

# Instrument Pilot

The PPL/IR Europe Magazine

No. 49

May-June 2005

## EDITORIAL

Meeting with Charlotte Atkins 1

## REPORTS

Intelligence Reports 4

## REVIEWS

EAD Review 13

## ARTICLES

IFR or Not IFR - That is the Question? 2

IFR Certification 6

The standing costs will get you every time 7

Diesel Engines - The Way Forward? 8

EC charges may be down... ..But CAA charges may be up 10

The Emergency Triangle 12

PPL/IR Refresher Workshop 14

Mode S Update 15

Pilot's Talk 18

EUROSTUFF 16



*Jeppe Sørensen tackles headwinds and icing to represent PPL/IR Europe at a Briefing Day for Business & General Aviation arranged by IAOPA and Eurocontrol. See Eurostuff, page 16*

## Meeting with Charlotte Atkins Parliamentary Under Secretary of State with responsibilities for aviation



Seven members of the GA Alliance were present to meet with Charlotte Atkins at Wycombe Air Centre on 4th April. The weather had fortunately lifted around 1300 and got better as the afternoon went on. Ms Atkins had a trip to/from Battersea in an EC120 helicopter, courtesy of Jeremy James (GA Alliance member and Secretary of the Helicopter Club of Great Britain), saw a microlight flying and rode in a homebuilt Rans from a farm strip to Wycombe courtesy of fellow founder member Roger Hopkinson (PFA).

We then presented a slide show giving facts and figures about GA and our concerns with regulation including:

- the lack of proper GA representation on various bodies including CAA
- the lack of support offered to GA by Government, local and regional assemblies
- the high cost of aviation in UK now further threatened by proposed huge rises on charges by the CAA on General Aviation as well as the effect of European Airspace (SES) and Safety/Maintenance changes (EASA)
- the unfair pressure being exerted by airlines on the CAA to make GA pay more when it is the airlines who are the major beneficiary and GA largely a loser
- the lack of effective consultation by European organisations on changes affecting GA and the need for fair GA representation at the highest level
- the lack of a UK GA policy on the operation and development of UK airfields

Difficulties of access to regional airports including when training Ms Atkins then viewed the Wycombe Air Centre maintenance facility. The members of the GA Alliance had a good debate and some press were there

from Pilot, Today's Pilot and Flyer so there will be articles about it and the GA Alliance in future issues.

Ms Atkins commented that the meeting and the visit had opened her eyes to the views of GA and she felt the fact we had formed the GA Alliance was very helpful to her as it means "they" now have a single point of contact on issues; she also was made aware members views do not always coincide on all issues. She had heard of there being difficulties of regulation and maintenance and has asked us to put forward our ideas on what Government policy should be on GA with input to the Transport White Paper. The position with the EC was discussed and whilst showing concern she also pointed out that we have to appreciate what might be "politically achievable" in that arena.

In discussion Ms Atkins was pleased to hear of schemes such as "Young Eagles" which she said were important to harness and focus currently inactive and "difficult youth". She also learnt of the case for airfields contributing to the "green" countryside benefits. These benefits she said were not well appreciated.

Formation of the GA Alliance followed an informal session at a bar in Brussels when Roger Dunn, Roger Hopkinson (PFA) and I were on our first Eurocontrol trip to Brussels in October 2004. Little did we think then that we would get to the point of meeting with a Minister - and so quickly!

Although Ms Atkins is no longer the Minister in charge following the recent UK election, we have forged a good link with the Department which should stand us in good stead for the future.

**Paul Draper**

“  
The Minister asked us to put forward our ideas on what Government policy should be on GA with input to the Transport White Paper

”



# IFR or not IFR - That is the question?

By

Polly Vacher

## Round the World Solo Aviatrix

A single engine solo around the world, how do you achieve this with no luxuries such as de-icing and just one engine? It started with PPL/IR Europe – a gauntlet was thrown. A plan was hatched. “We will organise a fly-in to Moscow – but twin engines only” – “Why twin engines only?” was my retort. “Because singles wouldn’t be able to make it!” “Balderdash.” I thought. “Discrimination in PPL/IR Europe? That is as bad as saying ‘no women pilots!’” But I kept my council. It is no use arguing – far better to just go and do it and not just Moscow, why not circumnavigate the World!

### Planning

‘Just go and do it’ – well, of course that is exactly what you *don't* do. Two years of hard planning followed. Flight planning, fuel planning, and permits filled the mind. Engine re-build, avionics checks and ferry tank fitting occupied the time. Survival training, ice, snow, water, jungle, desert everything the world might throw challenged mind and body alike. This is serious business and there is no room for error. One bog-standard PA28 Piper Dakota and one bog- standard PPL/IR Europe member – a woman to boot!

Birmingham International Airport – 6 May 2003 – everyone gathered. Sponsors, supporters, family and a most honoured guest, HRH The Prince of Wales. The RAF escorted the departure with a Hurricane and Spitfire, but then reality dawned. Scotland, the North Sea and the West Coast of Norway disappeared below the black and orange 36 ft wingspan and 235HP engine. Already we were an ‘item’ and already we had faced potential icing and winds of up to 50kts.

Tromso to Longyearbyen. You don’t mess here – you file IFR – but there is no radar beyond 100 miles except that of two escorting F16s – Echo Zero One and Echo Zero Two. You chose your weather carefully because here ‘zero’ is warm and cloud means one thing only.

### North Pole

Up to the North Pole – an Arctic high is all that we could accept and it took 10 days to arrive. But arrive it did, and with some trepidation we set off for the ‘top of the world’. IFR is the flight plan, but the reality is VFR only with HF radio and satellite phone the only means of communication. GPS is the order of the day. It is a perfect bit of kit, and my Bendix



King KLN90B *did* read 90N! It is a far better instrument than VORs and NDBs although like all instruments it is man made so as ‘redundancy’ a sun compass was fitted to the dash and I took sun sights every 20 minutes. The early navigators knew a thing or two; as I cross referenced the sun compass with the GPS and marvelled at how accurate the navigation was – for the compass doesn’t work in the Polar regions and all ‘roads’ go South from the North Pole. You must know which line of longitude to follow otherwise you could spend the rest of your fuel and probably the rest of your life going round in circles for it is all white and looks the same.

IFR or VFR in the States, it is all the same. Airways, well in true ‘can do’ American fashion you use airways whether IFR or VFR and everyone does use them and you are always under radar. “Do you want vectors round the storm?” The busy controller volunteers: “Affirm.” Blurts out with an undisguised relief, for G-FRGN has no storm scope or weather radar. It is sheer bliss flying in the States where nothing is too much trouble and there are no landing fees. “Do you want to borrow a car?” Is the norm at the smart FBOs where you have been plied with numerous cups of coffee and as many home made cookies as you can handle whilst lounging in soft easy chairs in air conditioned luxury. This is a country where GA rules even if you have to put up with a goodly dose of ‘God Bless America!’

Mexico, Brazil and Trinidad are second only to India and Europe with bureaucracy. I wonder where it originated. Four hours to clear customs is the norm in these countries but they all smile in the sunshine and I never paid any ‘Baksheesh’. Argentina – here the Samba rules and the people are warm even if the climate has a distinct chill. Our little duo was greeted with an Air Force two plane escort, the band played rousing music, and champagne flowed. Flowers and



*Marambio - Flying across Antarctica*

breakfast with the Chief of the Air Force completed the welcome. It was the Air Force who looked after me in Argentina and the land of smiles grabbed my heart.

### Antarctica

It was not just a 10 day wait to cross to Antarctica but a five week wait in Ushuaia at 'the end of the world'. Here my mood swung alarmingly from being whipped up in the bosom of friendship to utter terror at the thought of Cape Horn and Drake's passage. I learnt some Spanish and made many friends as the aviation world and the sailing world were united. All face the same potential peril in this the most lethal and unpredictable weather area in the world.

Finally, the good weather came and eight hours after leaving Ushuaia I saw the grey gravel strip of Rothera in the Antarctic Peninsula. Relief was paramount as I virtually skied down the mountains of Alexander Island and over spectacular icebergs. IFR – filed yes, but reality – VFR.

Forecasting is unpredictable in spite of Jeppesen latest state of the art weather forecasting equipment, and most experienced forecasters. For there is no-one in Antarctica and it is the highest, coldest, driest and windiest continent in the world. Tail winds were forecast, but in reality 100 miles into the continent no-one could tell. Tail winds became headwinds as I plodded across the ground at 80kts with a 50kt headwind. I had 1860nm to cross to the other side of Antarctica and seven hours into the flight and only a third of the way, it became abundantly clear that there was a real possibility of not making it.

The most difficult decision of my life



Ice Survival Training - Building a snow wall



Ushuaia - The runway is on the isthmus just below the boat. The mountains in the background lead to Cape Horn and Antarctica

ensued, but I know I made the right one and I am here to tell the tale. I had to turn round and retrace my steps. But this was a flight to raise awareness of and funds for 'Flying Scholarships for the Disabled'. I was trying to help those less fortunate than us, but in the end they helped me. "How much worse is it to have an accident and end up in a wheelchair?" A voice whispered in my ear and that put it all in the right perspective. I sat back and with a huge tailwind I literally sailed back to Rothera. I drank in the privilege of seeing the rarest and beautiful sights imaginable as the ice and snow sparkled in the clear blue skies.

It was the Argentines who again came to the rescue. They sent a C130 to their base at Marambio especially with some fuel on board for me. Thus I was able to get back to Ushuaia in time for Christmas aboard a 52ft yacht belonging to friends.

What then? I had to get to New Zealand to continue my flight where schools, sponsors, meetings and promotion of 'flying for the disabled' were paramount. So it was that I claim the longest diversion in the world. I flew back up to California and across the Pacific to pick up my planned route from New Zealand. It was a distance of 14,000nm and 133 flying hours. The longest leg from California to Hawaii took me just 16 hours 5 minutes, a distance of 2068nm in one hop!

### Home

IFR or VFR, that is the question. As I arrived back in Europe having landed on all seven continents in the world I had my first flight plan rejected from Brussels. IFR - rejection is the norm for small aircraft filing IFR with Brussels – rejection or re-routing dogged me all the way home as did the worst weather and icing conditions imaginable. None the less, tears welled and my voice cracked as I spoke to the first British controller and saw the white cliffs of Dover after 365 days away.



### Facts

Website: [www.worldwings.org](http://www.worldwings.org)

Records broken:

- ✓ First woman to fly solo over the North Pole in a single engine aircraft
- ✓ First woman to fly solo in Antarctica
- ✓ First person to fly solo around the world landing on all seven continents

Distance: 60,000nm, 550 flying hours

Worst icing: California – Death Valley!

