Instrument Pilot
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The Australian IR for PPLs

Part 2 by Brian Jackson

Photo, early morning outbound from Moorabbin

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PPL/IR EUROPE

In the second part of his article, Brian Jackson compares the advantages and disadvantages of the PIFR and the CIR, and goes on to discuss training issues

PIFR rating versus CIR

So what are the benefits of a private pilot holding a Private IFR (PIFR) rating compared to holding a Command Instrument Rating (CIR)? (some private pilots hold both.) The most obvious benefit is access to the required training and lower cost. Unlike Europe, very rarely in Australia is the weather so bad that highly developed instrument approach capabilities are required. Furthermore, incident trends indicate that most events involving VFR pilots encountering marginal VMC, or inadvertently entering IMC, tend to occur after the aircraft has already left its departure aerodrome and is well established in the enroute phase of flight. Based on these observations, the enroute PIFR rating is seen by some pilots as probably offering more value to private pilots than instrument approach capability, particularly in ensuring pilots can navigate at safe altitudes (rather than "scud running") and have the ability to safely divert to alternative aerodromes if the destination weather is non VMC. The removal of some of the pre-qualification requirements applicable to the issue of a CIR combined with the attraction of achieving enroute instrument flying capabilities after only a minimum of 20 hours training compared to 40 hours training for the CIR, offers considerable operational and cost value to private pilots.

The second benefit is the flexibility the rating offers in terms of training, theoretical knowledge and flight experience recency. The modular approach to the acquisition of theoretical knowledge and flight experience is more attractive to private pilot budgets and puts the achievement of instrument flying skills within easier reach of many VFR

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Training for ditching

By Martin Welling

Martin describes his experience of a simulated ditching course and advises on how to plan for the real thing.

Wet drill training course

When you fly, as I do, from somewhere like Shoreham, inevitably a lot of the flights are over water. Whilst a nice layer of stratus between me and the sea is always comforting, I do have to accept that it is not exactly a substitute for knowing about how all the life jacket and dinghies actually work, if the engine decides to quit! At the last ***PPL/IR Europe*** meeting in Cambridge, we had a useful talk from SES on their products and how to use them, and the next obvious step was to attend one of their courses at South Cerney which is just a short taxi ride from Kemble. So one fine Saturday, I flew up to Kemble and joined other members on the lake side.

The day was split into morning for the full briefing of the various types of equipment, and how to use it. Then in the afternoon, we donned wetsuits to try out the theory for ourselves. Once clad in the wetsuits and helmets, (council owned lake, therefore presumably we had to make sure that we did not bash our heads on the rubber rafts – very painful I am sure!!), we made our way to the lake side. Our first task was to jump in the water carrying our single person life raft, inflate the lifejacket, get into to the raft, bale out surplus water, blow up the cover and finally don the spray hood. Theoretically this was all very easy. As usual, not as easy as the theory! The jumping in and deploying the lifejacket was simple enough.

Single-man life rafts are used for training

The getting in the raft was just getting to know the knack. The bailing out of water and inflating the cover was not quite so simple.

The first thing I found, was that the line to the raft needed a sharper pull than I had thought to inflate it. Then getting it upright can be an issue, as there is a fair chance that it will start off upside down. I used to do a lot of dinghy racing off the coast at Eastbourne, where clambering aboard a capsized dinghy was a very frequent occurrence for me. Because of this past experience, I was able to get in without too much problem. Most people instinctively try to climb into a raft. The knack, however, is to grab something in the entrance to the raft and drag yourself in, keeping your feet behind you, rather than letting them sink. Once in the raft, the first task was getting the water out that had been shipped, and whilst there was a bailer, it was a slow process. I only removed a small amount, and then concentrated on inflating the cover which you inflate by blowing into a tube. Again, technically simple, but I could not do it. I only found out later that the valve that you blow into needs to be turned 90 degrees first. Obviously I had not been paying attention to the briefing! This raft was for one person (apparently it can take two at a push). After everyone was in, we had fire hoses turned on us to give a touch of realism. We then got out of the raft, into the lake, and boarded a much larger ten place dinghy which was easier to get into, and had the advantage of having other people already inside to drag you in if necessary.

That completed the wet drill, and after showers and changing we had a de-briefing. I took away new thoughts as well as reinforcing things that I had already a good idea about, which I would summarise as follows:

- It is essential to know exactly how your equipment works; I suspect that many of us do not.
- Everything that you want to take from the aeroplane needs to be attached to you – it is all too easy to drop a piece of equipment in the water. Even if it floats, it can float away and out of reach.
- The one-man dinghy is probably a good idea for a two seater aircraft where two can be carried, but I suspect most of us would opt for a four place raft.
- Spray hoods are strongly advisable, as they protect the face from cold water. I tried out a pair of the recommended Mercalon gloves, which kept hands very warm. This would be vital in a real life situation.
- Rafts will usually contain, amongst other things, sea sick pills. All, including the strongest stomachs, will need these after bobbing around in the English Channel for even a short while.
- Even if your aircraft has an ELT, take a personal locator beacon with GPS. A "Mini flare" is also advisable; this has smoke at one end and a phosphorus flare the other.
- When crossing water in winter, do at least make sure that you wear more than light-weight clothing, however warm the interior of your aircraft might be.
- Above everything else, the biggest risk whilst in the water is not drowning, but hypothermia. Survival time in the English Channel in all but the hottest months of the year (late summer), is measured in minutes. Even the fittest of us will start slowing down after 10 to 15 minutes. Remember that sea temperature lags air temperature by about one season.

These then were some of the key points, and a useful session that I would recommend to everyone who has not done it. I must compliment SES on a very well organised day, with very efficient pre-course information details. They did make things as realistic as they could. However, short of asking us to skip the wetsuits (I don't think there would be too many takers for the course if they did!), anyone doing this course has to accept that doing this for real, is going to be a fair bit more difficult. You are certainly going to be a whole lot colder. So ended a useful day, but it does make one realise that there is a lot more to consider. Doing a drill feeling warm, in summer, and in a calm lake, is very different to handling things in the English Channel when there is a bit of sea running. On top of which, there remains the little matter of actually getting your aeroplane safely on the water!

Avoidance and preparation

The CAA Safety Sense Leaflet (no 21) is well worth reading and it gives some useful pointers. Encouragingly, it says that the UK and USA stats show that 88% of ditchings result in few injuries to pilot or passengers, stressing that it is Hypothermia which is the greatest risk in the water. Only 50% survive before help arrives. The other good news for me as a C182 pilot, is that there is apparently no more difficulty ditching a high wing plane than a low wing one. This is principally due to better controllability right down to the water. Moving on to the best way of actually getting onto the water, or preferably avoiding it altogether, I summarise the key CAA points below, together with my own thoughts as to items such as route planning. I have split the headings under, Flight Planning, Equipment, Pre-flight, The Flight, Engine Failure, Ditching and Vacating Aircraft.

Flight planning

- Fly High – Even just below the London TMA, you would only have five to six minutes in the air in the event of the engine quitting.
- Don't fly over water at night - Ditching and rescue will be much more difficult.
- Don't fly more than 40 nm over water in winter (Nov – Apr) without immersion suits – Risks are far greater due to hypothermia.
- Consider sea conditions when the surface wind is 33 kts or more (Force 8), and go the shortest possible route, as you would be highly unlikely to make a successful ditching.

Equipment

- Life Raft – This should be serviced annually.
- Life jackets (Preferably with spray hoods) – These should be serviced annually.

- PLB 406 MHz - Preferably with GPS, even if your aircraft has an ELT.
- Flares - Dual smoke and phosphorous.
- Mercalon gloves - At least for the pilot.
- Waterproof case – For R/T handheld and/or telephone
(See www.aquapac.net).

Pre-flight

- Baggage – Correctly stowed and tied down.
- Life raft – KEEP EASILY ACCESSIBLE.
- Clothes - Wear warmer clothing in the cockpit if cold outside.
- Life jackets – Wear, always.
- Passenger Briefing – Brief on all emergency equipment.

The flight

- Keep to the flight planned route - Unless ATC/London Information have been advised differently.
- Fly directly between beacons or known features – This makes it easier for reference.
- Set 121.5 on standby frequency – In case the frequency in use is not available.
- Cruise checks – Carry out immediately before the water crossing.
- Be aware of closest land – Be aware of wind speed/direction.

Engine failure

- Trim for glide/engine failure checks – as per your POH, but don't switch off the master.
- Transmit Mayday and squawk 7700 – State your track and position. Turn on landing and nav lights.
- Choose a ditching point - Aim for the nearest boat, the smaller the better. Land in front of it.
- Brief passengers – Re exiting, bracing and not inflating jackets whilst in the aircraft.
- Life jackets – Check all are secure and not too loose.
- Life raft – Have it ready, and designate one person to look after it.
- Equipment – Prepare all necessary items and tie them to life jackets (around the waist or on the front ring).
- Communications – Prepare and secure handheld radio and/or mobile.
- Safety – Remove glasses and headsets (unplugging them to avoid getting caught in the cables).
- Hatches & harness – Doors unlatched, and seat belts tight.

Life rafts ready for inspection

The ditching

- Winds up to 10 kts. (Force 3) – Land parallel to swells.
- Winds 10 – 21 kts. (Force 3 to 5) – As above, but also use headwind component.
- Winds 22 – 33 kts. (Force 6 to 7) - Ditch into wind on the crest of a wave or on a down slope of swell.
- Winds exceeding 34 kts. (Force 8) – As above, but AVOID AT ALL COSTS, DITCHING INTO FACE OF RISING SWELL.
- Land as slow as possible, tail down – but DON'T STALL.
- Be prepared for an initial touch on water, followed by another greater deceleration.
- Raise flaps if possible on high wing aircraft to facilitate leaving the aircraft.

Vacating aircraft

- Vacate in order – Front seats, then rear.
- Check and help – Rear seat or passengers in difficulty.
- Inflate life jackets – When outside aircraft.
- Deploy life raft and board.
- Deploy PLB.
- Take seasick pills as soon as possible.
- Bail out surplus water.
- Use handheld/mobile to contact emergency services.
- Deploy flares – ONLY WHEN BOAT/HELECOPTER SIGHTED.
- DO EVERYTHING TO KEEP WARM – The closer to each other the better.

That is about it and of course the trick is to try and remember most of it in a very stressful situation. It would be useful to have a check list to cover all the actions between engine failure and the ditching, as there are many things to remember, and very little time in which to do them.

A few final points. Firstly, according to the CAA leaflet, there is a landline for D & D of 01489-612406. It would a good idea to store this in the mobile and or course there is 999 for the Coastguard. Secondly, when flying an SR22, I found a standard piece of equipment called an "Egress Tool", better known to the rest of us as a hammer. This might come in handy for a stubborn window or cockpit window. Thirdly, I wonder about the effectiveness of a "Rapid Ditch Bag" available for putting all bits and pieces in. Is it not better to put the important things like GPS, R/T (in waterproof pouch) and flares secured to your waist, as this frees up an all important hand? Last point is that I would imagine that, all things being equal, with a number of boats in the Channel, (as there usually are), it would probably be better to chose a boat more or less on track (or behind), rather chose one 90 degrees off track. This will facilitate Search and Rescue.

