a fair bit of communication with Kolb Twinstar Mk III owners so far this year. The Kolb is a very lightweight high-wing design with a pusher propeller mounted above a tubular tailboom. There have been two incidents; one where the pilot had a control restriction (10 March, 2015) and one where the propeller detached in flight (4 June, 2015).

In the incident in March, the pilot had taken off from Runway 25 at Otherton Airfield and found he couldn't pitch during a shallow left turn at approximately 450ft. The aircraft began to descend and, in the latter stages of the approach for a forced landing, the left wheel struck a wooden post and yawed the Kolb to the left. The left leg dug into the ground and the aircraft slewed left before skidding to rest after approximately 15 metres. The pilot and passenger were uninjured.

The pilot had checked the controls prior to take-off and the restriction wasn't apparent after the forced landing. The aircraft was examined by the LAA, which concluded that the control issue was probably caused by excess slack in the elevator control cables allowing contact with the tailboom. Bulky clothing might have exacerbated the effect by pushing a turnbuckle into the side of the boom, causing a temporary restriction. The LAA wrote to UK-registered Twinstar owners to remind them of the importance of maintaining correct cable tensions and the risk posed by clothing impinging on controls.

In the June incident, the propeller separated from the engine in flight without warning and damaged the tailboom. The pilot landed successfully. The propeller wasn't recovered, but photographs of the fracture faces of the propeller retaining bolt shanks (which had remained attached to the engine crankshaft) showed evidence of failure due to high cycle fatigue. As a result of this incident, and two other similar events (one in the UK in 2007 and one in Australia in 2013), the LAA is in discussion with the engine manufacturer regarding the issue. Additional details of the event, together with the recommended procedures for propeller attachment, were published in the July edition of the LAA's engineering Safety Spot (*lightaircraftassociation.co.uk/2015/Magazine/Jul/SafetySpot.pdf*). CJ

INCIDENT DETAILS

Aircraft Type
Kolb Twinstar Mk III
(Rotax 582/48 engine)
Kolb Twinstar Mk III Xtra
(Jabiru 2200A engine)

Date and Time
10 March, 2015 at 14:02
4 June, 2015 at 11:30

Pilots' Flying Experience
PPL, age 27, 153 hours, 4 on type
Last 90 days – 2 hours
Last 28 days – 0 hours

NPPL, age 63, 288 hours, 83 on type
Last 90 days – 13 hours
Last 28 days – 2 hours

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02

Towbar takes to the sky...

YOU WOULD USUALLY become aware pretty quickly that a towbar was still attached if you tried to take off, but in this instance a pilot flew two perfectly normal circuits.

The pilot carried out his pre-flight check of the Cessna F172E inside the barn where it was stored. When he was finished, he pulled the aircraft out of the barn, jumped in, started the engine and taxied approximately 150 yards to the runway to carry out his before takeoff checks.

After landing, the pilot was shown pieces of metal that had been found on the grass runway. He recognised the metal as being part of the aircraft's towbar and a subsequent examination of the aircraft showed propeller damage consistent with striking the towbar.

The pilot considered the most likely reason he had inadvertently left the towbar attached was that he made his walkaround inspection inside the barn, whereas normally the aircraft would have already been pulled out before carrying out the checks. He said he must have been distracted by another task before climbing inside and starting the engine.

The pilot's report highlights the importance of checking around the aircraft immediately before any flight. CU

INCIDENT DETAILS

- **Aircraft Type**
  Cessna F172E
- **Date and Time**
  27 March, 2015 at 11:00
- **Pilot's Flying Experience**
  LAPL, age 53, 369 hours, 180 on type
  Last 90 days – 2 hours
  Last 28 days – 0 hours

03

DA40 injector alert

THIS DIESEL-ENGINED DA40 was climbing out after takeoff from Shoreham Airport when the engine stopped at a height of approximately 1,100ft.

There was just the pilot on board, a 27-year-old PPL holder who was hour-building with 31 hours on type. During the initial climb, the aircraft's performance and all indications appeared normal. At approximately 600ft AGL, he flew a planned 90° climbing turn to the right but, as he reached 1,000ft, he sensed a slight reduction in engine noise and saw a drop to approximately 95% RPM. The RPM corrected itself, but he began a precautionary turn to the right in anticipation that he might have to return to Shoreham. As he reached approximately 1,100ft, there was another drop in noise and then silence with less than 2% engine RPM indicated.