Funds raised over two round the world flights for 'Flying Scholarships for the Disabled' (FSD) - £310,000 – Target to raise £2,000,000



### WINGS AROUND THE WORLD

(with the kind permission of Carlton Television and the support of Magpie Micros)

is delighted to offer you the chance to purchase the DVD or Video of Carlton's production of "DAREDEVILS" - the story of Polly Vacher and her flight around the world via the Arctic and Antarctica

#### "VOYAGE TO THE ICE"

The price is £12.00 including post/packing  
All profits go the charity **Flying Scholarships for the Disabled**



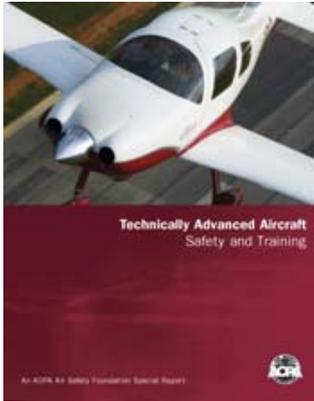
To purchase the DVD or Video of this unique record of aviation history, please send your name and address to:

Daredevils Offer c/o Gilbourne's Farm, Drayton, Abingdon, Oxon OX14 4HA

Cheques should be made payable to "Wings around the world" and please be sure to indicate whether you require the DVD or Video version



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## **AOPA Publishes Technically Advanced Aircraft Safety and Training Report**

With virtually every manufacturer now offering “glass” cockpits, many as standard and with some very sophisticated options such as TCAS and datalinks, the Flight Safety Foundation of AOPA has released a timely piece of research into the demands of technically advanced aircraft. The FAA defines TAAs as those equipped with at least a moving map, IFR approved GPS navigator and an autopilot. The report focuses on the change in mindset required for GA pilots when adapting to what is really a new era of managing complex systems. Airframes and handling are discussed, particularly with reference to the higher speeds of which many new types are capable but the report centres on the complexity of the systems and the mindset engendered by flying such capable aircraft. In doing so it studies a number of recent accidents which seem to suggest that whilst sometimes complexity is a factor, development of a mindset of technological invincibility is another. When glass cockpits were introduced by the major airlines in the 1980s and 1990s, a lot of time, money and thought was invested in training strategies and new hardware. This report makes the case for GA doing something to address the training issue.

I guess I am not alone in having completed the check ride on a bigger and better steed and being completely happy to fly the aircraft, only to be equally completely baffled by the avionics first time out of the circuit. How many of us would be completely confident to re-programme a Garmin 430/530 to fly a DME arc to ILS in IMC? Nothing against the Garmin which is a fine instrument - but with the capability (and complexity) of GA avionics increasing rapidly the systems management content of our flying task is increasing sharply too. By taking some recent accidents and incidents in complex types as case studies (many in the Cirrus), this report urges us to ask ourselves whether we really have put in the time to cover all the bases to ensure that we really do know what the aeroplane is going to do next. The report is a thought provoking read and can be downloaded from the AOPA website at: <http://www.aopa.org/asf/publications/topics>.

## **The Very Light Jet Revolution**

There are a whole clutch of new very light jets in development or flight test which raise the interesting possibility of being able to afford to fly one, buy one or even of being able to call up a jet on demand.

The new types include the Eclipse 500, the Adam 700 and Diamond Industries D-Jet (mentioned in the last *Intelligence Reports*). These aircraft are typically barely larger than a piston twin, have four to six seats (including the pilots), can do 300 plus knots and keep this up for 1,000 to 1,500 miles. Their ball park prices are around \$1-\$1.5 million. The Cessna Citation Mustang and HondaJet are also light jets but not quite so compact or as inexpensive.

The key advances which have led to these aircraft are in engine and avionics technology. In general to achieve single pilot operation for a relatively high performance they need a high degree of systems integration to reduce the management task. The panel illustrated below is the Eclipse 500 and it shows how the use of integrated displays have just about removed everything else from the panel – even functions up to now kept separate from the displays, such as the (dual) Mode S transponders are controlled from the multi function control/display units. For power the key has been the continued development of the very low thrust turbo fans which has enabled units of low fuel consumption and high reliability such as the Williams FJ33 and P&W Canada PW610.

Whilst proof of the real impact of these very light jets must await their reaching service, GA industry observers are speculating that they could change the nature of the GA market far more deeply than by merely providing access to (relatively) affordable jets for current turbo prop and high end piston operators. The view is that they will create a much larger owner flown market but more significantly they will make on demand services – true air taxis - viable for the first time. Some of the marketing states that such services could be provided for the cost of a full price airline ticket. The big question for us is whether such operations would catch on or even be permitted in Europe. Initial indications are not too encouraging.



*Glass cockpit in the Eclipse 500*

Diamond Aircraft Industries have been in dispute with the German authorities who are insisting that the D-Jet, a four seat single little larger and not hugely quicker than a Piper Malibu Mirage, be flown by an ATPL. We will see how the debate shapes up over here but in the US there is already some confidence in the on-demand concept – an outfit called DayJet has just ordered and optioned nearly 240 Eclipse 500's!



### **Manufacturer News**

Following on the theme above, **Raytheon Beechcraft** have announced that the Bonanza and Baron will be re-equipped with a Garmin G1000 based flight deck and renamed G36 and G58 respectively to mark the change. They will also sport new paint schemes. The “new” aircraft should be available next year.

**Diamond Aircraft** seem to be really on a roll. Firstly, in a move possibly related to a reported spat with **Thielert**, they have announced they are to start making their own engines (diesel and avgas), initially low power output units. In another corner of the wood they are also to tackle the simulator market, this time for their higher end products based on the Garmin G1000, including the DA-42 TwinStar. Not content with product diversification, CEO Christian Dries is also tackling expansion abroad by building a manufacturing plant near Beijing. There is a big market for flight training in China - they need 15,000 new aircrew by 2007 - and Diamond have recently taken a single order from a Beijing academy for 79 aircraft. In addition, provided the government relaxes some existing restrictions, many analysts forecast GA in China could become very significant very quickly because of the poor surface transport infrastructure – maybe a smart move by Diamond.

Finally, whilst diesels seem to have been gaining traction(!) everywhere in GA, the higher power output end, where presumably, the benefits of reduced fuel burn would be equally marked has not until now been well provided for. To address this market **Thielert** announced a 350hp version of their new 4 litre unit at AERO Freidrichshafen, they expect this to fly later this year. The baseline 310hp version is now certified in Europe. No news on target platforms and whether they will be available for retrofit.



*A new 350hp version of Thielert 4 Litre engine was announced at AERO Freidrichshafen and is expected to fly later this year*

### **US GA May Face Airspace User Charges**

Last issue we reported on aspects of how well the US continues to treat GA by not imposing charges for services related to flight safety. Unfortunately, the sector is now facing another, potentially larger, problem which could yet increase the cost of flying in the US. The government administered fund which pays for airspace management and improvement, which has traditionally been in substantial surplus, is now drawing down quickly, so much so that the system is now said to face bankruptcy without fresh sources of revenue. One of the key reasons for this situation is that the fund was topped up by airline passenger ticket tax contributions which were a percentage of face value. Falling airline yields and (until quite recently) reduced ticket sales post 9/11 have meant that the revenues for the fund have dropped dramatically. One proposal is to get GA to pay for airspace access (of course!). Apparently this does not look very likely, however, as AOPA has been applying pressure within Congress to fend off charges - with some success. Interestingly (and of relevance here in Europe) is that the debate being driven by this situation is just as much about how to provide future capacity as how to find the money to continue the existing system. Many in the US are proposing that now is the time to push innovative technologies (ADS-B etc) to drive out cost from the airspace management system.

### **After Landing Check.....Altitude Zero, Airspeed Zero.....So Why Are We Still IMC?**

Not sure of the circumstances but this Cessna 182 looks like it had a (very) short landing in some pretty soft snow.



### **PPL/IR Europe 2005 AGM**

Whilst middle England bathed in sunshine, hardened PPL/IR Europe members emerged from a 350 foot cloud base and a glide path that had taken an early Summer vacation to struggle down the localizer-DME approach to Guernsey's runway 09. Thus was the scene for the start of the annual AGM, magnificently organized by Phil Rigg with 17 aircraft and 43 members and guests attending. Although the cloud base had risen to only 500 feet by the time we departed on Sunday, the weather only added to the sense of flying achievement for what turned out to be a fascinating and very social weekend. With formalities kept to a minimum and captivating presentations ranging from Air Racing to Channel Islands Air Search, as well as a guided tour of the island, we all came away with that sense of satisfaction that comes from a packed and rewarding weekend. A full report will appear in the next edition of Instrument Pilot.



# IFR Certification by Jeppe Sørensen

“ Euro-control and EASA only think of, and work for, the airline industry ”

I came across the following statement a few days ago.

*"I believe that in some European States aircraft have to be certified before they can carry out IFR operations. In the UK it has simply been necessary to comply with the minimum equipment list. Based on the assumption that an effect of European Harmonisation is to spread the most onerous legislation existing in any one State to all States in the EU, we must expect that in due course we shall all have to have our aircraft IFR certified. This practice is already starting in the UK for BRNAV and PRNAV operations, which now require certification."*

This seems to be a widespread opinion so I thought that I'd better clarify a few points especially as, when it comes to certification we do have a European issue, but not, thankfully, the "most onerous legislation existing". Most countries have followed the FAA way of doing things and indeed that is still the case. I will try to explain some of the issues regarding certification.

## UK Rules

The UK is out of step with the rest of the world in the way it achieves the same objective. The UK simply publishes a minimum equipment list which sets out what equipment an aircraft must carry in order to operate legally under IFR. This list varies according to the type of aircraft and type of operation. The installation of the various items of equipment is usually a minor modification for light aircraft. A UK IR pilot is expected to know the contents of the Minimum Equipment List and satisfy himself that the aircraft he is about to fly meets the requirement. In the UK the Certificate of Airworthiness has no classification for VFR or IFR flight. It does look as if the UK is beginning to move to the US position and does now require aircraft to be certified for BRNAV and PRNAV use.

## Certified Use

Outside of UK registered aircraft Airworthiness Certificates will have a statement like "This aircraft is certified for IFR" or "This aircraft is certified for day and night VFR" etc. Most likely it is in the form of boxes that are ticked if your aircraft is certified for this category of operation.

If you buy a new aircraft that is certified for IFR it will be certified for B-RNAV (even a Piper). This can't be seen from the Airworthiness Certificate as no statement to this effect appears in this document.

You have to look in the Aircraft Flight Manual. In this document in the part describing the GPS system it will show that this equipment makes the aircraft eligible for B-RNAV in accordance with JAA-TGL (Technical Guidance Leaflet) No. 2.

If your aircraft is pre-GPS and you want to use B-RNAV you have to install a GPS and do this in a way that fulfils the requirements for B-RNAV i.e. in accordance with JAA-TGL No. 2 (This paper has been integrated into an EASA document now).

The FAA does it the same way and has even published a nice Advisory Circular on the subject (AC 90-96).

