

Instrument Pilot

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Cloud tops

By Peter Holy



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Why do they matter? The perception of “instrument flight” among many VFR pilots is that the whole point of getting an instrument qualification is that one can fly in the clouds.

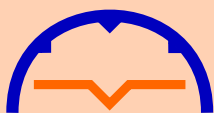
IFR Strategy

Nothing could be further from the truth. That's just what you spend weeks doing in your instrument training. In reality, prolonged flight in IMC is avoided at any reasonable cost. At best, there is no outside view which makes it boring - many prospective passengers are sufficiently scared of flying in light aircraft and one needs all the compensation one can get one's hands on. In all but the most benign cloud there is some turbulence and this can reach severe or even dangerous levels if one flies into something nasty which, in the absence of radar, is quite possible during a long flight in IMC. Then there is icing: if the outside temperature (corrected for the

aerodynamic temperature rise) is below 0°C then supercooled water droplets are likely to exist. In reality icing is very much a hit and miss affair with nothing happening a lot of the time, but one is virtually certain to pick up a lot of ice if one sits in such conditions for some hours, and it can happen very much faster than that in convective weather. Finally... it's cold in cloud! In sunlight, most light aeroplanes pick up a huge amount of solar heat which can avoid the need for any heating even in sub-zero temperatures - just as well since a lot of them have barely adequate heaters.

The whole “IFR strategy” therefore becomes one where you depart, climb as fast as possible through any cloud to reach VMC, stay in VMC for the entire enroute section, and then descend in one more or less continuous descent all the way down to landing.

If your aeroplane is fully de-iced (rubber boots, TKS, electrically heated propellers



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For reports on meetings, conferences and other
activities attended in the last 12 months by directors
and members of the executive on behalf of PPL/IR
Europe members, see www.pplir.org – Lobbying

The IMC

PPL/IR Europe attended an EASA / CAA press briefing on 22nd January which was extremely positive. EASA made public their support for European private instrument flying and the CAA strongly supported the IMC.

- ☞ The IMC in the UK would remain in place for 4 years, the maximum transitory period EEC law allows.
- ☞ During this period a new study would be launched to recommend a future structure for private IFR flying in Europe.
- ☞ EASA expressed their support for appropriate transition credit for UK IMC pilots moving to any new qualification.
- ☞ EASA explained that in the unlikely event of no satisfactory European outcome being found after four years there was still a process by which the UK could retain the IMC.

It is hard to see how EASA could be more accommodating. There remains opposition in Europe mainly from airline, professional pilot and National Aviation Authorities to any sub-ICAO instrument qualification. Indeed, there is some opposition to any private IFR flying whatsoever. PPL/IR Europe will actively participate in the process of persuading these opponents by rational argument and positive engagement that their fears are not justified.

Our policy remains as it always has been, to welcome anyone who has a serious interest in instrument flying. We have struggled for many years to make the IR more accessible and we are at last starting to make significant progress. We have welcomed IMC pilots and recognised that for some, the financial and time demands have made the transition to an IR impracticable. There now appears to be a real opportunity to work at developing some accessible modular instrument qualification with privileges that work across European airspace. It is in the interests of instrument pilots to have common rules and systems across Europe. UK airways are unlikely to remain class A airspace so change of some sort is inevitable. There is work to be done firstly to define ideas with the potential to work across Europe and secondly to persuade all stakeholders that whatever preferred system emerges is rational and desirable. PPL/IR Europe will redouble its efforts to remain the natural source of ideas and expertise in this area.

Jim Thorpe,
Chairman



Tempelhof Berlin fly-out

A social fly out with a range of aviation and tourist related events, group dinner and a group visit of the historic Tempelhof airfield

By Alan South



This weekend away was a real treat; a fly-in to a very special airport, socialising with fellow pilots in a wonderful city, and a privileged tour behind the scenes. 11 members in four aircraft flew in.

Tempelhof is undoubtedly one of the most important airports of the twentieth century, and somehow it symbolises three phases of our recent history. In the beginning it was built as a demonstration of Nazi might and was the largest building by surface area in the world. After the war, it was the focus of the Berlin Airlift, which remains the greatest relief effort in the history of aviation. Today, partly as a result of unfortunate timing, nearly all the building is empty and its future is in doubt.

Flying into somewhere like this is always going to be something special, and it was a pleasure to be vectored expertly on a smooth, clear evening with all three Berlin airports in view. The ILS takes you in low over the city finishing up famously between the tenement blocks on short final.

It's at this point that you become aware of the size of the building, which appears about the same size as the runway. That's because, at 1200m long, it is!

We spent the Saturday off in small groups doing different things around Berlin and met up for an aperitif at the Westin Grand. The social dinner was at the Lutter & Wegner restaurant facing the opera house in central Berlin, at which we learned about good traditional German cuisine.

On Sunday we were back at Tempelhof for the highlight of the trip. We met Dieter, who was facilities manager from 1966 and was to be our guide for an amazing three-hour tour behind the scenes.