With the sea to his left and a built-up area below him, he steepened the right turn towards the north and open ground and tried to restart the engine without success. There were only two suitable fields to choose from; one with a flock of sheep and one with power lines obstructing it. He opted for the field with sheep and, as he touched down, the aircraft struck and killed three of the sheep. The aircraft then went through the boundary fence and into another field containing trees. As the left wing struck one of the trees, the aircraft was spun through 90° anticlockwise before coming to a halt with the rear fuselage partially detached and the nosewheel collapsed.

The pilot shut down the aircraft and got out normally in time to warn a couple who had come to help to stay clear in case of fire because he had smelt burning during the descent, although there was ultimately no fire. The couple called the emergency services and he called the flying club.

Engineers from the aircraft's maintainers checked fluid levels and downloaded the data from the engine FADEC (Full Authority Digital Engine Control) unit. The data showed a series of alerts for low fuel rail pressure. The next day, after closer inspection of the engine, it was found that the No. 2 cylinder injector securing screw and injector support were missing, the injector was out of

03

position by 50mm and the associated fuel pipe unions had loosened. The injector had been replaced in February 2015 to rectify a leak from its seal. At the time of the accident, the aircraft had flown eight hours and 40 minutes in more than 13 flights since the injector seal replacement.

The spares invoice indicates that, in addition to a new sealing ring, a new injector securing screw was also needed. The maintenance manual (revised in July 2014) specifies that: 'Before a third injector change – the Repair of the Thread for Injector Attachment must be done. Refer to Chapter 73-10.10'.

The manufacturer said this requirement arose from a case that occurred earlier in 2014 in which an Italian-registered DA40 suffered an engine failure and forced landing. The FADEC data for that Italian accident also showed a loss of rail pressure occurring at the moment of failure and the injector was similarly displaced. The screw and support in this case were displaced but were still present. Investigation by the Italian authorities and the manufacturer showed that the thread in the aluminium cylinder head had been stripped.

The manufacturer decided that the corrective action would be to do the thread repair at the third injector change, but it was not felt necessary to issue a Service Bulletin or similar to highlight this change. While Chapter 73-10.05 had been revised in July 2014 with the note to refer to Chapter 73-10.10, this chapter did not refer to the third injector change requirement and remained dated December 2013.

The maintenance company said staff involved in the DA40's injector removal in February 2015 were aware of the repair requirement, but were using the engine logbook to ascertain how many times the injector had been changed. However, the logbook was not used to record how many times the injector had been removed and refitted. All staff have now been instructed to record every time an injector is disturbed in the engine logbook.

It could not be determined how the injector support and its securing screw had come undone because neither was recovered. The Italians offered three explanations; fluid at the base of the thread which could expand with temperature and strip the thread; the screw was either overtorqued or undertorqued by the mechanic; or the screw was not renewed at its last removal/replacement. CU

INCIDENT DETAILS

- **Aircraft Type**
  Diamond DA40 D
- **Date and Time**
  7 March 2015, at 17:00
- **Pilot's Flying Experience**
  PPL, aged 27, 126 hours
  (31 on type)
  Last 90 days – 4 hours
  Last 28 days – 0 hours

/ INCIDENT REPORTS IN BRIEF

Grumman AA-5
24 June, 2015
Shobdon Aerodrome

UNDERSHOT RUNWAY
While landing on Runway 27 at Shobdon, the aircraft was too low so the pilot raised the nose and applied power. The pilot said the engine then spluttered and was slow to respond, with the result that the aircraft landed a few metres short of the threshold on a disused concrete surface. Photographs of the damage showed a scraped ventral strake, indicating an abnormally nose-high attitude and considerable tip damage to a propeller blade. This suggests that the engine was developing a substantial amount of power.

Piper PA-28R-201 Cherokee Arrow III
19 June, 2015
Crosland Moor Airfield

LOSS OF DIRECTIONAL CONTROL ON TAKEOFF
During take-off, the aircraft swung to the left and the pilot was unable to correct with the rudder. The aircraft left the runway, ran down an embankment and through a stone wall. The cause of the loss of directional control has not been established.