It is not possible to blame the EU in requiring you to certify the B-RNAV installation - it is because this feature was not part of your certified aircraft and when you change a certified product (aircraft) you have to supplement the certification to include the new feature. These specific changes can be minor changes or major changes. Major changes require supplementary certification (a STC - Supplementary Type certificate). Some countries have accepted the installation of a GPS as a minor change although most countries classify this as a major change if it is for IFR. The FAA has another Advisory Circular on the subject (AC 20-138) that spells out how to do this. In the States they have a Form

337 procedure to follow on major changes, so it is somewhat easier to do on the other side on the dam. Not having this procedure we have to do all these installations as STCs. An STC is supplementary to the original Type Certificate and thus a new STC is needed for each Type Certificate although the GPS works the same in a Piper as in a Cessna.

JAA-TGL No. 2 on B-RNAV points to FAA AC 20-138 and TSO-129a if you want to use GPS as the sensor for B-RNAV - so your GPS based B-RNAV installation basically has to fulfil FAA requirements.

## FAA Rules

Before I go to the European issue I have to point to some facts regarding certification. The basic requirements for the certification are described in FAA FAR-documents. FAR-23 describes the certification requirements for small aircraft, FAR 25 for business type aircraft etc. The structures of the FAR requirements are the same - i.e. same chapters and even the same paragraphs - but the higher you go the more elaborate the requirements. These requirements have been amended and updated constantly and represent 70 years of knowledge of how an aircraft should work. EASA as taken over almost all of these requirements - they are called Certification Specifications (CS) - have a look at [http://www.easa.eu.int/certspecs\\_en.html](http://www.easa.eu.int/certspecs_en.html).

The main point is that the requirements are geared to the subject, for instance - you don't have to have cabin lights that are automatically activated by 1.5 G forward deceleration in your Mooney (FAR-23) unlike the Cessna Citation (FAR-25).

## P-RNAV

The European issue we face can be illustrated by P-RNAV. The requirements for P-RNAV are written only with transport category aircraft

# The standing costs will get you every time

By Arnold Parker

**Aircraft ownership does not make much sense on less than 200 hours a year.** This is basing the calculations on a Eurostar, one of the most popular ultralight aircraft around. Just add zeros to the end of each number as required for heavier aircraft. The figures reinforce the adage: "Taking delivery of your new aeroplane is one of the happiest days of your life. The day you sell it is even better!"

## How the Numbers Add Up?

Let's run through the maths. Flying costs - my Eurostar is professionally serviced but even with this extra expense plumbed in, flying it only comes out at £15 an hour. This is made up of:

- £ Professional servicing at £150 per 50 hours - £3 an hour
- £ Engine overhaul reserve @ £1,500 per 1,500 hours - £1 an hour
- £ Oil, plugs, filters @ £50 per 50 hours - £1 an hour
- £ Fuel, 12 litres an hour (tops)
- £ Mogas - £10 an hour
- £ Total flying cost - £15 an hour

Cheap as chips!

Now add in the Standing Costs - that's what the aircraft actually costs just sitting in the hangar before it even turns its propeller. What do you think standing costs add up to - on the average pilot's 50 hours a year? How does £154 an hour grab you!!? Stick on the £15 an hour flying cost and this makes **£169 an hour** on fifty hours a year **for an ultralight aircraft.**

Find it hard to believe? Let's tot up the standing costs for a year:

- £ Hangar, £1,000 a year
- £ Insurance £1,200
- £ Depreciation £44,000 new, say over ten years it will drop straight line down to £20,000 and then hold at £20,000 value for virtually ever more. Each year for the first ten years, £2,400. The interest lost on the money tied up (if the £44,000 was not in the Eurostar it could be making 5% in the building society) - £2,200
- £ Club fees & home base flying charges £100
- £ Annual Inspection (fee and engineer) £300
- £ Miscellaneous expenses over a year, £500

£ Total - £7,700 divided by 50 hours = £154 an hour.

And remember, these figures are for flying at the economy end of the aviation food chain. You can easily calculate what the costs are on a new four-seat cabin-class single... or a twin! It helps to explain why (except for the 5% of pilots who are long-term aviation incurables) the average person's time between buying an aeroplane and getting out of flying altogether comes out at about six years.

Divide the £7,700 by 50 hours, the standing Cost is £154 an hour. The flying cost is £15 an hour. Total £169 an hour.

**The Hourly Standing Cost is all down to utilisation.**

Get annual hours up to 100 and the £154 hour comes down to £77 an hour. At 150 hours it is £51 an hour and at 200 hours it is £38 an hour.

## The Julie Christie Paradox

There are those who say that factoring depreciation and lost interest into aircraft ownership is like declining a weekend invitation from the breathtakingly beautiful Miss Christie 'cos you'd be hit with a straight line write-off on the hotel bill. I tend to agree with this point of view, the only downside being that so far, Miss Christie has failed to telephone. It's a 'quality of life' thing - we'd all spend less if we never bought wine or flowers. So let's dump depreciation and interest. By removing these, the standing costs come down a lot, even though by doing so we are sticking our financial heads further into the sand than an ostrich with a degree in civil engineering.

New standing costs would just about halve, coming down from £7,700 a year to £3,200 making:

- £ 50 hours a year - £64 hour
- £ 100 hours a year - £32 hour
- £ 150 hours a year - £21 hour, and
- £ 200 hours a year - £16 hour.

## So...a group looks good

The key to breaking the standing costs barrier is to get the aircraft hours over 200 hours a year.

Generally speaking the only way to do this is by forming a group of say, four active pilots doing an a minimum 50 hours

a year each (flying 50 hours a year being a condition of being in the group). Taking only daylight hours on 200 hours a year the aircraft will actually be flying for less than 4% of the available daylight time - it is on the ground for 5,840 daylight hours a year - so there's plenty of availability. Most groups will - quite rightly - ignore depreciation and loss of interest. That is because instead of one person having to eat the whole elephant, four pilots are sharing it. On that basis standing costs on a top end microlight flying 200 hours a year come out at £16 an hour. The group could comfortably work on £67 a month each standing charge (clearing the £3,200 a year) and £20 an hour flying (wet).

On £20 an hour flying for 200 hours there will be a surplus of £1,000 a year on the actual £15 per hour flying costs. This means a pilot can do 50 hours a year in a nice modern aeroplane for only £36 an hour all in with a happy group that has got a surplus on its costs.

This is still not cheap (flying never was) but much less painful than the single private owner's £169 an hour for his fifty hours a year. 200 hours a year minimum is vital. So having a monthly charge of £150 a month each - including four hours flying - ensures this (extra time charged at only £15 per hour). This comes out at £35 a week - not bad for a year's serious flying. Unused time can be carried forward but if not taken by the end of the year the pilot has to write off any unused time. Groups are great - I've run four and enjoyed every one, but I've chosen to be a sole owner/operator because I do about 150 hours a year. It is expensive but I meet the costs by periodically selling off one or more of my grandchildren - usually around Christmas time when they fetch the best prices.

The imbalance between standing costs and flying costs is something we have always been stuck with. If Orville and Wilbur Wright had worked out their standing costs before they trailed over to Kitty Hawk they probably would not have bothered going.

After flying for more than forty years I still can't offer any real advice on the standing costs enigma, except: "For Christ's sake don't let your wife see these figures!!"



# Diesel Engines - The Way Forward?

By Jim Thorpe

“  
The TAE Centurion is a much-modified Mercedes car engine

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I have felt moved on a couple of occasions to write in response to readers' letters in the mainstream flying magazines. The typical letter, often I feel from pilots who would not dream of risking their own money, argues along the lines that diesels work well in cars so surely sticking them into an aircraft is a really simple matter so why doesn't someone (else) do it. My small maintenance company is authorised to work on Thielert (TAE) diesels and we own a Cessna 172 with a TAE Centurion conversion. I have also completed the factory course on the SMA diesel since we have a customer who is importing a Cessna 182 SMA conversion from the USA. I therefore have reasonable technical knowledge of both the available certified engines. I also have about 20 hours flying the TAE Centurion. As far as I am aware there is as yet no flying example of the SMA C182 in the UK. Let me say clearly that I believe there is a future for diesels particularly as original equipment in new airframes such as the Diamond DA40 and DA42. I want to emphasise this because in what follows I will be focussing on the more interesting technical issues, which tend to be problems.

## *Different Philosophy*

There is a major philosophical difference between the two engines. The TAE Centurion is a much-modified Mercedes car engine. It is a common rail engine fully controlled by dual FADEC (Full Authority Digital Engine Control) units. You are completely dependent on the electrics and electronics to control every aspect

of the engine's management including the propeller pitch. TAE as a company has a background in motor racing and while I would hesitate to say that their engine is unnecessarily complex it does appear that they are attracted to technical sophistication and the engine reflects this.

SMA on the other hand designed their engine from scratch. They are owned by a consortium of companies that includes Airbus. It is in some ways a less sophisticated engine with traditional fuel injection from an in-line pump. While there is electronic control in the event of its failure an entirely mechanical control mode is available. Perhaps I am old fashioned but this approach gives me more confidence. It could also be that I have already had ample experience of being puzzled and occasionally frightened by the TAE Centurion while as yet SMA's only chance to puzzle me has been the multi choice technical exam at the end of the course. On this course, which took place alongside the airbus engine engineering courses, the old joke is that the difference between a new airbus pilot and an experienced airbus pilot is that the new guy says 'Oh! Look what it's doing now?' and the experienced pilot says 'Oh! Look, it's doing that again!' This reflects my utterances as an experienced diesel pilot.

## *Major Undertaking*

The engine installation in a Cessna 172 is a major undertaking. It involves removing everything firewall forward, both fuel tanks and a fair bit of wiring. Naturally, being a 30 year old airframe our C172 had accumulated numerous

extra bits and pieces over the years. The STC for the installation is quite specific as to where things like the FADEC should be located but in our aircraft the space was occupied by a DME. Hence the DME had to come out and be found a new home by removing an ancient Cessna autopilot. All this was unforeseen and added both to the time and cost of the conversion. Significant sheet metal work was also needed, mainly involving modifying the cowling to accommodate the various cooling ducts for the intercooler, oil cooler and water radiator. I will return to the economics of the conversion but the £35,000 cost can certainly be justified in terms of the equipment provided and the labour involved.

## *Small Performance Impact*

One aspect of the conversion which is hard to credit is that the 160 HP Lycoming can be replaced by a 135 HP diesel with minimal impact on performance. TAE cannot satisfactorily explain this themselves. They refer to the differing torque characteristics of the diesel and of course a VP prop is replacing a fixed pitch prop. Whatever the reason, it is true that takeoff and climb performance at low level is only marginally worse and with the turbo, climb performance soon overtakes the Lycoming at higher altitudes.