I am sure that there will be people who will have different views on what to do, or a different order in which to do them. If nothing else, I suggest that it is good to think about these matters in the calm of your own time, rather than under extreme pressure of that hopefully never-to-happen event. However, for my part, having now considered the situation in detail, I shall continue to opt for a layer of stratus between me and the sea, as it will still make me feel more comfortable!

The Australian IR for PPLs, continued from Page 1

pilots. Furthermore, the PIFR rating concept allows pilots to incrementally develop and practice their instrument flying skills and gain valuable experience in the process before advancing onto the more complex instrument approach manoeuvres. This incremental approach offers significant safety benefits to low time VFR private pilots, particularly those who have not had a strong exposure to working with the ATC system or conducting self separation in non-controlled airspace.

The CIR requires recency experience to be gained either in the aircraft or on a CASA approved synthetic training device. PIFR pilots, however, have the option of also maintaining instrument flight proficiency using any number of commercially available PC based flight simulator or part task trainer programs. This further reduces the costs to private pilots of gaining and maintaining the rating. The validity of the PIFR rating and any associated Flight Procedure Authorisations (FPAs) is only subject to a biennial flight review, compared to an annual renewal for the CIR. Private pilots can therefore achieve further savings when revalidating the rating.

Holding a concurrent PIFR rating also offers a significant advantage to CIR pilots. Should the CIR expire before the pilot has had the opportunity to undertake the CIR annual renewal test, the pilot can legally continue to fly IFR on private flight operations under the terms of their PIFR rating subject to a satisfactory self-assessment of instrument flight competency. In fact, for many pilots holding a CIR, the annual CIR renewal flight test also meets the requirements for the PIFR rating biennial flight review. This results in some pilots adopting the practice of flying under the terms of their CIR for the first 12 months and then flying under the privileges of their PIFR rating for the subsequent 12 months before undertaking another CIR renewal. This CIR renewal then doubles up as the PIFR biennial flight review.

Industry concerns

Despite these benefits, many training organisations continue to harbour concerns about the PIFR rating with some of these training organisations electing not to seek training approval from CASA as an approved PIFR training organisation. Others, holding dual approvals, sometimes encourage pilots away from the PIFR rating and recommend CIR training instead. The more significant concerns noted by these organisations centre on the differences between the CIR and PIFR rating in terms of:

- Instrument recency and validity requirements.
- Aeronautical knowledge requirements.
- Required experience and in-flight decision making.
- Holding in non-controlled airspace.
- Interaction with ATC.

Each of these issues is discussed in the following paragraphs.

Instrument recency and validity

Unlike the CIR, pilots holding PIFR ratings are solely responsible for determining their level of competency, prior to conducting each IFR flight. There are no legal requirements for the pilot to meet any recency standards, although CASA strongly encourages pilots to follow the same recency standards applicable to CIR holders as published in the Civil Aviation Orders. This aspect has been the subject of significant criticism from the pro-CIR training lobby group. They argue that this approach to assessment of competency and the maintenance of recency for the PIFR rating is placing an unacceptable level of responsibility onto generally less experienced pilots having to make such important judgement calls. CIR-only advocates suggest this may lead to differing levels of safety occurring between pilots flying under the CIR and those flying under the PIFR rating within the same airspace. In the absence of published PIFR recency standards, some CIR training organisations advocated (without success) for CASA to at least consider implementing an annual flight review requirement in lieu of the biennial flight review for PIFR rating holders. Whilst advocates for the PIFR rating acknowledge that regular and recent flight experience is the best path to maintaining instrument flight competency, they present an alternative argument that most pilots are motivated to fly responsibly at all times for their own safety. They go on to argue that the system-wide safety benefits offered by more private pilots holding the PIFR rating far outweigh the potential risk presented by any isolated case whereby a private pilot may not be up to the required proficiency standard. Given that the PIFR rating has now been in operation for over ten years without any serious incident or accident ramifications, it would appear that the fears held by the CIR-only lobby may be unfounded.

Aeronautical knowledge

There are signs emerging indicating a difference in the level of procedural knowledge between those pilots holding a CIR who have completed the CASA managed IREX theory exam, and those PIFR rating holders who have undertaken a PIFR theory examination set and supervised by the PIFR training organisation. The IREX theory exam is renowned throughout the Australian pilot community as being very comprehensive and exacting, requiring intensive study leading up to the examination. Many pilots fail to pass the IREX on their initial sitting. Contrastingly, it appears that the same level of structure, study intensity and exam discipline is not as evident in those PIFR examinations being conducted by the approved PIFR training organisations. The PIFR examination process appears not to be subject to the same level of governance scrutiny by CASA as the IREX process. It is open therefore to potential abuse to any training organisations inclined to manipulate exam results in response to commercial considerations.

The recent move by CASA to offer PIFR training organisations the option of using the CASA CyberExam system for the setting of examination content is considered a welcome move towards improving the aeronautical knowledge of PIFR rating candidates, and lessening the potential for abuse of the examination system. However, it is not known how many PIFR training organisations have taken up the option of using the CyberExam system.

In-flight decision making

IFR flying introduces increased procedural and situational complexity. This, in turn, requires a significant step up in a pilot's flying competency and decision making ability throughout all stages of flight. Considerations relating to self assessment of instrument flight competency, interpretation of complex weather trends, fuel planning, selection of alternate aerodromes, in flight equipment failures under IMC[1] as well as diversion point planning, are aspects that have not confronted the average VFR pilot in the past. These now become a very likely probability once an instrument rating is acquired. Consequently, many critics consider the minimum 20 hours of instrument flight training for a PIFR rating is insufficient to enhance these critical skill areas for a typical VFR pilot and, therefore, exposes the newly minted PIFR pilot to

[1]Particularly for single engine aircraft that have limited equipment redundancy options

increased safety risk.

In particular, many training organisations are critical of the fact that, under existing guidelines, it is possible for a pilot to only hold a basic enroute PIFR rating without any additional instrument approach FPAs. This can lead to a situation whereby pilots may find themselves "caught on top" and unable to let down at their destination aerodrome due to IMC existing below the associated MSA; a situation potentially compounded by the pilot having insufficient fuel to divert to an alternative aerodrome. In order to avoid such a situation occurring, PIFR pilots holding only a basic enroute rating with no instrument approach FPAs need to be very diligent at the flight planning stage in ensuring they carry enough fuel to reach a suitable alternate aerodrome. They must then plan to continually monitor the weather conditions at the alternate aerodrome whilst enroute to their destination aerodrome. It would appear that this level of decision making and discipline is generally lacking in PIFR training (and sometimes also in CIR training). It could therefore potentially result in disastrous consequences, particularly for those low time pilots whose instrument flying experience may be limited to just the minimum 20 hours required for the issue of the initial enroute PIFR rating. Recent initiatives taken by CASA, encouraging pilots to develop their own set of personal standards, and to undertake self assessment against those standards, has provided much needed decision making guidance for low time pilots and provides some level of risk mitigation against PIFR pilots encountering these types of situations.

Because of the above considerations, almost all PIFR training organisations now insist PIFR rating candidates obtain at least one instrument approach FPA to supplement their basic enroute PIFR rating. The preferred instrument approaches for this purpose tend to be either the NDB or RNAV (GNSS) approach, as these approaches are the most prevalent throughout Australia.

Holding in non-controlled airspace

PIFR pilots intending to operate in controlled airspace must have a holding pattern FPA attached to their basic enroute PIFR if they do not already hold an instrument approach FPA. This is to ensure pilots are able to fly published holding patterns for either separation or weather purposes, if they are required to do so by ATC. However, PIFR pilots intending to operate solely in non-controlled airspace do not need to demonstrate proficiency in flying published holding patterns. They must though be able to demonstrate the ability to conduct a safe holding manoeuvre that ensures appropriate separation from other traffic and terrain. Critics consider this aspect raises serious safety issues as PIFR pilots who do not hold an instrument approach or holding FPA are not likely to be carrying the relevant instrument approach plates for the holding aerodrome. This could result in PIFR pilots flying holding manoeuvres that are contrary to published holding patterns at non-controlled aerodromes, thereby leading to potential midair conflict with pilots flying standard patterns. In addition, it is perceived that there may be increased CFIT risk for PIFR pilots conducting non-standard holding manoeuvres at locations having segmented 25nm MSA circles surrounding the holding aerodrome. At such locations PIFR pilots may be unaware that a segmentation requirement exists and, whilst initially selecting a safe altitude to clear immediate terrain, may subsequently fail to adjust altitude when transitioning to an adjacent MSA segment.

Interaction with ATC

Currently, Australia's flight planning notification form is designed on the assumption that a pilot planning IFR is authorised to use the nominated navigation aids for both enroute navigation and for instrument approaches; i.e. the pilot holds a CIR. Unlike a CIR holder, PIFR rating holders will be authorised for instrument navigation but may not be endorsed to use a navigation aid for instrument approach purposes, and there is no method for indicating this procedural limitation on the Australian flight plan notification form. ATC will therefore not be aware that PIFR pilot may be procedurally limited unless informed by the pilot. PIFR pilots have an obligation to inform ATC of any procedural limitations on their rating, and to decline clearances involving procedures which they are not authorised to conduct (e.g. STARs, IAPs and SIDs). Late notification of procedural limitations to ATC has resulted in some PIFR pilots being delayed, or having their airways clearances rescinded or amended causing some inconvenience to ATC.

Has the PIFR rating been a success?

The question of whether the introduction of the PIFR rating has achieved its original safety objective of reducing the number of incidents and accidents caused by private pilots inadvertently flying into IMC is a difficult one to answer for a number of reasons. Whilst statistics on aircraft accidents caused by inadvertent VFR flight into IMC can be relied upon for analysis, the integrity of incident statistics is of lesser value due to the fact that pilots who live to tell the tale are generally reluctant to report instances where they inadvertently (or deliberately) flew into IMC, and subsequently experienced difficulties in navigating and maintaining safe control of the aircraft. Secondly, the last ten years has seen significant advances in the availability and capability of autopilots, GPS navigation systems and (in some cases) terrain warning systems for general aviation aircraft. These have all given VFR pilots improved tools for enhancing situational awareness and preventing aircraft loss of control when encountering IMC. Therefore, it is not logical simply to compare statistics prior to, and after, the introduction of the PIFR rating to determine whether the introduction of the rating has directly contributed to an improved safety result, through a lowering of inadvertent flight into IMC statistics, over the ten years the PIFR rating has been in operation.

The only yardstick available by which one can measure the success of the PIFR rating is to analyse the uptake rate for the rating. The questions are whether (a) PPL holders consider the rating relevant to their operational needs, and (b) they consider the rating accessible and affordable. For the purposes of discussion in this section, only statistics relating to fixed wing pilots are considered as the number of private helicopter pilots holding instrument ratings in Australia is very low.