Piper PA-28-140 Cherokee
18 June, 2015
Caernarfon Airport

PROPELLER STRIKE FOLLOWING BOUNCED LANDING
The student pilot was on a solo flight and being watched by his instructor who thought the approach was slightly high and fast, with the result that the PA-28 bounced on touchdown. The pilot did not increase power and the aircraft bounced a second time, followed by a third when a propeller strike occurred. The student opened the throttle and went around, subsequently landing successfully.

Rotorsport UK Calidus
8 April, 2015
Damyns Hall Aerodrome

OVERTURNED AFTER ROTOR STRUCK TAILPLANE
The gyroplane began to move forward against the brakes before sufficient rotor RPM had been achieved for take-off. The pilot responded by re-positioning the control stick fully aft and the rotors struck the tailplane. The pilot lost directional control and the right landing gear subsequently failed, causing the Calidus to tip onto its right side. The pilot was uninjured.

/ INCIDENT REPORTS IN BRIEF

Zenair CH 601HD
15 June, 2015
Manchester (Barton) City Airport

LATE TOUCHDOWN AND RAN OFF RUNWAY

Following an uneventful flight from Headcorn, the Zenair made an approach to Runway 27L at Barton; ATC reported a slight tailwind component. The pilot said the aircraft touched down around halfway along the runway at approximately 45kt, although the groundspeed was probably some 50kt.

The surface was bumpy and it took time to slow down. As the Zenair passed over the numbers at the far end of the runway at 10-15kt, the nosegear bungee broke causing the nose to dip and the propeller to strike the ground, breaking off one of the three blades.

The pilot thought that the bungee failure happened due to the aircraft's excessive speed over a bumpy surface following a late touchdown with a tailwind component.

Robinson R22 Beta
13 February, 2015
Romney Marsh, Kent

HEAVY LANDING FOLLOWING AUTOROTATION EXERCISE

After the instructor demonstrated a 360° autorotation, the student attempted a similar manoeuvre. At some point during the turn, the 'low rotor RPM' warning sounded and, although the student lowered the collective control, the airspeed and height reduced to the point where the instructor applied power. However, the aircraft continued to descend so he applied full power and pushed the nose down to gain speed.

When it appeared a landing was inevitable, the instructor attempted to flare at approximately 40ft with the intention of conducting a low speed landing. The skids dug into the ploughed field, the rotors struck the ground and the helicopter ended up on its right-hand side. The instructor considered that, with a 25-30kt wind blowing over the area, he had encountered severe windshear in the final stages of the autorotation.

XtremeAir XA42
10 June, 2015
White Waltham

CANOPY DETACHED IN FLIGHT

Shortly after takeoff from Runway 03 at White Waltham and passing 400ft, the one-piece bubble canopy opened and was torn off by the slipstream. The pilot flew a modified circuit and landed on Runway 07. Neither occupant was injured. The canopy was recovered from the airfield, but had been destroyed.

Both occupants believed it had been closed before takeoff. However, the pilot thought it had opened in flight because it was not properly secured, despite appearances. He said he would be conducting more robust canopy security checks in the future.

Pegasus XL-Q
4 June, 2015
Over Farm Airfield

ENGINE FAILURE AND FORCED LANDING

The aircraft was climbing away after take-off when the engine momentarily lost power and, as the pilot turned back towards the airfield, the engine stopped completely. The subsequent landing was on the airfield but in crops bordering the runway and the nose landing gear collapsed. The pilot attributed the engine failure to an incorrectly seated carburettor float chamber which he routinely removed to fill with fuel as part of the pre-start priming procedure.

Reims Cessna F152
28 October, 2014
Earls Colne

KNOW THE PANEL

The student was on a solo navex from Stapleford to Earls Colne. As the flight progressed, radio communications became progressively more difficult and, on attempting to contact Earls Colne, it appeared the radio had failed. The pilot orbited in the Earls Colne overhead and tried switch selections without success, before selecting the radio failure code on the transponder.