Difference training is required for the diesel. The operating characteristics of the engine are different and a couple of hours ground school is needed. One step forward is in instrumentation. Sensors, mostly duplicated, indicate oil pressure, oil temperature, coolant

temperature, gearbox temperature and fuel temperature on LED displays. However all that the pilot requires is to see that the LEDs, conveniently clustered in two standard size gauges are all green. There are also a couple of large, pilot resettable, annunciator lights which, in essence, are designed to draw your attention to the detail information on the other gauges when something is amiss.

Information is great but you do need to understand its implications. I thought I had seen most of the problems but sitting in the right hand seat during a recent air test an amber light illuminated that I had never noticed before. We then realised from the digital RPM display that the prop was over speeding and it took a substantial throttle reduction to bring it back under control. Only after some ground study did we realise that there was a prop speed LED as well as the digital rev indication although I still have no idea what units of prop speed are represented by the 1/min written under the warning light.

### Self Test

One aspect of the engine that gives me slightly childish pleasure is the pre take off checks. You simply press and hold a button. The unit self tests, revving up and down under the control of each of the duplicate FADECs in turn, while various warning lights illuminate. All the pilot has to do is keep a finger on the button and see that at the end of the sequence all lights are extinguished. It is possible to use this power cycling to provide taxi power so that checks can be completed on the roll. It is important to remember that there is no direct connection between the throttle and the engine. It is not really a throttle but a power lever, which tells the computer what you want the engine to do and there is a small lag involved.

The only time this is significant is on landing when something in the way the computer changes prop pitch means that full fine only comes when the throttle is fully closed. Combined with the three-blade prop this has a significant braking effect and if you fully close the throttle while rounding out the aircraft will stop flying rather abruptly. This characteristic combines

with the Cessna 172 conversion in an unfortunate manner. The re-engined aircraft was supposed to be approximately the same weight as before but in reality it came in almost 100 lbs heavier. Aside from the loss of useful load, which effectively makes the aircraft into a two seater, all this extra weight is at the front. This has made the aircraft handle more like a Cessna 182 than a Cessna 172. This is no big deal for an experienced pilot but makes the nose leg more vulnerable in the hands of the inexperienced, especially when combined with the marked braking effect of the prop when the throttle is fully closed.

### Fuel Cost

The engine has some excellent points. The fuel consumption can be brought back to just over two US gallons per hour and even with a 75% cruise, it only burns just over 5 gal per hour. The price of Jet A1 is about one third of AVGAS so to fill the tanks completely from empty for a theoretical maximum endurance of about 17 hours and a sensible endurance of over 7 hours only costs about £50.

As someone who hates the embarrassment of being unable to start hot fuel injected engines (and anyone who tells you that they can reliably start a hot 300 HP engine is lying) there is considerable pleasure in turning the key and hearing the diesel reliably rattle into life, hot or cold.

Speaking of cold there is a temperature limitation on starting the engine. With Jet A1 this is minus 35 degrees C so is probably not an issue but with diesel it is only minus 5 degrees. Once running there is a considerable surplus of hot fuel which returns to the tanks and take off should not be attempted till the fuel tank temperatures are in the green. Once in flight this is not a major issue although in very cold conditions it may be necessary to switch tanks from time to time so that an unused tank does not drop to an unacceptably low temperature.

### Service Bulletins

The engine has been subject to a considerable number of service

bulletins. Mostly these have been software changes which involve physically changing the FADEC units which is time consuming and fiddly. We accepted that we would be part of the development process in buying a new engine but find it annoying that the manufacturer expects someone who has just spent £35,000 to take this on the chin without even a word of apology or encouragement. I thought this attitude was exemplified by a recent missive that I reproduce below word for word. I may be over sensitive by this stage but this rather implied to me that as a pilot I would be quite unreasonable to expect the engine to keep running at all if it was that cold!

*"It has been found that if the outside air temperature at altitudes above 5000 ft is below -15 degrees centigrade and the aircraft is in a prolonged descent at idle power the engine will cool and might fail. A restart is possible at any time.*

*Therefore above 5000 feet prolonged descents have to be avoided if the OAT is below -10 degrees C. For such descents the power setting has to be at least 30%. During descent clear the engine occasionally. If a restart in flight is necessary ensure that the power level is in the idle position. This problem will be solved by software update 2.7 which will be available shortly."*

### Warning Lights

The in flight occurrences so far have been mostly just irritating but have on a couple of occasions reached my fear threshold. There have been a number of warning lights in various mysterious combinations. Mostly they related to faulty sensors rather than real faults. The manufacturer's requirement is to download the data onto a PC and send it to them in order to have them analyse the problem and authorise resetting the FADEC unit as necessary. This all sounds very modern and efficient but it does not feel that way when, for example, the aircraft diverts into Exeter due to warning lights. Our engineer has to be flown to Exeter complete with a PC which has overcome the miracles of Microsoft and the internet and succeeded in downloading the latest version of the analysis software. Of

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Fuel consumption can be brought back to just over 2 US gallons per hour...and the price of Jet A1 is about one third of Avgas so to fill the tanks only costs about £50

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# EC Charges may be down...

*Paul Draper provides the latest update on how changes in the EC and the CAA may affect our future costs of flying*

Some possible good news for a change!... EC Charges may be less harmful....

You will need to look back to IPs 46 and 47 to refresh your memories of the full story on the EC Charging Regulation, and space does not permit me to recount much here, but it seems that our intensive lobbying on the initial and subsequent proposals drafts has had some success. The issue now will be whether our Government, and other EC Member States, will accept the proposed position. A majority vote is required.

The Single Sky Committee, which met on 14th April, had presented to it an almost complete re-working of the original Eurocontrol document; the EC had been substantially re-writing it to accord with the SES Regulation 550/2004 (Article 15 of the "Service Provision Regulation" by which the Commission is required to establish a common charging scheme throughout the EC).

We were sent a copy prior to the DfT Forum on the matter held 28th April. It was pleasing to note that in Article 9 they proposed inter alia (extracts with my underline):

"2 Member States shall exempt from charges:

- (a) Flights performed by aircraft of which the maximum take-off weight authorised is less than two metric tons;
- (b) Mixed VFR/IFR flights in the charging zones where they are performed exclusively under VFR and where a charge is not levied for VFR flights;

3 Member States may exempt from charges:

- (b) Training flights performed exclusively for the purpose of obtaining a licence, or a rating in the case of cockpit flight crew, and where this is substantiated by an appropriate remark on the flight plan; flights must be performed solely within the airspace of the State concerned; flights must not serve for the transport of passengers and/or

cargo, nor for positioning or ferrying of the aircraft;

- (d) Flights terminating at the aerodrome from which the aircraft has taken off and during which no intermediate landing has been made;
- (e) VFR flights;

4 The costs incurred for exempted flights shall not be taken into account for the calculation of the unit rates.

*Member States shall be responsible for the financing of these costs. They shall take into account for the financing the revenues generated by taxes on fuel used by flights referred to in paragraph 2 (a) and (b) or any specific fees imposed on such aircraft."*

The points mentioned above will likely be of most immediate interest to members but there is much additional detail elsewhere in the document concerning how charges are assessed. The principle that has been adopted is for the scheme to accord with the ICAO Convention and the Eurocontrol Route Charges System. Additionally the one time proposal to delete the weight factor adjustment was

P 11 ►

# ...but CAA Charges may be up

As mentioned in IP48 (Intelligence Reports) the CAA is about to publish a proposal to revise the basis of charges made by the Safety Regulation Group (SRG) following a review by its JRT (Joint Review Team) comprising representatives of CAA, DfT and industry. We thought this deserves some further explanation.

GA interests in the JRT are represented by Mark Wilson CEO of GAMTA (now BBGA) and despite a request for AOPA to be a member this was, amazingly, refused by the Chairman of the JRT; this despite AOPA being a member of the SRFAC (Safety Regulation Finance Advisory Committee).

In developing its charging mechanisms, SRG relies heavily on the SRFAC, a committee of representatives of a cross-section of the UK's aviation industry.

The Committee currently has eighteen

members who meet at least five times a year and is charged with examining and consulting with SRG on its costs and associated service levels and with advising SRG on the financial aspects of the development of strategic plans. Most importantly, the Committee considers proposals for charging schemes to seek an equitable distribution of the Group's costs among industry participants. SRG meets with the Committee to discuss its charging proposals prior to carrying out its formal written consultation.

Crucially, as the SRFAC was unable to agree on the basis of a new model of charging, the Joint Review Team (JRT) forum was established "being designed to overcome issues raised within the existing Safety Regulation Group Finance Advisory Committee where, in recent years, consensus could not be reached

on progressing issues relating to cross-subsidies."

The JRT is tasked with reviewing:

- 1 Cross subsidies between and within schemes
- 2 Opportunities to increase efficiency in regulation processes
- 3 Other opportunities for reduction of regulatory activity, and
- 4 The need to improve charges consultation process

The need for a review is being pressured by the large airlines, particularly BA who would see a 23% reduction in their current regulation charges of about £14M by increasing the charge to smaller airlines by £4.5M (40%) and to GA aircraft and pilots by £1M as we reported earlier. Small airlines have already seen charges rise by 40% during earlier moves. Pilot licences and renewals are planned to increase and

P 11 ►

## EC Charges may be down...

Continued from Page 10

dropped; if it had remained there would have been substantial cost increases for aircraft over 2 tonnes. We were pleased and quickly wrote to the DfT asking them to support the proposals in the forthcoming SSC meeting and thanking the EC for the revised proposals being more accommodating of the points we made albeit we have a few further comments to make.

At the DfT Forum Denis Huet of the EC explained the thinking behind the new draft. Whilst we basically support it, the airlines and ANSPs (NATS) stated there is no distinction between "cost" and "price" in the transparency requirements and as currently proposed it would require release of commercially sensitive information. The Airlines, with BA arguing over the weight factor adjustment, stated it is contrary to principles in the Articles. They were also concerned it might be changed over time as aircraft types change. Easyjet want competition in Articles 10 & 11 (of the Draft) and are concerned over the proposals increasing costs rather than reducing them due to more levels of

oversight. Airports queried the "single till" approach (where airports are allowed to put all income into one category to offset costs in another). BAA were very derogatory of the whole proposal and see no need to change the present system as ICAO 908 (2) covers the needs. The CAA thinks as regulator they cannot prescribe price regulation and rate of return element of the charges proposals.

So there is much further debate to be had and especially in the statement that States shall take fuel revenues into account in the financing; the UK Government does not accept hypothecation of taxes. We expect this part of Article 9 to be dropped but we do expect the rest of the exemptions to remain; the DfT could not talk about possibilities on 28th in advance of the Election.

There will be further debate on the remaining Articles by the SSC in July and we are in close touch on the matter; let us hope all the hard work by many in GA will see a successful outcome!



## ...But CAA Charges may be up

Continued from Page 10

there would also be substantial charge reductions for large aerodrome operators and very large increases for smaller licensed aerodromes.