Currently in Australia, there are some 9,050 PPL holders holding a valid medical certificate. Figure 3 shows that, out of this number, only 667 private pilots (approximately 7.4 percent) currently hold some type of instrument rating, with only 140 fixed wing pilots (1.5 percent) holding a PIFR rating on an exclusive basis.

Overall, it can be seen from Figure 3 that the traditional CIR remains the preferred instrument rating for 80 percent of private pilots in Australia. Of all the multiengine instrument ratings issued by CASA, 93 percent are MECIR ratings, while CIR holders account for 64.5 percent of all single engine instrument ratings issued. Figure 3 shows that a number of CIR pilots also hold PIFR ratings however, in most cases, this is due to CIR pilots applying for, and automatically gaining, equivalent PIFR privileges on the back of successful CIR flight tests. Interestingly, MECIR pilots

Category	Total Ratings	Multiengine	Single Engine
PIFR Rating Only	140	23	117
CIR Only	395	204	191
Both PIFR Rating and CIR	132	110	22
Total	667	337	330

Figure 3: Breakdown of Instrument Ratings held by Australian Fixed Wing PPL Holders *(source CASA)*

tend to be more attracted to also holding a MEPIFR rating, with 35 percent holding the equivalent PIFR rating compared to only some 10 percent for their SECIR counterparts. The reasons for this anomaly are not clear.

So, it may not be possible to determine accurately the contribution to improved pilot safety resulting from the introduction of the PIFR rating. However, it is a fact that the availability of the PIFR rating has made a small contribution to increasing the number of private pilots with instrument flight capability in Australia. This is evidenced by the 140 pilots who only hold this rating exclusively, and who may not have been in a position to achieve instrument capability through the CIR process for whatever reason. Other factors also need to be considered here and may explain the relatively small uptake of the PIFR rating on an exclusive basis. Private flying in the general aviation sector in Australia has been in gradual decline over many years (in terms of flight hours), with private pilot numbers remaining relatively static. This is mainly due to the increased cost of flying general aviation aircraft, the emergence of low cost carriers offering competitive airfares and the drift of private pilots towards the lower cost and self regulating light sports aircraft (LSA) industry sector. Regulatory control within the LSA sector is administered by Recreational Aviation Australia (RAA) and RAA certified pilots are not permitted to conduct flights under IFR.

Concluding thoughts

It is at this point that I wish to declare my support and advocacy for the PIFR rating for the following reasons. I first learnt to fly in 1974 but, due to competing family financial commitments and an ATC career that involved many career transfers around Australia, I did not accrue much cross country pilot in command time before I was forced to take a 25 year break from flying. In 2000, once my children had become financially independent and I retired from ATC duties, I was in a position to return to flying but this time I was determined to obtain both a multiengine aircraft rating and a CIR. Unfortunately, I was unable to commence training for the CIR due to the fact that I did not have sufficient cross country pilot in command time. I was advised by many CIR training organisations to hire an aircraft and build up the required time before coming back for training. This seemed to me to be a mindless waste of money, which could be better spent on either paying for my actual CIR training or adding to my flight experience once I obtained a CIR. Then, magically out of the blue, the PIFR rating arrived on the scene immediately solving my dilemma.

The PIFR rating did not require any cross country PIC experience before commencing training for the basic enroute PIFR rating and FPAs. This meant that I could commence instrument flight training immediately, making the best use of my scarce dollars. As I knew that one day I would want to convert from a PIFR rating to a CIR, I studied and sat the CASA IREX theory exam (despite its commercial pilot content), rather than sitting the PIFR theory exam set by the PIFR training organisation. On passing the IREX, I then started flight training for my enroute PIFR rating. Immediately after gaining my enroute PIFR rating, I commenced further flight training for all the relevant FPAs, which eventually resulted in my achieving the same level of instrument flight capability and privileges as a multiengine CIR pilot. My new enroute PIFR rating and attached FPAs were immediately put to work building up my instrument flying experience and, when I finally met all the experience qualifications for the issue of a CIR, I took the initial CIR flight test without the requirement for any further flight training. I now fly under the privileges of the CIR, although I continue to also hold the equivalent PIFR rating and FPAs.

The point of this long story is that the availability of the PIFR rating afforded me access to instrument flight training far earlier than what was possible under the CIR framework, and also provided better value for money. So, yes, I remain an advocate for the PIFR rating. I do, however, hold some concerns as to whether CASA is providing the appropriate level of regulatory oversight over the approved PIFR training organisations, and whether the associated PIFR standards are being correctly applied by these organisations.

Notwithstanding the small increase in instrument pilot numbers attributable to PIFR ratings, many industry stakeholders continue to note that CASA's original objective for improving private pilot access to instrument flight training through the PIFR rating concept, whilst desirable, has not been realised to the extent originally envisaged by CASA. Therefore, the argument continues, the PIFR concept should be scrapped in favour of returning to the CIR only system. Whilst there is no significant difference between the practical flight training and test standards of the CIR and those of the PIFR, the fact remains that the CIR aeronautical knowledge syllabus is not private pilot friendly in many aspects, and could do with some restructuring to meet private pilot requirements for operational relevance and incremental knowledge acquisition. In my view, a possible way forward towards reconciling the opposing industry viewpoints on this issue is for CASA to consider offering the aeronautical knowledge component of the CIR under two separate modular streams, private and commercial, whilst retaining an integrated structure for the practical flight training and testing components. This new structure would then be differentiated from the existing CIR and PIFR instrument rating arrangements by the adoption of a new name.

As the UK's IMC rating and Australia's PIFR rating are the only two non-ICAO recognised instrument ratings in the world, it will be interesting to see whether the IMC rating can co exist with the EIR under the EASA regulatory framework and whether its co existence or abolition will have any downstream regulatory impact on the future structure and operation of Australia's PIFR rating. As readers could appreciate, I'm now watching developments in Europe with interest.

Brian Jackson is Managing Director of an international aviation consulting firm and has an extensive career background in aviation policy and regulation development, as well as air traffic management systems and operation. He holds an Australian PPL with both CIR and PIFR multiengine instrument and night flying ratings and regularly flies a Beechcraft Baron for business and private use.

Gaining the Instrument Instructor Rating IRI(A) and Class Rating Instructor CRI(A) qualifications

Part 2

By Stephen Niechcial

In the final part of this article, Stephen Niechcial describes the experience of training and flying a Skill Test for these ratings

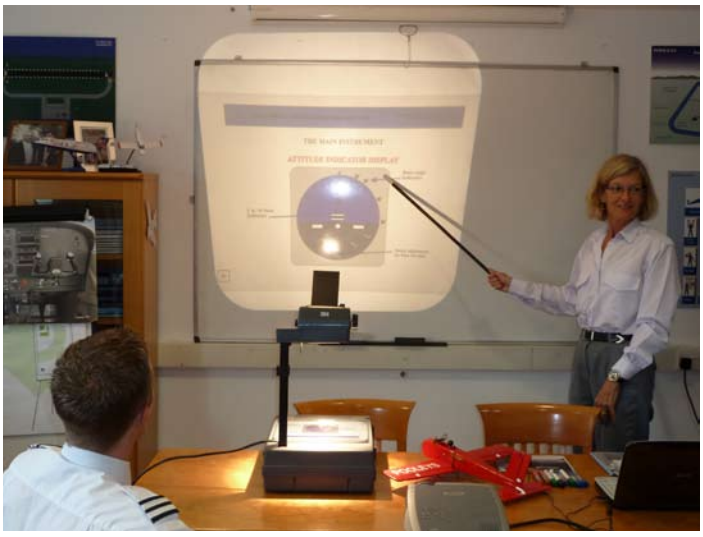
The appointed week to begin training duly arrived, and the idea was to spend Monday to Wednesday on class room work and start flying on the Thursday. A degree of mutual flexibility was always part of the deal and since we had made the original arrangement, Dorothy Pooley had been invited to one of HRH's garden parties, thereby reducing the time available by a day. I could hardly object to that one!

Back to the lively atmosphere of Shoreham to begin the training

The total sixty hours time requirement for the theoretical component of the IRI(A) is divided between classroom learning, sample teaching presentations prepared by the trainee instructor, and self-assessment progress tests. A good deal of the theoretical part of the course is concerned with developing teaching skills, and the theory of adult learning. In other words, general transferable skills, rather than aviation specific ones. The skills covered are as relevant to teaching adults Chinese as they are to teaching them aviation. All the basics are covered, for example how to arrange a classroom seating pattern, and how to put together a PowerPoint presentation. What motivates and what impedes adult learning is gone into in some detail. Whether you will find this interesting or not will depend on how much teaching experience you have from other areas of your life. In my case, having had a fair amount of experience as a trainer in other fields, I knew a lot of the material already. It was however interesting revision.

Dorothy aims very much to practise what she preaches by modelling good teaching/instructor practice at all times. The material itself (which she gives mainly in presentation form using a projector) is well laid out, engaging and sparks off ideas for one's own work. On several occasions she also got out teaching material produced by former trainee instructors which was really quite inspiring in demonstrating the creativity and enthusiasm which they brought to their training. Plenty of questions were thrown at me as we went along, and there was ample time to explore points in more detail as interest or understanding demanded. Between sessions I was given brief self assessment tests to complete at home as consolidation of the learning. For most of the theory course, as it happens, I was on my own in the classroom but because of the quality and variety of the teaching that did not detract from the liveliness. The more common arrangement would be two or three trainees at a time.

For classroom work with future students, the new instructor's work will generally divide into longer briefings of 30 to 60 minutes and shorter pre-flight briefings. The former are focussed on a specific theoretical topic whereas the latter prepare the for the air exercises about to be flown. As part of the training, I was asked to prepare and deliver one of these longer briefings and chose to teach on GPS. I picked the subject specifically because I wanted to increase my own personal knowledge in that area. The theoretical training is well structured to allow for following up a particular interest or mugging up on weaker areas of knowledge in that way. However, the course in no way attempts to refresh all the theory learning that had been covered for IR theory tests; the assumption is that you already know all of that in sufficient detail. This is a bit daunting, as the examiner can ask questions on any part of the IR theory syllabus as part of the Skill Test.



Dorothy Pooley presents some lively and engaging material

Occasionally, former or potential trainees appeared on bits of business, and there was plenty of room for some interesting conversations without feeling that time was being intruded upon. One such was a retiring 737 captain with thousands of hours

experience, and it was re-assuring to know that he was every bit as apprehensive about his teaching abilities as I was about mine. My future examiner Clive, an Air Aurigny captain, also called in at one point and it was very helpful to have that opportunity to 'break the ice' with him before the day of the actual test.

Time to go flying

On day three we were due to begin flying training, and this was prefaced by a general session about teaching in the air, covering all the things one would expect such as choice of manoeuvring area, maintaining lookout, legalities of aircraft and documents etc as well as common issues that arise with students in the air, in particular the issue of capacity versus overload at any given time. The flying syllabus basically followed the order of manoeuvres in which they would be taught to an IMCr/IR candidate with the additional CRI instructor material on the end. So the order came out something like:

- Instrument appreciation, full panel scan and manoeuvres - straight and level, climbing and descending, power changes, Recovery from unusual attitudes on full panel.
- As above, on limited panel plus compass/stopwatch turns.
- VOR and ADF tracking, holds and precision/non-precision approaches.
- Finally, the additional CRI material, visual steep turns and stall recovery, visual circuits and landings, practice forced landings and engine failures after take-off.