We started in the imposing terminal hall and went through a private door to find a deserted and in most places unfinished building. Our tour went from the secret underground war bunkers and air-raid shelters went up through the vast warren of the terminal buildings and up onto the huge sweep of the cantilevered roof.

Some of the of the things we learned were:

- ☞ At three million square feet, it was the largest building in the world, and still is one of the largest.
- ☞ It was built as much as a stadium for showcasing Nazi air power as an airport. The vast cantilevered roof was designed as grandstanding for thousands of people, with 13 huge staircases to get up there. The roof and the staircases have never been used.
- ☞ At the time of the airlift, it was still just an omnidirectional grass field that soon became unusable with the volume of traffic. As there had been no expectation of a blockade by the Soviets, some of the necessary heavy equipment to build the hard runways was not available in the city and had to be dismantled and flown in. Despite this the first runway was built in ten weeks.

- ☞ Because of the narrow corridors, the go-around procedure during the airlift was to fly back to the starting point.
- ☞ The legend is that around Easter 1949 the operation was going so well that it was decided to try and break the record for the number of tons landed and was able to match the tonnage normally transported by land. The inadvertent effect was to convince the Soviets that the blockade would not be successful and as a result it was lifted.
- ☞ During the Cold War, a large radar facility was built, ostensibly for traffic inbound from the west. However, it had the benefit of going just as far east as it did west!
- ☞ After the fall of the wall, there was a massive rush for office and hotel space. However, Tempelhof was still being used by the USAF, though only partly occupied. Most of the demand for space was fulfilled by the time the USAF left and as a result the building sits almost totally empty. There are ideas what to do with it, but no firm plans.

Lord Foster refers to Tempelhof as 'the mother of all airports'. How right he is.

After the tour, we all flew safely on to our various end destinations.

Big thanks as always to Steve Dunnett, PPL/IR Europe Meetings Secretary for organising a great weekend away.



Self-flown GA IFR transport in Europe: a User's Guide

Part 2 of 4

By Vasa Babic



Vasa Babic continues with part two of a four-part series on self-flown GA IFR transport in Europe

The IMC experience: avionics systems

In the last edition of *Instrument Pilot*, I described my experience of flying 50 different IFR sectors across Europe. Here I continue with a brief overview of the avionics systems used and my experience of en-route air traffic control and conducting GA IFR flights at major European airports.

Storm avoidance

The aircraft is equipped with digital colour weather radar and a stormscope, both displayed on a Honeywell KMD540 multi-function display. They proved useful on a number of sectors, but only essential on two or three.

WX 500 stormscope

This is an excellent device, and I have found its “false negative” error rate to be close to zero – i.e. avoiding the strikes indicated on the display does avoid any dangerous weather, although you may fly through some pretty heavy rain and turbulence that does not generate electrical discharges the instrument can detect. It is subject to “false positive” errors, and at ranges of 40nm or below will display the odd flash where there is no weather hazard. At 80nm or above, the accuracy is erratic – repeated

and/or concentrated strikes are a very good indication of a storm, but I’ve had a number of occasions where either a scattering of strikes around the GPS route overlay at a range of 80-160nm did not prove to be anything but light cloud, or real storms popped-up at 40nm distance in what had previously been strike-free air.

Of course, this could be consistent with the lifecycle of storms forming and dissipating, but my impression is that above 40-80nm, the stormscope is of limited use in planning your route except when it shows very many strikes or none at all. If fuel and other contingencies permit, I would always get closer to anything other than a fairly solid band of strikes, to see how the picture develops at a nearer, but still safe, distance. At ranges of 40nm or closer, the stormscope is very good for tactical avoidance.

Weather radar

One can read weather radar articles about echo properties, masking, attenuation, tilt geometry etc. that make the technology seem rather arcane and difficult. No IFR pilot should be put off by this. I found that, after a little experience, the complexity can be reduced to two basic operating rules:

- ☞ Set the tilt to 5 degrees up,
- ☞ Don’t fly near any yellow or red echoes.

Like the stormscope, the weather radar has

a range of up to 160nm. However, I found the accuracy even more strongly subject to range. Within 40nm, the radar displays the plan position of heavy rain (in green) and intense rain associated with thunderstorms (in yellow and red) very accurately. Beyond 80nm, I found it pretty useless – you get some dots here and there, but nothing you can use for route planning. This experience is based on fairly isolated cells five to twenty nm across, so it may be that larger, intense weather systems do show up clearly at longer range (unless masked by nearer echoes).

Comparison of radar and stormscope

You really need to fly with these systems in visual conditions that let you see the weather and storms they are identifying, and then in IMC, to get a sense of the avoidance margins and tactics that will work safely. I found a handful of flights in the right “teach yourself” conditions hugely valuable.