Whilst we have seen one of the interim reports we await the latest version but the message is clear that there will undoubtedly be an increase in charges all round for us.

One of the issues we have with the proposals, as last seen, is that the CAA has not considered its position in cost terms in the light of EASA affecting its operations and nor has it considered the basics as to what type of organisation it needs to be in the new European SES environment ie what form of regulation do we actually need if we started from scratch?

So, what are we doing about this and

can we influence matters? As a first step we have protested to the DfT and Chairman of the CAA that the terms of reference and constitution of the JRT are basically flawed; we await a proper response. We have also been co-operating with BBGA (Mark Wilson), and GA Alliance, over his proposed minority report which states that the review is flawed. That report is being considered shortly but we expect the CAA to publish its final proposals for consultation over a 60 day period, sometime later this Summer.

There will then be an opportunity to comment in detail on the proposals and protest at yet another "attack" on GA and the ever increasing costs we face in many quarters.

We will keep you advised.



## IFR Certification

Continued from Page 6

in mind - there is no graduation like in the Certification Specification. Because of this P-RNAV will require a very expensive FMS, often hand-in-hand with an EFIS, to fulfil the requirements. This may be OK when you consider the risks involved in the operation of transport category aircraft and the economic basis for installing a FMS, but P-RNAV could be utilised by small aircraft with less than FMS given proper pilot training.

## Airline Rules

The same situation exists with many EASA rules. EASA took over the JAA rules with minor changes but Part 21, for example, that deals with certification and airworthiness was only for aircraft over 5,700 kg in JAA. This was changed overnight to include all aircraft (except UL and experimental). So now we have to live by the rules that are for the airline industry who have thousands of employees in their maintenance organisation, lots of specialists and lots of bureaucracy. It is not practical and it does not increase safety - but it is expensive. JAA had rules for smaller aircraft on the drawing board but never got around to do the work.

So our problem is not the "spread of the most onerous legislation to all States in the EU" but that Eurocontrol and EASA only think of, and work for, the airline industry.

FAA AC 20-138 was revised more than a year ago to AC 20-138A. The original AC 20-138 was written when GPS was new so AC 20-138A is an updated version building on more than 10 years experience. To our PPL/IR community the most interesting change was that the kind of GPS systems we install are now considered a minor change and thus reduction of paperwork and cost would follow. A year ago I asked EASA to adopt the new version, but they did not even know what I was asking about - they contacted the UK CAA who knew nothing of the new version and gave a nonsense answer.

One additional point is that Eurocontrol work in non-transparent ways. Committees and sub-committees debate interminably and then ask the JAA to do the airworthiness stuff. It is quit impossible to point to anybody accountable for JAA TGL 10 - the airworthiness requirement for P-RNAV. Let us hope that will change with EASA.

Common European rules in many ways would be better than the situation before EASA and Eurocontrol. If only we could make them think a little and make them spell out the words "General Aviation".



# The Emergency Triangle

by Alan Toogood

A few weeks ago I experienced a real test of my IR abilities. It had a happy ending, obviously, as I'm writing this from my earthbound desk as I give thanks to my IR instructor who carried out my refresher training over the last decade.

Without getting too detailed, following a full avionics refit I suffered seemingly unconnected equipment failures that left me with COM 2, a glide slope, an ADF display and nothing else; nav, com or transponder-wise. These failures came on separately over the space of an hour and were astonishingly, as the post flight avionics investigation revealed, due to independent faults. The aspect that I was untrained on was how the failures eroded my confidence in the equipment that appeared to remain functioning.

## Exeter

My final approach into Exeter was based on a radar monitored glide slope/ NDB approach, to my knowledge an unpublished procedure that led me to pass over 'the numbers' at 400 feet, again an unorthodox decision height. In normal circumstances I would normally go around at 250 feet but I added a margin for the fact that I didn't want to trust the glide slope down any further and I had occasional visual contact with the ground below which looked damn close enough. The final departure from a standard ILS procedure was Air Traffic granting a level turn that allowed me to make a 360°, lose the height and make an uninteresting landing. The weather conditions added to the experience and although there was no cloud as such, a haze layer, seemingly without vertical limit, had reduced the of South of England's visibility to 1500 metres. Landing at Exeter directly into the sun was just the final bonus.

The whole experience led me to wonder what I would have done with a total electrical failure above cloud. With no communication or navigation ability I would soon be 'uncertain of position' and a descent to visual would be foolhardy if not terminal. Worse still what if I was VMC on a cloudless day and lost? Could I ever walk into the flying club again?

Despite these days of colour moving maps and inbuilt redundancy there are several faults that could produce a total electrical power loss. How would I cope in such a situation and why would the battery in my mobile phone and hand-held transceiver/ VOR be flat that day?

## Emergency Triangle

There is a procedure that was developed in the early days of aviation that is still in use today although I have only been able to find it in one civilian publication. It also has relevance where there is a partial radio failure. The military still publish a technique, called the Emergency Triangle, that is designed to attract help when, in Visual Meteorological Conditions, radio and navigational failure is compounded by being lost. If you happen to be stranded above solid cloud it has got to be worth trying because there isn't of much else to do.

Even if a neophyte civilian radar controller doesn't recognise what you are doing your area of distress will probably be monitored by military radar so there is a good chance that your actions will be recognised. This procedure should not be seen as replacing transponder codes 7600/7700, but if you've lost all electrical power that won't work anyway. Also, this is not a procedure you can practice as it might result in the scrambling or diversion of aircraft.

## Receiver Working - Fly Right

The procedure should be flown as detailed below, taking into account the estimated winds. The aim is to provide a radar controller with a fixed pattern on his screen that cannot be mistaken as anything



else than an emergency triangle:

- Switch Transponder to Emergency Code
- Continue to attempt to make radio contact and listen out on the appropriate emergency frequency
- If the receiver only is operating, fly a triangular pattern to the right holding each heading for two minutes for aircraft flying below 300 Knots TAS and one minute for aircraft flying above 300 Knots TAS. The aircraft should fly at best endurance speed and all the 120° turns should be made as tight as possible. At least two such patterns should be flown before resuming the original heading, the pattern should then be repeated at intervals.

## Total Failure - Fly Left

If both receiver and transmitter are inoperative a similar pattern should be flown as above but to the left. The ground radar observing will attempt to contact the aircraft offering heading instructions. If the aircraft fails to comply it will notify the appropriate agency so that a shepherd aircraft may be scrambled or diverted. It will also contact the appropriate ATC Authorities so that other aircraft in the area can be diverted to avoid collision. The theory is that the intercepting aircraft will escort the distressed aircraft until visual contact is established with an aerodrome. It will probably never be used but it's a useful aid to file in the deep cranial recesses.



# REVIEW - European AIS Database

## By Alan Toogood



**H**<http://www.eurocontrol.int/ead/EADBasic.html> will lead you to the European AIS Database (EAD); Eurocontrol's Centralised Digital Aeronautical Information which claims to be "Your new source for quality-assured aeronautical information." free of charge. As a fully paid up member of the "I'll fly an extra 50 miles to airfield with a landing fee £5 less than the one I'm flying over right now, club." access to such a web site is of great interest to me, so I delved in to see if it really had anything to offer.

With EAD Basic, the Public Access Service of EAD, you can apparently create ad-hoc Pre-Flight Information (PIB) bulletins for aerodromes and airports, areas and routes. You might want to read this article and follow the procedure on your PC to get the best impression of how useful the site is. To see a chart click on the 'Enter EAD Basic' hyperlink icon; then a slightly obscure icon while being told, "Read the following pages... they will change your life." From here you have to apply for free registration that is relatively painless or if you have previously registered for other Eurocontrol sites, Skyview for

instance, use that logon and password.

Once in, you arrive at the Home Page. If you haven't got all the required software listed you will have to download it (select 'Downloads') but this will probably be just the 'Java Plug-in' for most users as you should have the rest already. If you then choose 'Documents', expecting charts, you'll be disappointed as the choices are 'Release Information' or 'Abbreviations & Definitions', so skip that and select 'Enter'. Some Java software will probably download ("Loading Java Applet") and my PC appeared to hang so be patient and use CTRL-tab to watch the download's progress until it hangs big time. Then, go back to the 'Home' page and retry the 'Enter'. If you get the message "Start applet not initialized", close all Explorer (or equivalent) windows and restart at <http://www.eurocontrol.int/ead/EADBasic.html>, enter your password, press 'Enter EAD Basic', 'Go' and 'Enter', 'Grant always' for the downloads and it should take you to a new page with the options of 'PIB' and 'PAMS Light'. Double click on 'PAMS Light' and you get a search page (as shown below).

### Diesel Engines - The Way Forward?

Continued from Page 9

course on a wet ramp at Exeter he cannot email the data to Germany so returns to base, does the download and in due course is told there is no real fault. He then has to go back to Exeter to reset the FADEC. One of TAE's less endearing characteristics is to tell you that there is no fault. What they mean is that there is no out of parameter event indicated by the sensors. It is less than satisfactory having landed after a Pan with a very rough engine indeed to be told that there really was nothing wrong with the unspoken implication that bed rest for the pilot would cure everything.

### Water

This was the case in some of our most exciting moments in the learning process. A customer collected an aircraft from us after routine work and landed back when the engine ran rough just after take off. The FADEC units when interrogated indicated there was no fault. We had for some time been interested in the ability of the engine to create water. It has tank drains and an engine drain in the same position as a gascolator on a normal Lycoming powered Cessna.

We had always cleared globules of water at each drain at pretty well every pre-flight check but did not believe that this water was coming from outside since the tank seals are excellent. (Actually too good; at one stage we were grounded because the tanks caps were impossible to remove). We hypothesised that because of the hot fuel returning to the tanks condensation was considerably greater than in an AVGAS engine. We then discovered that the engine fuel filter was gradually filling with a substance that looked like milk or a suspension of white powder in clear fluid. After some experimenting we found that if water is agitated vigorously with Jet A1 it forms this white fluid, which is then stable and does not separate back into its components. What appeared to be happening was that the engine filter was quite quickly filling up with this fluid, which could then be injected in a slug into the engine causing failure. During this investigation I then suffered a complete engine stoppage while taxiing out to take off. Our best guess was that under full power the engine dragged some usable fuel through but under taxi power it took in a gulp of pure water. It also proved very difficult indeed to get rid of the water.