The trainee instructor spends most of his time in the right hand seat

The airborne teaching format for the first few hours was that Dorothy would talk through and demonstrate the manoeuvres as if I were the IMCr/IR student. I had then to talk through and teach the same manoeuvre back to her as if she were the IMCr/IR student . This obviously ensures that the trainee instructor can actually fly the manoeuvres himself, as well as demonstrate them effectively. To add to the reality, I was primarily responsible for the choice of training area, look out, radio, airspace avoidance etc. To keep things clear, when she was the teacher Dorothy remained 'Dorothy' becoming 'Mavis' when in the student role (her choice of name – not mine!). Throughout the flight training, she was in the left seat, and me in the right. To start with, I found the workload quite high as I was effectively learning to fly from the right seat manoeuvres which I had only done before from the left, whilst simultaneously trying to talk through them in a coherent and orderly way. Inevitably this resulted initially in a mixture of sloppy flying, confused explanations and garbled language, but with practice it all started to come together fairly smoothly. One of the things I constantly had to be aware of was the use of clear, specific language. If for instance you ask the student to 'push the nose down' rather than 'apply gentle forward pressure', you are very likely to find yourself careering towards the ground at speeds in excess of Vne with your head going through the canopy. Dorothy made these points very well by doing (within the limits of safety) exactly what I asked her to - no more and no less. This led to some very interesting flight attitudes and speeds. For a couple of these sessions, another instructor who was adding the instrument teaching qualification to his basic FI qualification joined us to observe from the back seat.

By the time holds and approaches entered the syllabus, the basic fluidity of my teaching was coming on quite well, and rather than spending a lot of time in effectively doing everything twice, the emphasis was more on giving me lots of direct practice in flying these from the right hand seat. We did the ILSs in a single session day over at Calais on the Saturday of the first week, and in actual IMC. So 'actual' in fact, that on return to Shoreham we had to go around from the non-precision approach and divert to Biggin for the ILS.

This effectively concluded most of the IRI(A) training, with the exception of some NDB approaches to be done later at Southend. By doing it in what was effectively a three day flying block interspersed with further bits of ground school theory training, I had got most of the course out of the way in a five day week. This in turn had enabled me to save considerable aircraft positioning costs by leaving the plane down at the airport and travelling by train (about a 15 minute walk to Shoreham station). There is some good and reasonably priced B&B within walking distance of the airfield if that option is preferred.

The last leg and the test looms

Beyond this first week, we hadn't pre-arranged anything and our respectively busy time tables began to clash, so it was not until a Saturday two weeks later that I was down at Shoreham again for the day, this time working mainly on visual stalls for the CRI. Three more days would be necessary to complete the remaining theory and flight training, and this took place on the Saturday, Sunday and Monday of the next week. The core of this was an hour or so of circuits at Bembridge. Being mainly an IFR flyer, I don't spend much time in the circuit these days, so the opportunity for a solid and comprehensive revision in all configurations on a shortish runway was welcome. The last bit of ground school dealt mainly with nuts and bolts administrative stuff such as the necessary paperwork for students, validity times and processes for renewal/revalidation of ratings etc. At the beginning of this week, we also set a date with the examiner for a flight test the following Friday. For the test, I was to prepare a long briefing on 'The ILS', and this gave me three or four days to prepare it. In all, the whole training had amounted to a four week period from start to finish, during which I spent eight fairly full days down at Shoreham, flying about twelve hours in ten flights, not including the test. Additionally, I had spent about another 10 hours in self study/presentation preparation, again not including the test.

The day of the test dawned, a pleasant one with light winds and scattered clouds around four thousand feet - more or less ideal. Neither Dorothy nor the examiner Clive had conducted a combined flight test for the two ratings before, so nobody quite knew what to expect. Like most pilots I suspect, I feel that I perform far from my best when under exam conditions. However Clive is one of that breed of courteous and friendly examiners who do as much as they reasonably can to put a candidate at ease. Although it was very much a serious flight test, it was certainly one of the more enjoyable and re-assuring ones I have done. This was mainly due to the continuous feedback Clive gave me as we went along.

The test started with my being asked to produce the usual weight/balance figures and performance figures for the aircraft under the day's conditions and give a briefing about the weather. Clive then asked me to deliver a short pre-flight briefing on the subject of stalling, which he cut short after a few minutes indicating he was satisfied with my performance. We then briefed for the flight itself. This would be mostly flown by him from the left seat with my demonstrating manoeuvres and commenting on his flying, correcting any errors he made as required. I would be responsible for the usual things of navigation, look-out, airspace avoidance and radio. My first test item was to brief him for takeoff and climb to a specified altitude to intersect and track a suitable radial towards the Seaford VOR. He would then tell me what to demonstrate next, step by step, as we went along.

I briefed him accordingly and off we went. Clive introduced some errors almost immediately. If my memory serves me correctly, he chose a wrong heading to intercept the required track, and then did not lay off for drift. I think he also mis-sequenced the Attitude – Power - Trim sequence on levelling off. Errors of that sort were introduced throughout the test, as well as asking me various questions about position and airspace at different times, in particular my choice of location for manoeuvres. The complete sequence of the test has faded from my memory, but I remember on the visual side being asked to teach, demonstrate and correct errors on stalling, steep turns and a practice forced landing. In addition to the departure for the instrument flying, I was asked to demonstrate NDB tracking plus holds and part of the approach. The test finished with my flying a couple of visual circuits. The whole thing lasted for 1 hour 35 minutes. Back on the ground, I was asked to deliver my pre-prepared PowerPoint presentation on the subject of the ILS. Clive let this run for about ten minutes, asking a few questions on the way, before cutting it short, and that was it. I had passed with a 'merit' grading.

The ratings are valid for three years initially. Revalidation of the CRI(A) is met by meeting the higher revalidation for the IRI(A) for which the candidate must achieve any two of the following (JAR-FCL 1.3555):

1) 50 hrs of flight instruction during the validity period with at least 30 hrs within the 12 months preceding the expiry. 10 hrs need to be IR or IMCr instruction.
2) Attend a refresher seminar within the validity of the rating.
3) Pass a Skill Test.

Test out of the way, and freedom to explore more of the Art Deco at Shoreham airport

Post qualification

Having toddled off down to the CAA at Gatwick and handed over two separate and substantial sums to have each rating entered on my licence, what next? I suspect these standalone ratings are not well known and understood by most flying schools which tend to recruit via the conventional full FI route. I also think that, paradoxically, offering to work for nothing will put off some potential 'employers'. Certainly a great deal of sensitivity and diplomacy is necessary not to undermine those who have to earn a living instructing. So far I have not put a lot of time into approaching schools for business because I have pupils from other sources as discussed below. However, as with most things in this life, having the relevant personal contacts who are prepared to take you on will be the way in for most I suspect.

It is not surprising that as Dorothy's business is built mainly on training instructors, she puts a lot into the instructor community as a whole. Starting in 2002, she set up and chaired for four years, the Instructors Committee a subcommittee of the Education and Training committee within the Guild of Air Pilots and Navigators (GAPAN). Within the same period, she instigated the now biennial Senior Instructors Forum at Cranwell. From this was born the Professional Flying Instructors Association, the South of England branch of which she still chairs. Regular seminars of general interest for flying instructors take place at Shoreham during the winter months. Within GAPAN she currently chairs the Education and Training Committee, has been elected as the first woman Warden, and from 2014 will be the first woman Master. She has been one of the editors involved in producing the excellent Air Pilot Manual series of training books and has produced a number of other aviation publications. Dorothy's commitment to the organisations involved with training in no way detracts from the time and ongoing support she gives individuals. I have found her very responsive to the various queries I have had since training.

The news is not all good though...

When I trained last year, there was every hope that European legislation was going to revert to the pre-JAR situation whereby PPLs with an instructor qualification were allowed to charge for instructing. If that were to go ahead, I would probably go on to complete FI training. The relevant EASA committee consulted widely, and there was virtual unanimity from all respondents that such a reversion was both positive and healthy for flying training. The committee therefore reached the same conclusion and as late as June this year the chairman was expressing confidence that such a move would pass into regulation. Almost literally overnight, the situation has now flipped back again and it now looks most likely that PPLs without commercial theory passes will *not* be able to charge. It is of course completely irrational that there should be two groups of instructors, both having trained to the same instructional standards, both preparing students to the same standard to pass the same flying tests, but one group being able to charge for their services and the other not. The explanation may well lie in the protectionist and minority interests of one or two powerful member states. It would appear that the crude horse trading of regulation which characterised the JAR days and led to so much bizarre and damaging regulation is very much alive and well. If the process had integrity and consistency with firm evidence that CPL knowledge was essential to train PPLs, the only logical conclusion to reach is that PPLs without it should not be allowed to train others under any circumstances!

Since gaining the qualifications, I have successfully brought one lapsed P 11 ►

Chairman's corner

Anthony Bowles

Winter has arrived complete with ice and snow and with it a raft of paper arriving on the desk of David Earle, our main external meetings co-ordinator and this is likely to lead to a flood of new initiatives in the New Year covering many aspects of GA. Glancing at some of these, it looks as if GA will suffer major restrictions in the London area for the period covering the Olympics and Paralympics in July, August and September 2012, although VFR traffic may be less affected. OfCom are expected to issue their response shortly to the many submissions opposing frequency spectrum charging and preliminary indications are that some form of charging system for frequency use will go ahead. We expect the definitive regulations shortly on transitioning to the EASA regime in April 2012, and it is worth mentioning again the advice given repeatedly on the Forum that those members flying most types of light aircraft on a non expiring CAA licence should take steps to get a JAA licence now as this is the only licence which guarantees automatic convertibility to an EASA licence in 2012. Members can meanwhile retain their old CAA licences which will remain valid post 2012 changeover date but only (broadly) for flying homebuilt and certain other aircraft operating under a permit to fly regime or older "Annex II" aircraft where no one holds the type certificate. (*ed. As a slight caveat to this, Pilot magazine has indicated that the CAA may come up with a reduced licence conversion fee in view of the large number of pilots involved. At the present time it will cost you £176.)*

Foreign Registered Aircraft

The Foreign Registered Aircraft issue returns soon to the European Parliament. At our recent Executive Committee (ExCo) meeting, this was discussed at some length and following statement was agreed:

We support the present FRA regime in Europe until such time as EASA introduce a system of pilot licensing and aircraft maintenance which encourages and facilitates owners and operators of FRA to transfer to EASA registration.

Time will tell what happens but there is no doubt that the politicians are much more aware of the complexity of the FRA issue than a month or two ago. The N Flyers Group are the primary co-ordinators of the action to maintain the existing FRA regime and I am sure that our N reg members have registered their interest with this Group.