She waited ten minutes for the squawk to be observed and for ATC to call Earls Colne by phone before joining the circuit to land. The first approach to Runway 24 was slightly high and fast and so she went around. On the second approach a gust caused the 152 to roll to the right close to the ground and it impacted hard on the nose landing gear which collapsed.

Although the aircraft was fitted with two radios, they were different and the pilot had not been shown how to use the second one; she was unaware it was a communication radio.

Robin R2160
27 May, 2015
Bodmin Airfield

RUNWAY EXCURSION DURING ABANDONED TAKE-OFF

The aircraft was approximately halfway along the runway during its take-off roll when the instructor sensed it was no longer accelerating. He abandoned the take-off but could not prevent over-running the end of the runway. A change in wind direction and inadvertent use of brakes by the student might have been causal factors.

SD-1 Minisport
24 May, 2015
Meldreth Valley Farm, Cambridgeshire

TAKE-OFF PERFORMANCE ISSUE

While trying to take off from his home strip, the aircraft failed to gain height so the pilot was forced to land straight ahead in a tall crop. The pilot felt that the aircraft had marginal takeoff performance from the strip.

Flight Design CT2K
23 May, 2015
North Coates Airfield

HEAVY LANDING

The CT2K was landing on Runway 05 at North Coates and the pilot described the approach and weather conditions, with

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/ INCIDENT REPORTS IN BRIEF

a light crosswind from the right, as 'satisfactory'. However, the aircraft bounced on touchdown and began to drift to the left, so he applied power to go around. The left wing then dropped and the CT2K struck the ground, damaging the landing gear, wingtips, propeller and engine mount. The pilot believes he might have applied rudder in the wrong sense when trying to correct the drift and wing drop.

NAMC CJ-6A
16 May, 2015
Goodwood Aerodrome

LANDING GEAR RETRACTS DURING LANDING ROLL

After an uneventful familiarisation flight, the pilot said the aircraft was configured for landing and the cockpit indications showed that the gear had extended. Two witnesses said it was down and looked normal.

Following a normal touchdown, the right main gear collapsed, quickly followed by the left and then the nosegear. The pilot submitted a photograph taken during the landing roll showing the aircraft with both main wheels retracted but the nose landing gear still extended.

The pilot said he had checked the position of the landing gear selectors in both cockpits following the incident and confirmed the front selector was down and the rear one was locked in the neutral position.

When the aircraft was lifted by a crane, both main landing gears extended without assistance but the nose landing gear could only be extended when the uplock was released with a screwdriver.

The CJ-6's landing gear is pneumatically operated and the pilot thought it possible that the landing gear retracted because of an air leak or an anomaly with the landing gear selector(s). At the time of the report, a definitive cause of the incident was not known.

DH.82A Tiger Moth
15 May, 2015
Old Sarum Airfield

FLIPPED INVERTED ON LANDING

The part-owner was renewing his SEP (Single-Engined Piston) rating and was seated in the rear with the instructor in the front. After approximately an hour, they returned to Old Sarum and the rear seat pilot planned to carry out a touch-and-go. He flared too high, causing the Tiger Moth to bounce on touchdown.

He continued with the manoeuvre, opened the throttle and attempted to rotate into a climbing attitude, but was unable to prevent a nose-down pitch which developed instead. The propeller and the nose struck the ground and the aircraft flipped inverted. The instructor vacated first and assisted the rear seat pilot; both were unhurt. The two pilots suspected a sudden gust of wind may have lifted the tail, causing the accident.

Cessna U206G
13 May, 2015
Strathallan Airfield, Perthshire

ENGINE FAILURE AND FORCED LANDING

The aircraft was late downwind to land when the engine stopped. The pilot checked the engine controls, including the magneto switches and fuel selector, but saw nothing amiss. He continued with a glide approach, selected flaps back to UP and turned onto the runway heading. Unfortunately, he was unable to reach the airfield and landed heavily in the field before it, breaking off the nose landing gear and the rear fuselage. One passenger suffered a minor injury.

The aircraft operator witnessed the accident and rushed over. In the presence of a witness, he removed the fuel caps and dipped his fingers in to verify the presence of fuel, estimating that both tanks were approximately half to three-quarters full. He then took fuel samples and checked for obvious anomalies, finding none. He checked for the presence of fuel in the injection system and found a normal amount, so he decided to run the engine. After recovery, the damaged propeller blades were cropped, the battery reconnected and the engine started, running quite smoothly, despite the lack of propeller blades. At the time of preparation of the AAIB's Bulletin, there was no obvious reason for the engine failure.