P 15 ▶

The screenshot shows the 'PAMS Light - Search' interface. At the top, it says 'Last content update: 01/06/2005 02:18 UTC'. Below this are search filters: Authority (Code): United Kingdom (EG), Authority Type: Civil, Language: EN, AIP Type: AIC, Part: Non-AIRAC. A 'Search' button is visible. Below the filters, it says 'Listed AIPs: United Kingdom (EG)/Civil/EN/AIC/Non-AIRAC/\* ( 210 documents available )'. A 'Page Index' shows '1-50 51-100 101-150 151-200 201-210'. A list of 22 AIPs is displayed, each with a file name and a title. The titles are: 1. EG\_Circ\_1997\_P\_103\_en.pdf: CIRCULAR AIC P 1997-103 THE NON-USE OF REVERSE THRUST AT LANDING FOR PUR... 2. EG\_Circ\_1997\_P\_130\_en.pdf: CIRCULAR AIC P 1997-130 PROPELLER FEATHERING ON TWIN PISTON ENGINED AIR... 3. EG\_Circ\_1997\_P\_145\_en.pdf: CIRCULAR AIC P 1997-145 INDUCTION SYSTEM ICING ON PISTON ENGINES AS FITT... 4. EG\_Circ\_1997\_P\_34\_en.pdf: CIRCULAR AIC P 1997-34 THE USE OF ILS FACILITIES IN THE UNITED KINGDOM... 5. EG\_Circ\_1997\_P\_81\_en.pdf: CIRCULAR AIC P 1997-81 GROUND HANDLING OF TRANSPORT AIRCRAFT... 6. EG\_Circ\_1997\_P\_83\_en.pdf: CIRCULAR AIC P 1997-83 PROPELLER AND ROTOR MARKINGS... 7. EG\_Circ\_1997\_Y\_148\_en.pdf: CIRCULAR AICY 1997-148 DEPARTURE SLOT (CTOT) COMPLIANCE... 8. EG\_Circ\_1998\_P\_101\_en.pdf: CIRCULAR AIC P 1998-101 HEAD PROTECTION DURING CERTAIN AVIATION OPERAT... 9. EG\_Circ\_1998\_P\_111\_en.pdf: CIRCULAR AIC P 1998-111 LANDING PERFORMANCE OF LARGE TRANSPORT AEROPLA... 10. EG\_Circ\_1998\_P\_141\_en.pdf: CIRCULAR AIC P 1998-141 REJECTED TAKE-OFF (RTO)-UK REGISTERED AIRCRAFT... 11. EG\_Circ\_1998\_W\_115\_en.pdf: CIRCULAR AICW 1998-115 GENERAL EXEMPTIONS AND GENERAL PERMISSION ISSU... 12. EG\_Circ\_1998\_W\_119\_en.pdf: CIRCULAR AICW 1998-119 THE REQUIREMENTS TO OBTAIN A FLIGHT ENGINEERS L... 13. EG\_Circ\_1998\_W\_77\_en.pdf: CIRCULAR AICW 1998-77 AUTHORITY TO OPERATE GROUND RADIO STATION... 14. EG\_Circ\_1999\_P\_131\_en.pdf: CIRCULAR AIC P 1999-131 THE NEED TO AVOID DELAY WHEN AN IMMEDIATE LANDI... 15. EG\_Circ\_1999\_P\_140\_en.pdf: CIRCULAR AIC P 1999-140 RT DISCIPLINE... 16. EG\_Circ\_1999\_P\_17\_en.pdf: CIRCULAR AIC P 1999-17 WAKE TURBULENCE... 17. EG\_Circ\_1999\_P\_35\_en.pdf: CIRCULAR AIC P 1999-35 OCCURRENCE REPORTING... 18. EG\_Circ\_1999\_P\_52\_en.pdf: CIRCULAR AIC P 1999-52 GUIDANCE TO TRAINING CAPTAINS- SIMULATION OF ENG... 19. EG\_Circ\_1999\_P\_54\_en.pdf: CIRCULAR AIC P 1999-54 AIRBORNE COLLISION AVOIDANCE SYSTEM (ACAS)-LEGAL... 20. EG\_Circ\_1999\_P\_61\_en.pdf: CIRCULAR AIC P 1999-61 RISKS AND FACTORS ASSOCIATED WITH OPERATIONS ON... 21. EG\_Circ\_1999\_P\_63\_en.pdf: CIRCULAR AIC P 1999-63 AIRCRAFT HAZARD - NOTIFIABLE DANGER AREA - EG D 7011... 22. EG\_Circ\_1999\_P\_82\_en.pdf: CIRCULAR AIC P 1999-82 MEDICAL EMERGENCIAS

P 20 ▶

# PPL/IR Refresher



By  
Paul Turner

My TB21 was booked in for its annual and C of A renewal and the first snow of winter was falling in Kent so I thought I would make use of the downtime by signing up for the PPL/IR Refresher workshop run by Professional Air Training (PAT) at Bournemouth's Hum airport. The course has been described in recent editions of Instrument Pilot and the training is provided by PPL/IR Europe member Anthony Mollison and PAT's CFI Stephen Hale. The course is designed to provide general refresher training for instrument rated PPLs and I found the day thoroughly worthwhile. If you are considering attending a future course, this article provides an overview of what to expect, although the format may change slightly based on student feedback.

The workshop is restricted to just six people so there is plenty of opportunity to focus on student's individual needs. In fact, on the day of my course we had only three attendees which allowed plenty of personal attention. The other candidates were John, recently retired and owner of a N-reg Piper Warrior with an FAA IR but little experience of UK airways work and Ian, another Trinidad owner and former PPL instructor who wanted to get back into instructing and was looking to brush up on his instrument skills.

## Cockpit Resource Management

Following the personal introductions, the day kicked off with a session on Cockpit Resource Management. This took the format of each instructor role-playing the part of someone coming up to their first IR renewal and wanting to fly with a safety pilot to gain some current practice. This provided us with an introduction to the simulator that we would use later – the FNPT 2. This can be configured either as the twin-engined Duchess or a complex single. This provides a very realistic flying environment with projection of the simulated world onto a forward screen.

Our turn at flying would come later but for now we had the opportunity to watch Anthony and Stephen role-play two completely different characters and the following debrief illustrated the practical problems that any one of us might face. For those of us who are not instructors, consider the situation carefully: what happens if the handling pilot, who admittedly is not very

experienced, gets into a situation that as safety pilot we are not comfortable with? The ground-rules need to be established before the flight – trying to sort them out in the air, in IMC in a situation going from bad to worse doesn't bear thinking about!

## GPS Workshop

Following an excellent buffet lunch supplied by Anthony's wife, Linda, we resumed with a session on GPS. This is a difficult subject to get right as some people may have little practical experience of using a GPS or, if they have, it is type specific. So providing guidance that will be useful to a wide audience is not easy. Stephen managed this superbly by focusing on general principles of operation and the wide experience of the workshop attendees provided a useful discussion on some of the "gotchas" to look out for. In a previous life, Stephen was also responsible for technical matters at NATS and so has a good handle on some of the more recent developments, including the fact that there is likely to be an AIC in the UK later this year covering approval of non-precision approaches by stand-alone GPS.

## Personal Tuition

One of the major advantages of this workshop is that it attempts to deal with the particular areas of guidance that the students feel would be of benefit. So while John went off to the simulator with Anthony to practice procedures for joining the airways from an uncontrolled airfield, Ian and I spent some time with Stephen looking at different ways of flying a DME arc and the peculiarities of the step-down fix on a non-precision approach. DME arcs have always been taught in the USA but until recently have been relatively rare in the UK. As our airspace gets more crowded, the airspace regulators seem to think they are a useful way of providing separation to some of the smaller airfields. Cambridge is a good example and Stephen explained the four ways which this can be flown:

- Fly a 1/10th rate turn
- Fly a three penny bit pattern, outside the DME arc
- Fly the same pattern inside the DME arc
- Just hack it!

It may seem strange initially, but the first of these methods is actually not recommended. The reason for this is that long, shallow turns allow the vestibular canals in the ear to stabilise and fool the brain into thinking it is flying straight and level. This can be dangerous in IMC when the turn is eventually stopped when you could be tricked into thinking that true straight and level is actually turning, possibly

resulting in disastrous consequences.

If, like me, your previous attempts at DME arcs have been of the fourth variety, this session provided useful guidance on something a little more structured and scientific. Stephen prefers flying the three penny bit pattern inside the DME arc and this is something I will try the next time the opportunity arises.

## Simulator Time

As I mentioned, the workshop tries to meet students' individual needs so a few days beforehand I had a word with Peter Watson, my usual IR examiner at Southend to seek his views on the sort of things I might find useful. Peter's suggestion was to look at the VOR/DME approach so I resorted to Jeppview to dig out a few examples from the continent where this type of approach appears to be more common than in the UK. From a selection of charts we focused on the VOR/DME Approach to runway 25 at Charleroi. This afforded a useful opportunity to review the requirements for the step-down fix which this approach provides. Even better, my time in the simulator allowed me to practice the whole thing.

Ian meanwhile wanted to look at what happens with a vacuum failure. The FNPT 2 enables various failure modes to be simulated including the instant failure of the Attitude Indicator as well as a slow wind-down resulting from a vacuum pump failure. Not content with just one instrument failure, Ian asked also for the direction indicator on the HSI to fail which hopefully would not arise in real-life since at least one of the two instruments would be electrically operated. Ian then proceeded to fly the ILS on this partial panel into Cherbourg. Ian did a great job and having now seen just how confusing this can be with both instruments out, I hope I never end up in the same situation. This type of failure brings home the true value of the simulator and this alone makes the day worthwhile.

## Summary

I suppose we were spoilt somewhat with just three people attending the workshop although I am sure that 2 or 3 more would just add to the richness of the various briefing and debriefing sessions. At a cost of £150, the workshop provides good value for money and I learnt a lot. Single-pilot, instrument work is a challenging environment and getting some personal tuition and brushing up on the latest rules was a great way to spend a winter's day. For more information, contact Linda or Stephen at Professional Air Training on +44 (0)1202 59 33 66 or email [info@pat.uk.com](mailto:info@pat.uk.com).



# MODE S Update

By Paul Draper

Mode S (ELS) in UK deferred to 31st March 2007 (in effect)!

In IP 48 I posed the simple question (as I thought) of wanting to know if we needed ELS by 31st March 2005 or was it to be deferred to 2007 as in other European States who had adopted the Eurocontrol recommended AIC deferment?

Well, although the CAA had said they would keep me advised and let me know when the matter was clarified, they haven't and I happened to find reference to it on their web site, per chance, at the end of April.

And, even now, the position is not clear cut as the transitional arrangements are only meant to apply to those "...experiencing genuine problems..." in fitting ELS and "...should not be used as an opportunity to delay equipage." Does this include problems of financing I wonder?

You can find the relevant detail on the CAA web site at: [http://www.caa.co.uk/docs/810/DAP\\_SSM\\_Mode\\_S\\_Transition\\_Arrangements\\_AIC\\_Text.pdf](http://www.caa.co.uk/docs/810/DAP_SSM_Mode_S_Transition_Arrangements_AIC_Text.pdf) which now has fuller details of the ELS requirements including the "transition arrangements" as extracted below; the position with EHS (not deferred

if your a/c is included) remains basically as before.