Website

Another matter discussed at our meeting was the interrelation between our web site and ***Instrument Pilot*** (IP). Until recently, one ExCo member edited our web site, and another IP. We felt this was somewhat unsatisfactory for various reasons, not least because on occasion an important item of news may be missed because both respective editors thought it more appropriate that this should appear "in the other place". Now one person, presently in the form of Stephen Niechcial will be in overall charge of editorial content of both the written and electronic format of our publications. There will be occasions when publication will take place in both media; our web pages offer the opportunity for placing breaking news items, which will later be the subject of a more detailed article in IP. While the majority of news making items may come from ExCo members, anyone may contribute matters of interest by email to editor@pplir.org.

Members' Details

While on matters of admin, Sali Gray, our membership secretary, made a plea in the last issue of IP for prompt renewal of your subscriptions and I echo this. Please also take this opportunity to update other details particularly in relation to licences and email addresses. Accurate information on licences held in particular is essential if we are to go in to bat authoritatively with the various regulatory bodies. We continue to recruit new members and recently there has been a welcome influx from Europe. Meanwhile there are interesting moves afoot for fuller collaboration with other GA organisations on EASA matters and I hope to be able to write more fully about these in 2011. Meanwhile my best wishes for Christmas and the New Year and good flying in 2011.

◄ P 10

PPL in my group up to the standard whereby she has passed her Skill Test and revalidated her licence. I have conducted a dual revalidation flight for a second PPL. I have also trained two other PPLs for the IMCr, one of whom has taken and passed his test. All these pilots are mature, competent PPLs, self motivated and self directed with positive attitudes, though of considerably different aptitude when it comes to learning. It has been very interesting to deal with the question of pace and support with very different concerns and learning issues for the individuals involved. So far I am thoroughly enjoying the experience, and my personal teaching syllabus and material has already developed quite a lot. As my time is free, I have been in the fortunate position to be able to spend as long as it takes on the ground school components and this has been a big help. I would really like to expand now by flying as safety pilot/mentor for new IMCr/IR holders wanting to 'push their envelope'. It would also be great to train someone for the full IR. In the meantime, I feel I have already had my money's worth out of the training because of the intrinsic pleasure in completing it and helping at least three pilots to get more out of their flying.

Of all the flight training I have done for myself to date, the IRI(A) and CRI(A) have been by far the best quality I have experienced. Completing them sharpened my own flying up no end, and for these reasons alone it has been time and money well spent.

Notes for members

Membership Renewals

PPL/IR Europe Annual Membership runs from 1st January to 31st December. To avoid our Membership Administrator being overwhelmed with renewal requests over the Christmas period, it would be most helpful if you could please renew your membership as soon as possible.

The easiest way to renew is on-line, via the 'Joining & member services' page of the website (www.pplir.org) where you can pay the renewal fee of £60 securely, via Secpay.

If you are viewing the IP electronically, you should be able to click on the link below, or cut and paste it into your browser http://www.pplir.org/index.php?option=com_facileforms&Itemid=49

Alternatively you can send a cheque for £60, together with your name, address and membership number, to ***PPL/IR Europe***, The Business Centre, Llangarron, Ross-on-Wye, Herefordshire. HR9 6PG

We regret that we are unable to process renewals by Standing Order, or Direct Debit.

If you currently hold a Membership Card (without photo) but would prefer an Aircrew Card (with photo), please email a 'passport style' photo, saved as a .jpeg to the Membership Administrator. If you already hold an Aircrew Card, but the photograph needs updating, please email a current photo as above. Again, if this could be done as soon as possible, it would help us enormously.

Your 2011 Membership/Aircrew Card will arrive by the end of January, which is when your current card expires.

If you have any questions regarding your renewal, please contact the Membership Administrator: memsec@pplir.org

When do you need an ADF?

Following a query to the CAA, our member Richard Bristowe received the following response which will be of interest to owners of Cirrus and other American aircraft recently off the production line:

"Following on from your enquiry into the carriage of ADF in Cirrus aircraft when flying the RNAV approach at Exeter, I promised you a more comprehensive reply. ANO Schedule 5 does not require the carriage of ADF when IFR outside controlled airspace (CA). However, you cannot legitimately follow the published RNAV approach procedure at Exeter without an ADF. CAP 773 states that not only must the ADF be fitted and working but so must the NDB itself (Part 2 para 1.6). This may change in future procedure designs, where the MAP may be based on RNAV waypoints as opposed to an NDB. Not the case at Exeter RW 26 - so ADF is required to be installed and working. DME is not part of the published procedure so is not required to be carried for that approach. That part of the ANO that applies is Rules of the Air, Rule 36 - Compliance with air traffic control clearance and notified procedures which states:

(1) Subject to paragraph (2), the commander of the aircraft shall fly in conformity with:

(a) the air traffic control clearance issued for the flight, as amended by any further instructions given by an air traffic control unit; and, unless he is otherwise authorised by the appropriate air traffic control unit;

(b) the instrument departure procedures notified in relation to the aerodrome of departure; and

(c) the holding and instrument approach procedures notified in relation to the aerodrome of destination.

Therefore any aircraft without an ADF is not equipped to fly the RNAV procedure at Exeter any more than an NDB approach elsewhere, without flying in breach of Rule 36 (1) (c). In recent years, there have been applications by Cirrus operators for exemption from the ADF carriage requirement. These have been denied; to the best of our knowledge there are no such exemptions in place. For information, there is a provision to allow public transport operators to carry alternative radio nav equipment, provided it is properly installed & approved etc. (ANO Schedule 5, Scale H para 2) however the attendant operating conditions mean that they are effectively prohibited from flying on any routes or procedures that are defined by reference to NDB. This only applies to commercial operators. Consequently, all aircraft are required to carry ADF when flying any instrument procedure defined by an NDB - because of the missed approach, this includes the RNAV (GNSS) approach at Exeter. On a test or check, an examiner must not allow any instrument procedure that is defined by reference to NDB, to be flown with a GPS in place of the ADF. There are many Cirrus owners who have gone to the trouble of fitting ADF & DME for these reasons. I do hope this clarifies the position for those interested parties. Please feel free to forward this to whomever you feel would benefit from seeing it."

Adam Whitehead

Future Airspace Strategy (FAS) Consultation Document

This is an area of development which very much concerns us all, and to which we input through our representative Alan South. Alan draws your attention to a comprehensive consultation document produced by the CAA, and available at www.caa.co.uk/docs/7/2010928AirspaceForTomorrow2.pdf.

Royal Aero Club Trust Bursaries

If you are aged between 16 and 21, you might be interested in applying for one of these to further your flying career. They are worth up to £1,000, and full details can be found on www.royalaeroclubtrust.org. The closing date for applications is 31st March 2011.

Launch of Very Light Jet (VLJ) shared ownership scheme in the UK

Speedflight have announced a UK based joint ownership scheme based around the Total Eclipse 500 VLJ in Signature Support's London Luton facility. Full details are available on the following link: www.flightworx.co.uk/2010/09/10/flightworx-supports-new-vlj-operator-speedflight.

On a lighter note…

It's good to know that not everybody 'talks up' an aircraft they are trying go sell. Jim Thorpe spotted this, taken from an advert for a Piper Arrow:

Damage history:

20.01.71	LH wing repair
11.08.72	LH wing repair
10.03.74	LH Wing repair after forced landing
24.07.75	Fuselage repair
10.07.85	Wing repair
02.01.88	RH wing repair after forced landing
20.08.91	LH wing repair
04.05.93	Repairs after emergency landing. Power loss
20.04.99	RH wing repair

Very good condition (!)

Top of form

By Douglas Baillie

Douglas Baillie describes the pleasures and pains of single pilot commercial operations as he encountered them on an eventful run to Barcelona.

The telephone call came just after 5pm on a Friday, and I heard it ring after the office door was closed and I was about to head home for the weekend. To answer, or not? At that time I was a pilot working for a company which operated a Cessna F406 Twin caravan out of Glasgow. The F406 is a nice big (14 seats) plane with Pratt and Whitney PT6 turboprop engines. However this aircraft was not pressurized and was fitted with only a very basic oxygen system delivered via smelly rubber masks. The operations were single crew then, and that is what I liked most about the job. There were no co-pilot availability/choice worries for the unexpected last minute jobs. I also had the freedom to make my own decisions on my own views of whatever situation I had to deal with. However, as the following story shows, there are times when a bit of help might have come in useful.

It had been a hard enough week already, but without much further thought, I rushed back in and picked up the phone. Would I like to go to Barcelona right away to pick up some freight that had to be brought back 'as early as possible' the next morning? A quick look at my duty hours confirmed that it was possible. A further look at the weather showed it was do-able - with a planned fuel stop in Jersey on the return if the forecast headwind materialised. The positive flip side was a possible tail wind on the way down, and going empty I would have room for full fuel and lots of IFR reserves. Fortunately the engineers were still around and they agreed to remove the twelve passenger seats and put the plywood spreader boards in place. They also had to place ballast in the aircraft for weight and balance purposes. On this occasion I was assured that the sand bags were intact and were from Prestwick beach in Ayrshire, fresh from a previous flight.

It all starts well enough

It is always pleasurable and liberating to fly alone, in a well-equipped reasonably powerful twin. Forty five minutes later I was fully flight planned and in the air heading for Spain. The IFR clearance was as direct as I could negotiate with ATC, in or outside of controlled airspace, at or about the flight level closest to ten thousand feet so as to stave off the horrible oxygen mask for as long as possible (it reminded me of trips to the dentist when I was about five years old). There are however some high mountains in the way, called the Pyrenees, and they are quite high in places, so the mask would become inevitable at some point. I simply will not fly above ten thousand feet without oxygen. I was one of the 'fortunate few', who, as part of an RAF team of officer cadet pilots, experienced first-hand, the effects of explosive decompression in the 'gas chamber.' I saw for myself what happens when you are not properly equipped for sudden reductions in cabin pressure! Anyway, the trip down got off to a good start with forecast winds as advised and a ground speed to match. There was no GPS in those days of course. I had just bog standard VOR/ILS, ADF, and DME, plus a nice auto-pilot that coupled to anything - even rates of descent, rates of climb, airspeed, pre-selected altitude hold etc. Quite versatile really.