Montgomerie-Bensen B8MR
4 May, 2015
Private airstrip, Reading

OVERRAN RUNWAY FOLLOWING REJECTED TAKE-OFF

Everything was normal on the take-off roll on the grass runway and up until the point of rotation, when the pilot reported that a sudden gust of wind pushed the aircraft sideways. He decided to abort, but there was insufficient runway remaining and the aircraft struck a hedge.

Rans S10
27 April 2015
Henstridge Airfield

ENGINE FAILURE DURING DESCENT TO LAND

The aircraft was descending when the engine started to run erratically and then stopped. During the subsequent forced landing, the aircraft ground-looped in the field and damaged its main landing gear. Low fuel levels might have been responsible for the engine failure.

Z-1RA Stummelflitzer
25 April 2015
White Waltham Airfield

TOO MUCH BRAKE?

The approach seemed normal with a wind of 8kt from 250° but, on touching down at an airspeed of 50kt, the aircraft bounced and the pilot applied a small amount of corrective forward stick. As it touched down again, the pilot applied the brakes and the aircraft nosed over onto its back.

The pilot, who had a full harness and protective helmet, was uninjured. He had taken ownership of the Stummelflitzer six days prior to the accident, during which he had accrued five hours' flying time and made approximately 16 landings. He felt he had become familiar with the brakes and commented that they had not felt particularly powerful.

On the day of the accident, he had flown wearing new shoes that he thought would improve his tactile feel of the brake and rudder pedals. He considered the reason for the accident was a culmination of factors, which included inexperience on type, excessive brake application due to a change in footwear and reversion to the heavier braking technique he used for tricycle landing gear aircraft when landing on short runways.

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MORE DRONES IN NEAR MISSES

An increasing number of near misses between light aircraft and drones have been highlighted in the latest UK Airprox Board report – and it reveals the difficulties in locating the drone operators afterwards

One incident involved the pilot of an EV97 on a solo circuit at Welshpool when he saw a quadcopter approximately 50ft in front. He applied full power and initiated a tight climbing right turn to gain separation. Once straight-and-level at 1,800ft, he reported the incident over the radio.

This took place over the Powis Castle grounds and the pilot contacted castle staff to see if they were aware of the drone. They had no knowledge and noted that drones are not allowed to fly from National Trust property. There is, however, a park surrounding the castle where the ground rises to 1,000ft on the downwind leg of the RW04 circuit. The drone operator could not be traced.

Another incident occurred when the pilot of an RV6 passed near Byfield, Northampton. He said he had just switched to a listening watch on the Sywell frequency when he saw a red and yellow three-rotor drone. He reported that it was the type that can be easily bought in shops. He took evasive action and the drone passed down the side of the aircraft and under the left wing. Again, the drone operator could not be traced.

An instructor and student of a Cavalon gyrocopter experienced one of the most severe instances. While passing over Detling village at 1,500ft in good visibility, a drone passed down the left side just 20m away. The instructor took control and, having ensured there was no danger, took photos of the drone. It was later identified as a Phantom FPV 'flying wing', which has a wingspan of 1.55m and weighs less than one kilogram. As in the incidents above, the drone operator could not be traced.

The Airprox Board noted that this weight of drone should not be flown higher than 1,000ft agl and said it had been flown into conflict with the Cavalon. "Chance had played a major part in preventing the collision," said the Board, who rated the incident as Category A.

Commercial aircraft have been affected too. An RJ1 airliner was at 4,000ft, flying in the London TMA, close to the Detling VOR. The First Officer saw a 'helicopter-type' remotely controlled drone in the 10 o'clock position pass 60ft below the left wing. ATC were informed. He assessed the risk of collision as 'high'.

"The drone operator was not entitled to operate there, and his non-compliance posed a safety risk," the Board said. "Furthermore, to reach a height of 4,000ft, the drone would need to be flown on 'first person view'. At 4,000ft, it would be impossible to see the drone from the ground and therefore to operate it legally." CU

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