In addition you can access arrangements for other near European States via: [http://www.eurocontrol.int/mode\\_s/](http://www.eurocontrol.int/mode_s/) (look for "information") and which, in essence, provides the same transition arrangements for the Netherlands, France, Germany and Switzerland; Belgium's AIC has not been altered but I understand they have also deferred for two years. The UK will issue a further/revised AIC in July.

If only those of us who have already fitted our Mode S units had waited a little longer.

## "8 Transition Arrangements

8.1 The transition period is a two-year period from 31 March 2005 to 31 March 2007 to allow operators who are experiencing genuine problems in the supply, installation and certification of Mode S transponders to equip. The transition arrangements described within this AIC represent an extension of the period permitted in which to fit Mode S, rather than a slip in the equipage mandate and should not be used as an opportunity to delay equipage.

8.2 Operators of EHS applicable aircraft flying IFR/GAT requiring access to Mode

S Airspace, who are not able to meet the 31 March 2005 mandate for the reasons specified in Paragraph 8.1, will be allowed continued access until 31 March 2007, by which time they must be fully EHS compliant, unless conditions of paragraph 6.4 are applicable.

8.3 Operators of ELS applicable aircraft flying IFR/GAT requiring access to Mode S Notified Airspace, who are not able to meet the 31 March 2005 mandate for the reasons specified in Paragraph 8.1, will be allowed continued access until 31 March 2007, by which time they must be fully compliant. Operators should be mindful that Mode S Notified Airspace is likely to increase as detailed in paragraph 2.

This document is provided for information purposes and will be superseded by an AIC due for publication at AIRAC 7/2005 on 7 July.

8.4 Operators of aircraft that are not subject to EHS applicability criteria should take particular note that unless an aircraft qualifies for special flight status<sup>1</sup>, or, is to be withdrawn from service<sup>2</sup>, no relaxation from the requirements of ELS for IFR/GAT flights in Mode S Notified Airspace will be permitted after 31 March 2007."



## Review - European AIS Database

Continued from Page 13

I thought I'd try and find Asturias (LEAS) in Spain, so entered Spain (LE)/Civil/EN/AIP/AD/ in the various boxes. This brought up 57 documents and a quick glance through produced a five-page pdf file of the LEAS AIP in English. Inspired I went for the aerodrome chart. This time entering Spain (LE)/Civil/EN/Charts/AD/\* brought up 611 charts alphabetically listed in 100 file lumps. Clicking on AD 2 - LEAS ASTURIAS - IAC VOR/DME RWY 29 gave me the option to open LE AD 2 IAC 4en.pdf. I went for it and soon had the full instrument approach chart available to print. So, if I'm going there I'll need an aerodrome chart, a few seconds later, it's located and hanging out of my printer. I tried various other airfields in other

countries and couldn't identify any gaps. Some countries have scanned in their charts and it shows, they are perfectly readable but looked just scanned in as opposed to being converted to pdf from their original format.

So, back to my original plan. I can get a free chart for say, my departure airport at Exeter and destination of Asturias but now I want free, up-to-date en-route charts. Entering United Kingdom (EG)/civil/en/charts/enr/\* I find load of charts but nothing similar to Aerad or Jepps. Moving on to Spain I select SPAIN (le)/civil/en/charts/enr/\* and find AIP SPAIN ENR 6.1-1 Radio Navigation Chart Lower Airspace 30-sep-04; flushed with the expectation of success I go to load the file and am told: "Sorry! File requested is not loaded into EAD PAMS system due to big size. Please, check the

paper version at your AIS office or contact the EAD service or concerned state for further information".

So, in conclusion, the EAD site is great for European aerodrome and instrument approach charts. In the long term it does make you wonder if Aerad and Jeppesen will continue to compete as their market dwindles. However, they will continue to dominate the en-route chart market until Eurocontrol find some way to cut down the file sizes of their available charts or make the files available in downloadable size sections. It is inevitable that no matter how extortionate the cost of light aviation becomes, human nature will always ensure that even the richest pilot will seek out free charts. EAD's future is therefore assured.





**By**  
**Jeppe Sørensen**

## *Briefing Day for Business & General Aviation at Eurocontrol*

The Briefing Day for Business & General Aviation is a yearly event jointly arranged by IAOPA and Eurocontrol. It took place at the Eurocontrol HQ on Friday 8th April.

As the objective of the event was “to provide all general, business and sports aviators with Air Traffic Management information that is likely to affect their flying activities in the future” the event was of great interest to the members of PPL/IR Europe.

You can read the presentations at <http://www.eurocontrol.int/eatm/public/event/050408bday1.html>.

In this issue of Eurostuff I will add some highlights, impressions and thoughts that I gained by attending the event.

### *Getting to Eurocontrol*

In order to be ready for the start of the day I had to travel to Brussels the day before. Strong headwinds of 45 to 50 Kts was forecast so the airborne time would be extended. The wind was even stronger and clouds and a little icing reduced the TAS of 150 Kts to 75 Kts groundspeed on some parts of the route. My passenger was an experienced glider pilot, who understood the situation so we pressed on and arrived in Antwerp after four hours and 20 minutes en route from Copenhagen. Antwerp is a nice airport for GA and getting to Brussels is easy.

### *The Agenda*

The first part was opening speeches by heads or representatives of Eurocontrol, IAOPA, European Air Sports, European Business Aviation Association and PPL/IR Europe.

The second part was a presentation of current topics of interest – Airspace Classification, Charging Policy, Mode S, 8.33 kHz Programme, P-RNAV and The European AIS database, followed by a question and answer session.



*Organisers of the Business and GA Briefing day: Mr. Phil Boyer of IAOPA standing, Mr. Victor Aguado and Lex Hendirks of Eurocontrol to his right.*

### *Welcoming Speech by Victor Aguado, DG Eurocontrol*

Mr. Victor Aguado stressed the challenges facing Air Traffic Management (ATM) and the pace of technological improvements. General Aviation represents more aircraft and flight hours than commercial traffic but it represents only 1.5 % of aircraft above 2 tonnes and only 0.5 % of the route charges.

There is a cautious optimism in the airline industry. ATM performance has improved a lot. 10 % more traffic than in 1999 and 67 % fewer delays. And for the first time the cost of ATM has increased less than the traffic.

Aviation regulations change almost every day and the European Single Sky initiative has an ambitious goal or “Freedom for all airspace users – big and small – in a safe airspace”.

### *IAOPA sees clouds and a bright future*

The chairman of IAOPA Phil Boyer started with a long presentation on IAOPA, followed by some remarks on the clouds hanging over General Aviation – mainly the increasing cost of flying. This includes new requirements for Mode S, 8.33 kHz and equipment for P-RNAV.

Phil Boyer then went on to present the bright future of the glass cockpit. He presented a very impressive slide and video show on the Chelton “high-way in the sky” multi function display and the Garmin new WAAS GPS system. Like most Americans, Phil is enthusiastic about new technology and a salesman from Chelton or Garmin could not have made a better presentation. On the other hand these devices would indeed increase our cost of flying although the infrastructure for these inventions is not currently in place in Europe.

I got the impression that Phil Boyer lives in another part of the world and does not quite understand the problems and issues facing General Aviation in Europe.

### *EAS European Air Sports*

Sir John Allison, the chairman of European Air Sports, presented a strong case for Sport Aviation. His entire speech is on the above mentioned web page and I urge you to read it.

One of the main points is that European regulations should deal with high level board issues and detailed implementation and practice should be at a local level leaving such subjects as maintenance and certification to national rules. On the other hand some of the issues discussed further in this event are by nature cross border issues and a harmonised solution is best, provided it takes all “stakeholders” interests into account.

### *Business aviation flying high*

Mr. Brian Humphries, Chief Executive of European Business Aviation Association (EBAA), presented his organisation and made a point of explaining that not just stars and celebrities were flying business jets, most flights transported business managers. Brian Humphries used to work for BP and they could save a manager by using business jets. Well you have to admit that managers are expensive nowadays.

The presentation also told us that EBAA members are flying the latest and greatest of Gulfstreams and the like – they fly higher, are better equipped and have a safety record better than the airlines. The only problem for EBAA was that they were not allowed to land at Heathrow any more. I can only envy the situation they are in.

## ***PPL/IR flying low***

I had the opportunity to present PPL/IR Europe. I did not find it an easy task after all the professional speakers who are used to speaking to a big audience and make presentation in English. In addition Phil Boyer had extended the presentation of IAOPA with selling the glass cockpit and used much more time than allocated, so the meeting was behind schedule - in fact far into the coffee break.

Anyway, I did my best to make a short presentation of PPL/IR Europe and to stress that though we mostly use lower airspace, we share the environment with the commercial IFR traffic. We operate under a quite different cost structure compared to the airlines (and the business jets) and because of this are faced with a number of issues and risk being squeezed out if our needs and conditions are not taken into account. We fly cross country, are in favour of European harmonisation and hope for sensible rules and regulations for all airspace users. In addition we would like to participate in the development of these rules and regulations.

## ***Airspace Classification***

Mr. Bill Armit of Eurocontrol has worked on this topic for a number of years. When you look at his presentation it is easy to see that harmonisation is needed. More than 20 different airspace types are going to be changed; a few types focused on users rather than on ATM. Harmonisation started from above down to FL 245. The work will get harder when lower airspace is worked on. Recent news is that Flight Level Zulu has been fixed at FL 195.

## ***Common Air Navigation Charging Scheme***

Mr. E. Soehnle, Head of Economic and Regulatory Affairs/CRCO Mandate Manager, presented the principles as set by the Service Provision Regulation/Mandate. The principles are in line with Eurocontrol Charging Scheme. Aircraft below two tonnes are exempt from Eurocontrol charges but in future exemptions have to be visible in the accounts. Some attendees fear this may tempt national service providers or politicians to charge small aircraft. The EAS point of view is that VFR traffic should not figure in this scheme as the service is forced upon them.

## ***Mode S programme***

By reading Instrument Pilot you will already know the status of the Mode S programme. Mr. John Law pointed to the fact that Mode S with extended squitter (part of the signal from the transponder) could function as an ADS-B system. Indeed most Mode S transponders sit next to and may even be connected to a GPS and therefore know their current position. Well it is easy to see with hindsight that this feature should have been part of the scheme.

## ***8.33 kHz programme***

Mr. Peter Alty told us that the present focus is on airspace above FL 195 and carriage will be mandatory by March 2007. An action plan for airspace below FL 195 will be out for consultation to 2006. Many State aircraft (e.g. fighters) can not comply.

I understand the airlines' push for the use of 8.33 kHz below FL 195. Many GA aircraft have upgraded to Garmin 430 and 530 but we should resist mandatory carriage and when required one 8.33 kHz radio should be sufficient for GA operations.

## ***P-RNAV***

As you may know P-RNAV is a recast of terminal navigation made by Eurocontrol – the requirements for equipment were made by the JAA. The design of P-RNAV procedures is standardised, simplifying the many existing confusing terminal procedures.