The trials begin

By the time I arrived it was both dark and very cloudy and my situation was altogether less rosy. If you are a regular visitor to particular foreign countries and airfields, you will know the procedures and how the local ATC operates. However, this was my first visit to Barcelona and the procedures and the radar services were quite different. This is mostly due to a lack of any reliable radar facilities, so no radar vectors or other helpful stuff. I was expected to fly the STAR according to the let-down plate, but here is the interesting bit. I was asked to take up another heading (not a radar heading) during the procedure. After flying this for a long time with no further instructions from ATC, I asked for my next heading, only to be told to re-join the STAR! OK, but where am I, where is the STAR from my current position, and what are the new safety altitudes for the remaining process? I didn't really know exactly where I was, and there was absolutely nobody to ask. The only help I had was on the RMI using the VOR which gave me a QDM to that facility, plus a DME reading, but absolutely nothing else. I had the ILS set up on number one VOR, but the RMI didn't work on that, so I had to switch to number two VOR, tune it, ident it, and figure out where it was relative to my position and relative to where I might be on the STAR. I knew I was still over high ground, so sector safety was all important, but where to start the descent? If I kept going towards the VOR I might arrive over Barcelona at many thousands of feet above where I should have been. The only solution was to plot a waypoint over the sea, made up by combining a VOR radial with a DME from the ILS. What a shambles! I can say that

this situation quickly turned my confidence into something a bit less comfortable very quickly indeed. Eventually I swallowed what remained of my severely damaged pride and made a request to Barcelona on their approach frequency. They gave me a radar heading and a let down to the ILS. Later on I found out that this service is available, but you have to request it, and it is not standard practice. Once on the ILS, the rest was easy and the runway lights showed up at about three thousand feet. Lesson learnt: Ask if you don't know, and do it sooner rather than later.

It's not over yet

The respite didn't last long before a new challenge appeared. This time it was in the form of rip-speed taxi instructions in broken English giving me the correct order to follow the taxi-ways by letters and numbers. These are on the ground plates for the airfield but are spilt between pages. Being asked to expedite certainly added to the pressure. My parking slot was not near the terminal building, and as I had not thought to arrange for ground handling, I was totally alone, with no marshaller, no follow-me van, and only my taxi lights to see anything! I parked up more or less where I thought I should have been, picking a place which didn't look like it would attract adverse comments. However, one thing I had not yet done was to request fuel based on the advised load for tomorrow morning. Refuelling on arrival is always a good idea because it saves time the next day. Also, if I am parked a long way away, it usually results in a lift to the terminal; or at least to the fuel company's offices to pay for the fuel. I never fancy being alone on any foreign airfield, miles away from human activity. I quickly remedied this situation, loading my fuel and getting my lift across the main runway from a surly fuel man who spoke no English and hated working the night shift. This was enough for one day and one night, but compared with what I was in for the next day, it made the job so far a doddle.

A new day, a new problem

The morning started off strangely, because the security at Barcelona Airport is somewhat confused and random. Not being a passenger, I was aircrew, but not a scheduled flight, and there is no General Aviation facility in the main terminal. I showed my licence to security who weren't interested. So, using my initiative, I simply walked through the baggage sorting area, over the piles of bags and suitcases, climbed around the conveyor belts, and out onto the apron, where I successfully thumbed a lift from a passing baggage tow truck driver. He was grateful for the opportunity to get away from his routine and find an excuse to drive all the way across to the other side of the airport where the Cessna was ready to meet the agents handling the freight.

The freight turned out to be locally manufactured electronic components made by NCR as part of their contract with the banks to supply parts for 'Automatic Teller Machines' (ATM, or hole in the wall, to most of us). These were to be flown to Scotland for assembly, prior to testing and installation. The boxes were far too big to fit anywhere except in the main cabin, and even then, we had to break out the contents, into smaller boxes to fit everything in. We would also have to load the nose baggage compartment for weight and balance purposes. The load itself seemed quite big, and I called back to UK to check the weights against the manifest as the aircraft looked distinctly lower than normal on its undercarriage dampers. Then I found out the problem. The charter company had 'assumed' (yes that word again!) everything in pounds, but actually it was in kilos. That meant an overload of 2.2 times the load-sheet. Way, way over my maximum take-off weight. There was no way I could de-fuel the aircraft, and even if I had managed to, I would not have had anything like enough fuel to get home without hopping all over Spain, France, the Channel Islands, and England to refuel. So we had to partly unload the aircraft and re-weigh everything before re-loading. It took three hours. The remainder of the load now sitting on the tarmac had not of course been anticipated, and the loading man had no instructions on where it should be kept. The agent who had cocked it up in the first place had by now clearly seen the error of his ways and had disappeared some time earlier! Then there was the problem of the brightly coloured plastic sand bags that I had brought with me all the way from Scotland. If anyone is ever visiting Barcelona, there is a big yellow phone point right beside the freight apron. That is where I stacked twelve pink polly bags neatly on the ground. I think they are still there. So perhaps being mislead into giving a price for pounds weight instead of kilos explained why the company I worked for had successfully won the contract. Except that they now had to do a double run to go and get the rest of the components. And guess who had to do that the next day?

Homeward bound

Away at last, but at maximum weight and climbing over the Pyrenees, the 'attention getters' went on. A 'cabin heat over temperature' warning caption confirmed the nature of the problem. The only way to remedy this was to turn off the cabin heat (a bleed from the PT6 turbine's compressor). This makes the cabin very cold after a few minutes. Trying to set up a medium temperature compromise only set off the over temperature warning horn and lights again, so I sat at FL 100 in bitterly cold air waiting until I could descend safely to warmer temperatures. Yes, some of you might have guessed the cause of the problem by now. As I hadn't closely supervised the loading, I had not spotted that the boxes were placed over the hot air vent outlets. That is what caused the over temperature warning, but it is re - assuring to know that the system actually works.

Lessons learned

So here are the lessons that they don't teach you at flight school:

1. Check the load manifest before you leave your home base, and check for confusion between pounds and kilos.
2. Make sure that your weight and balance will work, particularly with heavy stuff in big boxes.
3. In addition to making sure you have enough fuel, re-calculate the centre of gravity envelope (you might need additional ballast, even at maximum weight).
4. Do not believe what freight forwarding agents tell you. They mostly deal with big trucks.
5. Re-check the load sheet and the manifest before you load.
6 If the aircraft doesn't look right, it probably isn't right. Trust your instincts.
7. Closely supervise all of the loading. Do not assume that the loader knows what he is doing.
8 Keep heating louvers and temperature controlled cabins clear in order to maintain a clean airflow and avoid hot-spots building up.
9. Security can vary at different airports, and if you are not a standard security profile, there is usually nobody available with any discretion. So use your own.
10. Do not assume that anything will work out the way you plan it.

Fly safe, and THINK!

Pilots' talk

Compiled By Sahib Bleher

Automation erodes pilot skills

Reliance on automated systems may be eroding the flying skills of pilots, contributing to about 60 percent of the accidents reviewed by an FAA research team. FAA researcher Kathy Abbott, presenting the preliminary results at an aviation safety conference in Milan, remarked that operating flight-control computers can distract pilots from 'managing the flight path of the airplane'. In addition, 'pilots sometimes abdicate too much responsibility to the automated systems' and sometimes do not get enough practice in hand-flying, consequently hesitating to take control away from the computer in an emergency.

New helicopters

Robinson R66

A newly FAA-certified five-place Rolls-Royce turbine powered helicopter is now available from Robinson, which hopes to fit the aircraft into the market between its own very popular piston R44 and more expensive light turbine helicopters. The turbine blends vastly improved high altitude performance and load carrying capabilities with a moderate increase in fuel burn. The R66 burns about 22 gallons in the same hour its piston sibling burns closer to 15. Meanwhile China-based Avicopter announced on Tuesday the first flight of its first indigenously developed light single-engine helicopter, the AC311, in Tianjin. The helicopter, the design of which has likely inherited some lines from the light Eurocopter models that parent company Avic has long produced, has an mtow of 4,850 pounds and can carry six people. It can be powered by either a Honeywell LTS101-700D-2 turboshaft engine or a local design, the WZ-8D. The AC311 is also said to feature '*highly integrated*' avionics. Chinese certification is expected next year, with entry into service slated for 2012.


AC311

EuroFPL offers approach charts

EuroFPL, the internet-based ICAO flight plan filing & trip planning for Europe and the North Atlantic, released their latest cycle of instrument approach charts for the region. Speaking for the company, Travis Holland said: '*Pilots in the U.S. are used to internet approach chart downloads at little or no cost, and I thought operators in the North Atlantic and Europe should have access to the same information. It's a great resource for users based in these regions, or for those travelling through them.*' Current coverage is for 1,500 airports throughout Greenland, Iceland, and Eurocontrol countries. The service is offered to registered users of the EuroFPL.eu website. Elsewhere in the aviation press, this chart availability has been reported as free of charge. However, whilst the basic registration is free, the charts appear to be available only by upgrading membership at a cost of 10 Euros per month, or 99 Euros per year.

China & Russia open up GA

With its large geographical size and matching population, as well as ample wealth, China's demand for new business aircraft is growing. China has done a lot to make the country more business-aviation friendly in the last few years, including shortening the time required for flight approvals and lowering the tax rate on new aircraft. However, airport and airspace infrastructure remain as obstacles. Airspace restrictions are going to be relaxed with guidelines for the reform of low-altitude airspace management recently approved by the authorities. Russia has also restructured its airspace in a move likely to encourage more GA activity in the country. Flight notification is now possible online only one hour in advance of take-off instead of the previous requirement to submit a detailed flight plan 24 hours ahead. The country has further divided airspace into A, C and G zones, creating uncontrolled airspace for the first time. Maybe these communist and ex-communist countries will become the future destination of choice for private pilots from democratic Europe trying to force them out of the air by ever-increasing regulation.

Cessna Seat Checks

Owners of 36,000 Cessna aircraft will be required to add more steps to their inspections of seat rails to ensure they are secure, the FAA said in a notice of proposed rulemaking released recently.

The proposal applies to 18 models, including the 150, 152, 172, 182, and 210 single-engine aircraft, as well as several twins, including the T303 Crusader and the 337 Skymaster. The new directive aims to update an earlier AD issued in 1987. Since then, the FAA says, it has received several reports of accidents, some fatal, in Cessna aircraft where the primary latch pin for the pilot or co-pilot seat was not properly engaged in the seat rail or track. The inspections must be done within 100 hours time-in-service since the last inspection completed under the old AD, or within 12 calendar months of the effective date of the new AD.

Messy paint job

A man who was caught hurling oranges at planes at Mesas Falcon Field municipal airport admitted to officers that he had been sniffing spray paint, police said. Police responded to a disturbance call at the airport and found 33-year-old Brian Henio sitting in an orange grove next to the airport, holding a green jug to his lips. Officers said it appeared that Henio had been drinking from the jug. Police recognized the smell of spray paint and noticed paint on Henio's upper lip, police said. Henio admitted throwing oranges at the planes and said he didn't know why it was a big deal.

GA sales continue to drop

In the first nine months of 2010, general aviation shipments were down 15 percent compared to the same time period last year, the General Aviation Manufacturers Association reported recently. Pete Bunce, GAMA president, said despite the decline from 1,588 units last year to 1,357 units this year, he believes the longer-term outlook for GA remains positive. GA manufacturers were continuing to invest in research and develop new products. The third-quarter report shows that piston-powered airplane shipments totalled 634 units in the first nine months of 2010, compared to 679 units delivered in the same period of 2009, a 6.6 percent decrease. Turboprop shipments declined 20.8 percent to 232 units in 2010. Business jet shipments totalled 491 units, a 20.3 percent decrease over the 616 units delivered during this same period in 2009. As for individual manufacturers, Cessna had delivered 512 aircraft by the third quarter last year, and only 347 in this year's report, Diamond was down to 29 from 38; Cirrus, however, stayed virtually level, with 188 deliveries so far this year compared to 189 by this time last year, and Piper (16 to 25) and Hawker Beechcraft (9 to 13) increased deliveries.