The P-RNAV project has been on hold for some time because of the requirement for approval of the navigation databases. This will be solved by EASA by a Letter of Accreditation.

I think the procedures are much improved but the equipment requirements (JAR TGL 10) only consider transport type aircraft with Flight Management Systems and an Operating Department and this does not fit with General Aviation. The standard answer from Eurocontrol is that P-RNAV will not be mandated and alternative procedures will be available. The fact is that P-RNAV will not be mandated before 2010. General Aviation has been flying terminal procedures based on GPS for many years, so why reinvent those procedures in a way that excludes General Aviation? Some time ago I saw a proposal for the reinvention of approach procedures (non-precision based on GPS) that also excludes General Aviation – I wonder if it is lack of knowledge or done on purpose?

By the way, it seems like the database problem was a little over the top. 99 % or more of the errors have been bad design of the procedures, designs that were difficult or impossible to code in the database or wrong interpretation of the procedure. The way P-RNAV procedures are designed by using few simple Vancouver's and by implementing these directly into the database "language" excludes the errors that we have seen previously.

## ***AIS Systems***

The progress in this area is impressive. XML schemes for support of eAIP and MET are on the drawing board and it will be accessible and support all "stakeholders". Good work – just go ahead.

## ***Flying back***

Belgocontrol had a nice booth with on-line access to all sorts of services. I used the opportunity to check the conditions including the met for our return trip. Some headwind but only for the first 100 nm.

When flying back the impressions started to filter through. After Amsterdam control the radio got quiet and we could discuss and exchange points of view and personal impressions.

This year's attendance was somewhat less than 2003 when I attended the event. The issues were much the same: Harmonisation of airspace gets lower, 8.33 kHz gets lower, Mode S coming and P-RNAV no change in attitude.

Is it worth participating in the show? Yes – we were invited to present our organisation and the representation of General Aviation has increased with EAS making its appearance on the scene. If Eurocontrol will work for a free and fair access to the airspace as stated by Mr. Victor Aguado, we have to explain our points of view – after all, Eurocontrol employs ATM and airline people and the airline pays for Eurocontrol, so they will have an airline point of view if we do not take part in the development.

After two hours forty minutes we arrived at our destination thanks to good ATM service all along the route. In addition many thanks to Mr. Phil Boyer of IAOPA and Mr. Lex Hendriks of Eurocontrol for arranging the Briefing Day for Business & General Aviation. We are sure it will lead to better understanding on all parts involved.



# Pilots' Talk

## Free Circulation

Most members will be aware of the situation that some pilots have encountered when challenged by French Customs Officers. They have been asked to produce documentary evidence to show that VAT has been paid on the purchase of the aircraft. The safest way to avoid problems is to keep a copy of whatever evidence you have, in the aircraft.

For aircraft that are imported from outside of the EU - You will need the original Customs importation document, a C88 or SAD (single administration document). It will need to show:

- A reference number in the top right corner and will look something like EPU 290 900021K 24/07/99, and may have the office name e.g. SOUTHAMPTON.
- In box 31 - a description of the aircraft including identifying marks e.g. registration and serial number.
- In box 33 - the commodity code, which should start with 8802 with either a further four or six digits.
- In box 37 - Procedure code - There are only four codes that identify that all import duties have been paid in relation to aircraft. 400038, 400069, 940038 or 940069.

If you already own an aircraft and don't have a C88 try to contact the previous owners for a copy and before you purchase a second-hand aircraft, request sight of the import documentation before agreeing any purchase. Some mortgage companies will insist on a copy of the C88 before handing over any money.

If the importation took place prior to 1st January 1993, then you may be eligible to apply for a Free Circulation certificate (FCC). In the case of UK registered aircraft, you will need to contact the CAA registration department, requesting printouts of all previous owners going back to 31st December 1992, to demonstrate that it has remained in the EU since that date. Non EU registered aircraft will need to be able to demonstrate that the aircraft has been in the ownership of a UK entity continuously since 31st December 1992.

Second hand aircraft previously on other

EU registrations, and acquired since 1st December 1993 should be deemed to be in free circulation. You will be required to produce the purchase invoice.

If you are purchasing an aircraft built in the EU e.g. Eurocopter, you will need to show HM Customs & Excise (C&E) the purchase order, acceptance of order, and the purchase invoice. They can then issue a certificate, which covers the EU acquisition law. If purchasing through a UK distributor e.g. McAlpines, you can request them to send these documents direct to C&E as they are unlikely to let you have a copy citing company confidentiality as the reason.

When transferring residence from outside the EU to the UK, and you bring your aircraft with you, you will need to complete an application form (available from C&E).

For aircraft imported after 1st December 1993 with no C88, you will need to collect all available evidence of importation, e.g. C79 VAT statement, copies of bank statements, invoices etc.

## On line flight plans

People have been searching for an ATC unit prepared to accept flight plans over the internet. You can now do this courtesy of the Dutch ATC service at <http://www.ais-netherlands.nl>. Indeed you can file, delay, change and cancel on line from any handy on line computer (but you do have to register first). And... for a veritable Aladdin's cave of GA information all on one web site, see [www.flyingineurope.be](http://www.flyingineurope.be) (Charles Strasser)

## Diary Date 1-Greece

We have had a good response for the Greek trip (17-26 June) but could probably squeeze in one or two more aircraft within the 12 or so aircraft parking spaces which is the maximum the islands can accept. Don't hesitate to email [thorpej@solutions-childcare.co.uk](mailto:thorpej@solutions-childcare.co.uk) if you are interested. (Jim Thorpe)



## Diary Date 2-Roskilde

Jeppe Sørensen has agreed to organise the trip to Roskilde from Friday 9<sup>th</sup> September to Monday 12<sup>th</sup> September 2005. **This is one week earlier than previously announced.**

It is intended that members fly to Roskilde during the Friday and return on the Monday to enable the trip to be made at a leisurely pace for those of us who only have 'slow singles'. Of course anyone is welcome to join us on the Saturday if they wish. (Ian Chandler)



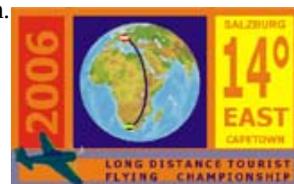
*Tivoli! Fly out to Roskilde, 9-12 Sep 2005*

## Diary Date 3-2006

Some members plan their holidays well in advance so we are making a firm commitment to do a tour of similar length and scope next year from **16 to 25 June 2006**. Do let Ian Chandler or I know what destinations you are interested in and whether you would be prepared to help with the organisation.

If you fancy something a little more adventurous, at least two PPL/IR Europe

members have made provisional bookings on an FAI Rally next year from Salzburg to Capetown and back. See [www.14east.org](http://www.14east.org) for details. This is a big commitment but it is possible to participate in only one leg or several legs of the outward or homeward journey. If anyone is interested in this but hasn't got an aircraft or has an aircraft but needs other pilots to make the trip possible drop me an email and I will see if its possible to co ordinate anything. (Jim Thorpe)



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## **Instrument Pilot**

(Print) ISSN 1747-0382  
(Online) ISSN 1747-0390

## Diesel Engines - The Way Forward?

Continued from Page 13

Endless draining of gallons of fuel would show the filter clean only to see the 'milk' reappear after a long ground run or short flight. I became less than happy about doing the test flights and was (correctly) hauled over the coals at Gloucester because my tight circuits, aimed at keeping me within gliding distance of the field at all times were in danger of infringing the helicopter circuit which is 250 feet below the fixed wing circuit and closer in to the airfield.

It would be good to report a definitive outcome to this problem but that is not the case. It does not appear to occur in the Diamond installation of the same engine (they have their own problems) and supposedly does not occur on all the Cessna 172 conversions. In the end we completely drained the tanks and started with fresh fuel. We are also keeping the aircraft in a relatively warm hangar. At the moment we are back to an acceptable few globules of water on each drain with no sign of the milky fluid but we await developments.



*This milky looking substance is caused from mixing water and diesel*

### **Economics**

The economics of after market diesel conversions are difficult to justify. If we take a typical 1979 Cessna 172 with a mid life engine its value might be £40,000. If it needs a recon engine, a Lycoming might set you back £15,000 installed. The TAE will cost you £35,000 although this includes a new prop which, if required for the Lycoming, might bring the bill up to £18,000. There would be some value in the engine that came out of the Cessna but the end point is that you have £75,000 invested in your 1979 diesel engine airframe. As explained previously the price can be



*Unfamiliar gauges in a Cessna 172 powered by the TAE Centurion diesel engine*

justified in terms of what is received. Nevertheless while the market value of such an aircraft has yet to be really established my guess is that you incur at the very least £20,000 depreciation when it leaves the workshop. If you take the engine life as 2000 hours (it may well be more than this but I suggest on low utilisation private aircraft this will be academic as there will be a calendar time based rebuild requirement) the fuel saving might be £20 per hour i.e. £40,000 over the life of the engine. However at 100 hours per annum this would take 20 years to realise. One might assume that the replacement cost of the TAE and a Lycoming will be broadly similar. Therefore if one has some high utilisation project for the aircraft, for example the 600 hours per annum that a busy flying school might achieve, then the numbers could add up. For the private owner the economics just don't work.

In my opinion the Cessna 172 conversion is also problematic because the engine does not add to the utility of the aircraft other than by reducing its running costs. The advantages may be more obvious with the 300 HP version of the engine, providing it is no heavier than the Lycoming and Continental installations it replaces. Here there may be real improvements in useful load, range, elimination of cooling problems and even speed increases.

### **SMA Engine**

The present difficult retrofit economics also applies to the SMA engine with a cost in the region of £60,000 for a Cessna 182, which might be worth about £80k. At the moment

there is a substantial anomaly both because of the weakness of the dollar and SMA pricing policy. This makes it far cheaper to have the conversion carried out in the States even allowing for the cost of shipping the aircraft back to the UK and reassembling it. This hardly seems a sustainable situation for an engine, which was made in Europe in the first place.

It seems to me that either engine will only show their full potential when installed as original equipment, particular in new designs optimised to take advantage of the diesels characteristics. At the moment the Diamond designs and particularly the DA42 Diamond twin are the most advanced with unbeatable performance figures, assuming that reality matches the manufacturer's claims. SMA also has a version of the old Partenavia twin now made by Vulcanair nearing approval. These were good aircraft let down by poor manufacturer support and by being somewhat underpowered; so replacing 200 HP Lycomings with 230 HP SMA engines may well offer significant advantages. The 300 HP V8 TAE Engines have just flown in the unusual German TT62 twin where they are mounted in the rear fuselage driving propellers on aft mounted pylons through a gear train and drive shafts. (Does this offer airship like potential for your engineering officer to go aft and service the engines while in flight?)

There is a lot more to be said about diesels and assuming the editor is not bored with the subject I will return to it when I have some experience behind the SMA engine, and have flown the Diamond twin.