Certification for flying car

A flying car has received FAA certification for special airworthiness as a light sport aircraft. Concocted and created in Florida by Steve Saint, head of the Indigenous Peoples Technology and Education Center, the flying car is positioned to fill a need for people living in areas where roads are a luxury. Saint is working with the Waodani tribe at the edge of the Amazon in Ecuador. He now has obtained the first FAA certification for special airworthiness for a light sport aircraft, namely the Maverick flying car, as opposed to the roadable aircraft, like the transition or Terrafugia, both of which are still awaiting certification. To switch from drive-mode to fly-mode, the operator has to deploy a mast and parachute. The chute is tucked away on the roof for the car and the mast is underneath the chassis when the car is in drive mode. The mast locks into place, the parachute is attached, and it is raised to over 25 feet. All the driver has to do then is switch the motor from drive to fly, pull back 100 yards, and take off.

As for roadable aircraft, low-volume production of the Terrafugia could begin by the end of the year, according to the company. Terrafugia plans to hire 50 workers over the next three years for its plant in Woburn, Mass. Terrafugia is developing two prototypes of its roadable aircraft.

Photos for FAA licences

The FAA will publish a new proposed rule in the next few months that would require pilot certificates to include a photo, an FAA spokesperson said.

Currently, pilots are required to carry a government-issued photo ID in addition to their pilot certificate. U.S. Rep. John Mica, R-Fla., recently wrote to the FAA, the TSA and the Department of Homeland Security asking why they haven't complied with a 2004 law that requires pilot certificates to include not only a photograph but a means to record biometric data such as fingerprints and iris scans. The FAA's Sasha Johnson said the FAA will release an NPRM by the end of this year. She also said that the current plastic certificates already are capable of holding biometric data, although no such data currently is required. Those of us remembering the fiasco over, and cost of, getting the old paper certificates swapped for plastic ones, can look forward to an interesting replay.

New TBM dealer

The UK now has a TBM dealer. Entrepreneur and long-term TBM owner/operator John Merry will establish a new Company and dedicated team to take on the distributorship of the TBM 850 family in the UK and Ireland. From January 2011, the new organisation will also be responsible for maintenance, technical support and spare parts provision from a soon to be announced airport base.

Background checks failed

Recent arrests of illegal immigrants who may have received clearance to take aviation lessons near Boston have raised questions about how the U.S. monitors foreigners who train to fly there. 33 Brazilians are now awaiting deportation hearings and federal officials say none posed a terrorism threat. However, under federal law, illegal immigrants may not take flight lessons and the Transportation Security Administration is required to check foreign flight students against a variety of databases. The TSA is currently reviewing how the immigrants were issued pilot licenses. Their instructor at the flight school, who is also charged with being in the U.S. illegally, said the students received approval from the TSA to take classes. A TSA statement said that the agency '*performs a thorough background check on each applicant at the time of application to include terrorism and other watch list matching, criminal history, and checking for available disqualifying immigration information.*' Maybe we were right all along

in saying that pilot background checks, also favoured by many European countries, don't add much to actual security.

Europe and U.S. set talks to harmonise security procedures

Aviation regulators from the U.S. and the EU are due to meet in Washington soon in an attempt to harmonise airport security rules. Differing technologies among various countries, and even individual airports, means passengers often face confusing rules regarding laptops, shoes and personal data. Given the lack of harmonisation in other fields, we shouldn't expect too much too soon. Meanwhile, pilots who fly passenger and cargo planes want the U.S. government to implement a programme under which their identities will be confirmed using biometrics so they can pass quickly through airport security checkpoints and avoid - for the most part - controversial screening procedures involving body scanners or pat-downs.

Pilots unions have entered into what are described as '*high-level*' and '*sensitive*' talks with Obama administration officials recently in response to a public backlash against the use of the whole-body imaging machines and physical pat-downs that are seen as being too invasive. As a consequence, pilots and flight attendants have now been exempted from random full-body scanner checks, the TSA announced, unless they set off the metal detector. Exemption from the routine scanner examinations also means flight attendants and pilots will not undergo the controversial pat-down procedures introduced earlier this month. Meanwhile, the Obama administration has asked the TSA if it can modify its security procedures to dampen passenger backlash to the new rules and TSA Administrator John Pistole says they will look at it.

According to the Daily Mail, scanning travellers' ears may be the next innovation in biometrics used to improve aviation security. Researchers at the University of Southampton in England have created technology that allows passenger ear scans to be compared with images in a database. '*There are a whole load of structures in the ear that you can use to get a set of measurements that are unique to an individual,*' said Mark Nixon, the professor who led the team that devised the system. He noted that other biometric systems lose recognition as a person ages. '*Your ears, however, age very gracefully*' he said.

European Union pushes back vote on pilot training

There has been a delay in the vote on regulations over pilot training recommended by the European Aviation Safety Agency which would prevent private pilots in Europe from flying on FAA licences as well as restrict the option of training for European licences abroad. The EASA committee is due to discuss the issue again in December.

ADS-B gets go-ahead, GPS backup remains uncertain

Following successful ADS-B deployment at key sites in Alaska, the Gulf of Mexico, Louisville and Philadelphia, the FAA recently gave the go-ahead for the system's national rollout, with coast-to-coast U.S. coverage forecast in 2013. The agency's announcement also stated that wide-area multilateration (WAM) '*will serve as a backup to ADS-B in the event of a GPS outage in high-value airspace.*' The FAA did not define high-value airspace, but it possibly includes that surrounding the nations 35 Operational Evolution Plan airports.

The FAA has already installed 300 of the 800 systems that will be required to ensure ADS-B provides all the coverage that radar does now. In mountainous areas, a system of ground sensors called Wide Area Multilateration will provide coverage for the nooks and crannies that the ADS-B sensors can't see. WAM will also serve as a backup for GPS in high-traffic areas. By 2020, aircraft operating in controlled airspace will have to have ADS-B Out capability to announce their position and identification. If they have the optional ADS-B In, they'll get cockpit displays of traffic and weather.

On the other hand, 'Risks' identified by a recent DOTs Office of Inspector General (IG) report 'will impact the cost, schedule, and expected benefits of ADS-B' and may feed off of each other until addressed by the FAA. The Inspector General said the greatest risks to successful implementation '*are airspace users' reluctance to purchase and install new avionics*' and '*FAA's ability to define requirements*' for the advanced capabilities of that equipment'. ADS-B Out 'essentially replicates existing domestic radar coverage,' meaning adopters would bear a cost but see few new benefits. The main benefits of ADS-B rely on in-cockpit ADS-B In. But the IG estimates FAA requirements and equipment costs for that feature may not be mature for at least two years. According to the IG, so long as that mix of uncertainties remain, '*progress with ADS-B will be limited*' and delays, cost increases and performance shortfalls 'will continue.' Aside from the cockpit side of ADS-B, the IG says integrating ADS-B on controllers' displays also presents a significant and yet unmet challenge. And on the foundation level, the IG says the FAA has failed to update its cost-benefit analysis structure to ensure the most cost-effective approach to implementation. Finally, IG questioned the FAA's resulting in-house technical oversight capabilities due to '*knowing very little about a system that is expected to be the foundation of NextGen.*'

UAVs (almost) capable of see and avoid, says Air Force

As unmanned aerial vehicles inevitably find their way into the National Airspace System, both the FAA and other airspace users worry that these remotely piloted aircraft can't see other traffic the way a human pilot can. The reality, says the Air Force, is that the current generation of UAVs may be able to see traffic better than human pilots because of sophisticated sensors that operate in both the visual and infrared spectrums. The current generation of UAVs have two sensor balls, one for ground scanning and one for scanning the airspace. Each has a dedicated human operator.

These sensors are capable of resolving targets in great detail out to five miles and they can determine range and vector in order to initiate avoidance manoeuvres. What's not in place yet is the data and procedures the services need to support onboard, visually-based see-and-avoid by UAV operators. But the Air Force believes this will be possible within two to five years and that drones will be fully integrated into the NAS for normal operations in about ten years.

Weather, operational limitations and flight planning

Part 2, by Nick Gribble

In the second part of his two part article, Nick Gribble goes on to discuss the requirements of visual references and the issues around icing

In the last issue I discussed weather minima for approach and landing. This month, I shall continue with a discussion of required visual references and icing (as far as practical operations are concerned). In a future article I'll talk about low visibility operations and take-off minima; these two were on the subject list for this article, but space does not permit this time.

Required visual references

When the weather is at minima and you look up at DA/MDA or the missed approach point (or DH/MDH if you're one of the few still using QFE on approach), you have a split second to decide whether or not you can continue. What exactly are you looking for? According to the AIP, JAR-OPS 3 (commercial helicopters) and EU-OPS 1 (commercial aeroplanes), the references required are:

Non-Precision Approach

1. Elements of the approach light system
2. The threshold
3. The threshold markings
4. The threshold lights
5. The threshold identification lights
6. The visual glide slope indicator
7. The touchdown zone or touchdown zone markings
8. The touchdown zone lights
9. FATO (final approach and take-off)/ runway edge lights

Precision Approach

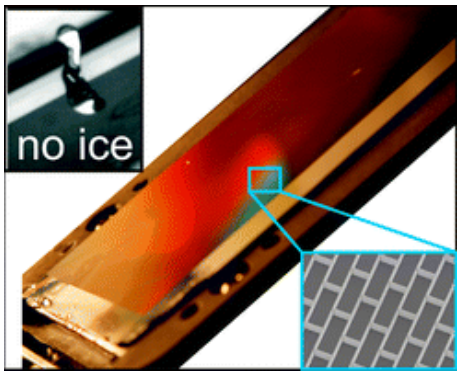
As for non-precision with the addition of-

10. Other visual references accepted by the CAA

Note the words used: 'elements, 'the threshold markings' etc, rather than 'an element' or 'threshold markings'. The implication is that at least one element of the approach lighting system, all of the threshold markings, all of the threshold lights, all of the threshold identification lights etc must be seen before you can say that you're visual. In the heat of the moment, however, deciding whether you've seen enough is clearly a matter of judgment, since unless you know exactly how many items there are to see and actually count P 19 ►

◄ P 17

Nano technology against icing



Researchers from Harvard University have developed and tested specific, patterned, nanostructured materials that reject supercooled water droplets before that water can freeze to a surface. When supercooled droplets hit smooth surfaces, the researchers found they spread out and freeze. That was not the case when the Harvard team applied the same tests to nanostructures created with patterns that reduced the surface area to which the water could adhere. Perhaps counter intuitively, that involved adding texture to the surface on a microscopic level. With their most successful tests, the researchers found a supercooled droplet would initially hit the surface and spread out, but instead of freezing, the droplets that hit the nanostructured pattern would then retract back into a sphere and simply bounce off.

The research tested materials and showed them to prevent ice formation down to -30C. Below that, ice did form, but did not adhere as well as it did to non-nanostructured surfaces and was considered easier to remove. The project began with a look at the legs of mosquitoes and water strider insects. The insects manage to keep dry thanks to an array of bristles that minimize surface area and repel water droplets. The research is now moving from controlled tests to real-world settings. The group hopes to be able to develop coatings best described as ice-preventive materials specifically designed for particular applications.

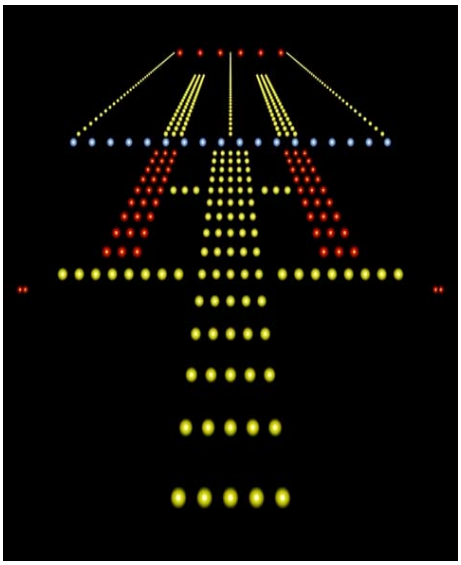
EPA finished reviewing avgas comments

The US Environmental Protection Agency has heard the concerns of the general aviation industry about the potential elimination of lead in aviation fuel and promised the impacts on GA will be at the forefront of future deliberations on the issue. The agency is said to be moving deliberately on the issue and not rushing the process. '*We do not have a specific timeline for moving forward with a Notice of Proposed Rulemaking*,' EPA spokesman Passavant said. He said EPA is working with the FAA and aviation groups and stressed the '*endangerment finding*' that would trigger legislative action is not imminent. He revealed that EPA has now finished reviewing more than 500 comments received on an advance notice of proposed rulemaking (ANPRM) that was issued last April. Normally, the agency gets about 30 comments on ANPRMs.

◄ P 18 them all you have no way of knowing if you've seen enough. Interestingly, 'FATO/runway edge lights' does not have a definite article before it, inferring that only a minimum of two of these are sufficient.

Now, I'm not saying that the CAA or whoever wrote this paragraph had it in mind that pilots should be so pedantic. I rather suspect that the meaning should have been 'so long as you can see sufficient of these lights then you can continue'. Notwithstanding, this is legislation and should be accurate since, quite apart from anything else, the exact words used are what would be used in court should it come to that. So with that in mind, here's some more food for thought.

Elements of approach light system



As mentioned, the fact that the word used is 'elements' rather than 'element', implies that at least two elements are required. The question is, what constitutes an element? Aerodrome Standards at the UK CAA consider an element to be either the centreline lights or a cross-bar, so you need to see either the centreline and a bar, or two bars. Considering further, ICAO Annex 14 'Aerodrome Design and Operations' does not define an element but gives clues. In the section relating to maintenance of lighting systems it specifies that all lights should be serviceable during Cat I operations (i.e. ILS). During any other operations, at least 85% of the lights should be serviceable in the precision approach (Cat I) lighting system and the runway threshold, edge and end lights. In the corresponding section which relates to Cat II/III operations, the word 'elements' is used to describe the inner 450m of the approach lights and the runway centreline, threshold and edge lights. So does this pedantry help us? Well no, not really. The bottom line is that you have fractions of a second to react if the weather is at limits and you see some lights just as you make your decision. In that time should you really be expected to note whether you have seen (for example) all 45 of the 45 required lights or not? Clearly not. Quite apart from anything else, approach lighting systems vary in the number of lights that they contain, and as mentioned, it is acceptable to have 15% of the individual lights unserviceable without this being NOTAMed as a problem. (Readers will remember that the previous edition of ***Instrument Pilot*** discussed what to do if parts of the lighting are u/s). So then, what is required? Many times I have looked up at DA, seen a couple of lights and called 'visual', only to realise that whilst I might have the minimum required references I can't gauge my attitude based on only two lights, so this is clearly not adequate. If I remember correctly, in the Fleet Air Arm we used to specify that the minimum lighting was the centreline and at least two bars, because only with that much could you determine your attitude. Clearly that didn't require the *entire* centreline and the *entire* two bars, but just enough to be able to fly based on the visual information that they portrayed. Since nobody could ever prove how much you did or didn't see at the bottom of any one approach, the depths of this investigation are probably of academic interest only, but obviously the bottom line is that you need to be able to continue flight visually with whatever references you choose to accept, and if you take the meaning of 'elements' as 'individual lights' then two is not really sufficient.

Going IMC after the MAPt

Now we drift into realms where there is no guidance and the legislation fails to help. Consider this situation. You look up at DA and see the required visual references, so you continue visually towards the runway, only to find a thin layer of fog just above the runway into which you fly and lose visual contact. What do you do? Descending towards a runway you cannot see is not an option, but you are below minima. Clearly this is a situation that you should never find yourself in, although I have experienced it once. The circumstances were exceptional mind you. We were on a SAR mission at night and descending in VMC towards Kerry, when we flew into a layer of fog which hadn't been visible from above. With the landing lights on, it looked worse than it was, so quickly going lights off allowed continuation of the descent in moonlight to the unlit runway. Going properly IMC would have been a different matter, and the only sensible option in such a case is to pour on the power, climb at maximum angle, and cross your fingers. PANS-OPS 8168 requires an aircraft to climb at a minimum angle of only 2.5% on the missed approach, so it's unlikely that in a modern light aircraft you'd not be able to out-climb any obstacles even if you did start too low. However, in order to make absolutely sure, you'd need to out-climb this 2.5% gradient; by how much exactly depends on where the obstacles are in the missed approach. (For information, 2.5% equates to a climb rate of 177fpm at 70kt groundspeed). Things are perhaps even more favourable, since in addition to the relatively low minimum climb gradient, the 'start of climb' is positioned at a point equating to 18 seconds at maximum final approach speed converted to TAS plus a tailwind allowance. Typically, this is at least half a mile and is the distance that an aircraft is considered to travel in the time it takes to retract anything draggy, get the power on and start climbing. From a DA of 300ft, you'd normally take another mile to land (at a 3° descent angle), so if you were to get to 150ft and have to go around then you'd be very close to the official 'start of climb' point, but aircraft in Category A are pretty responsive and can generally go from a descent to a climb fairly quickly. This is very much *not* to advocate going below minima or extending beyond the MAPt, by the way, and is mentioned only as a discussion point in the serious hope that such an eventuality would not occur.

There are multi-pilot operators who, at the MAPt, have a third option, which is for the flying pilot to remain in control on instruments while the non-flying pilot monitors the situation outside and does not take control until he/she is happy to do so. The critical thing here is that the non-flying pilot must see the required visual references at the DA/MDA/MAPt since, unless he/she is visual at this point, a go-around must be initiated.

Icing

Enough material is available about icing for me not to write about the types, or how/when they form. From a flying perspective, possibly the most important discussion point is what you can do about excessive amounts of ice.

All aircraft have in their flight manual a sentence near the beginning which states what icing clearance has been granted, which for most light aeroplanes and helicopters is none at all. This means that such aircraft can fly down to just above 0°C when there is visible moisture (engine icing P 20 ►

Photo: Glider tug waiting for the fog to clear, reproduced with kind permission of Mike Rubin.
Mike's aviation website is at www.Flybywire.org.uk

Weather, operational limitations and flight planning, continued from Page 19

limitations notwithstanding). How much above 0°C is 'just' above? This depends on your aircraft or, more specifically, on your OAT probe. Standard OAT probes have an accuracy of maybe ±2°C, so when it reads +2°C the real temperature could be zero. It is thus important to know the accuracy of your particular gauge and realise that icing could occur when it is still showing a positive air temperature.

By the same token, it's perfectly acceptable to fly in clear air when the temperature is well below zero, but if you then enter an area of moisture you'll ice up very quickly indeed. I once drove my supercooled car into a fog-bank and within the space of just a few seconds had an inch of ice glued to the car; thankfully, this was a safe way to learn never to fly in such conditions!

Flying through fronts (cold to warm or vice versa), descending into warmer air with a very cold fuselage, or climbing into colder air all have potential to make you ice up. Going into warm moist air with a cold fuselage will eventually warm the aircraft up but not before more ice has formed. Avoiding such situations is clearly the best option, but if you do end up picking up ice beyond your aircraft's icing clearance you need to know what to do about it. Assuming you can maintain control, the obvious thing to do is try to warm the aircraft up, which is normally achieved by descending. A friend of mine when on Search and Rescue in Ireland once got caught in the mountains and the only way out was to climb into icing beyond the aircraft's clearance with no obvious way out. It was that or hit the mountains, so he took the only option available. Thankfully he discovered that there was an inversion and the temperature rose above zero as he climbed, but this was luck and must NOT be relied upon. Perversely, if the temperature had dropped below -20°C or so, then it's likely he would not have accumulated more ice (since it tends not to stick below that temperature), but any ice that was already on the aircraft would have adhered even more firmly.

Helicopters have slightly less of a problem than aeroplanes, since the main rotor blades are warmed by kinetic heating. Only the tips are generally travelling at sufficient speed to benefit much from this, but it's a start. Add to that the amount of flexing which a helicopter blade goes through in the course of a single rotation and it is fair to say that ice has a hard job clinging on.

So you start to ice up and consider a descent. The lowest you can legally fly in IMC is 1000ft above the highest obstacle within 5nm. You'll have worked out this safety altitude already, of course, and noted it on your operational flight plan, won't you? You descend to your safety altitude and the temperature is still below zero; what do you do? Well it depends where you are. If you are near the coast then you may be able to head in that direction and descend over the water where the temperature below about 500ft is often very slightly above zero even on a really cold day; this might not be enough to clear ice, of course, but it might stop you accumulating more. Going below 1000ft is inherently unsafe without radar, but if the only option is tumbling out of control then I know what I would prefer.

The critical words here, however, are 'without radar'. Most light aircraft don't have radar of their own but they do have access to one in the form of Air Traffic Control. Put out a 'pan pan' call and ATC will help you to descend to the minimum safe altitude in your area. Tell them you need to go lower still and they'll vector you, if possible, to the area where the lowest sector safe altitude is located, and to do this they have overlays on the radar which show the minimum safe altitude in each area. If you carry a set of plates you'll perhaps have seen a 'minimum altitude chart' which shows this information and allows you, by comparing your range and bearing from the applicable navaid, to determine in which sector you lie. If you're multi-pilot this is at least possible in theory, but while flying a single-pilot aircraft that's picking up ice and descending and working out options I would suggest that asking ATC is by far the better option.

With the coldest part of this winter only a few weeks away by the time this goes to print, it is timely to think carefully before flying in IMC, particularly when the temperature is low. Time taken in pre-flight planning is very rarely wasted, and it's far better to have considered the possibilities beforehand than have to work them out when all around is going wrong.

As always, please contact gCAP if you want more information: nick@gcap.eu.