Radar is better for precision avoidance, especially with storms in the vicinity of an airport, because the depiction is very clear in the horizontal plane and the intensity colour-coding is accurate (to the extent that I’ve found all-green areas acceptable to fly through, although best avoided with nervous passengers). However, I have once

or twice seen a nasty vertical development that had a strike depicted in its centre but no radar echo at all, so I think that using radar exclusively might lead to a very occasional unpleasant encounter that a stormscope would help avoid. However, a stormscope is less precise and has more false warnings, so your avoidance will be more conservative; it might also lead you through dramatic (but safe) heavy rain.

A stormscope is the less expensive and more practical installation, and either system will work well for most GA IFR needs. I have read many vigorous debates between pilots who prefer one system or the other and I have to conclude that there is real value in having both; in being able to correlate the two displays and in terms of redundancy.

TCAS and EGPWS

The aircraft is fitted with the Honeywell IHAS8000 traffic and terrain avoidance systems. These include audio warnings (e.g. “pull-up”, “traffic, traffic”) and the MFD reverts to the display mode of the alerting system from any other selected mode.

TCAS is a back-up to ATC radar separation, so it provides ‘interesting’ rather than critical traffic awareness during routine IFR. It is very useful during low-level VFR in busy parts of the south of England, even though only aircraft with active transponders are detected. It helps you monitor and see converging aircraft more easily than an ATC call of “traffic left to right X o’clock”, and is, in effect, a personal airborne SSR display. The system is expensive, so not realistic for most light aircraft, but if one’s budget can stretch to it, TCAS does not disappoint. I chose an “active” unit with the maximum 40nm range. The “active” part is useful because it interrogates traffic outside of ground SSR coverage, but I think the 40nm range is of little value over somewhat cheaper boxes with 10-20nm range.

Like TCAS, the purpose of EGPWS under IFR is to prevent the remote chance of things going very badly wrong, so there is no real experience to report from 50 ‘normal’ sectors. However, the record of controlled flight into terrain (CFIT) accidents is such that I think terrain alerting is essential for this kind of transport IFR. The current certified GA version of EGPWS, “TAWS-B”, has come down in price significantly in recent years, but is still relatively expensive. I think the non-certified terrain alerting system in the Garmin GNS430 (or MX20/GMX200) is very suitable for most light aircraft, and have also been impressed by a very professional, yoke-mounted Garmin

396 installation. I would not trust GPS topographic moving maps or various tablet PC and PDA gadgets as any kind of substitute.

En-route ATC across fifteen countries

My enroute ATC experience was uniformly positive. The system is impressively seamless and well co-ordinated. There are only a few points worth noting:

Routes

There is a view amongst UK PPL/IRs that “you never fly the route you file”. I think this must only apply to the busy airspace over central and southern England, because for the 40 sectors (80%) that were mainly outside the UK, I flew 20,000 route miles almost exactly as filed. The exceptions were direct-to clearances between filed route waypoints and the odd few minutes of radar vectoring for separation. In general, short cuts seem most likely if they are within a single FIR or ATC sector and in airways well away from the busy TMAs.

Communications

The phraseology across Europe is very standard. The UK has a slightly more formal and precise ATC style than most countries, which I think I prefer, although it does not make much practical difference. It’s worth noting that “FL Wun Hundred” is unique to the UK, it’s “FL Wun Zero Zero” elsewhere. Otherwise, you soon pick up the R/T nuances you didn’t experience during IR training by listening to the airline and bizjet crews. I didn’t find accented English was ever a barrier to understanding of ATC, nor was there very notable variation across different countries.

The five letter ICAO format for waypoint names is phonetic and distinct, but they are strange words that can be hard to comprehend over the radio. On a new route, it is worth studying all the waypoint names ahead of you, to avoid ATC having to spell out an unfamiliar one.

When changing frequencies on handover, I have learned to never fiddle with a prior frequency (e.g. to listen to ATIS) until I have successfully made contact with the next one.

En-route charts

I rarely glance at these in practice, but I would never be tempted to fly without published paper charts. A GPS nav-com or an IFR chart on a laptop are not quick tools for locating an unfamiliar waypoint name or an ATC frequency. I have not found that

enroute charts printed from JeppView are adequate; some items and legends are lost at different print scales in unpredictable ways.

GA IFR at major airports

Many of the 50 sectors were flown to main international airports, rather than the typical GA ones. This was sometimes my personal preference, but often it was necessary because the smaller alternative lacked some essential element of opening hours, IFR facilities, customs or ground services. In this section, I will try and detail the main differences I found operating in this environment, which may be unfamiliar to many PPL/IRs.

Pre-flight briefing

The Jepp section for a major airport can look daunting. Multiple runways, with a mix of CAT I and CAT II ILS and non-precision procedures, may result in a dozen different IAPs. Barcelona has 70 pages of SIDs. Le Bourget arrivals involve an initial arrival chart, a continuation chart and then vectors from the end of the continuation to the start of the IAP. All of this complexity can be overcome with about 30mins of extra reading the first time you do the pre-flight planning to a new destination of this kind.

Firstly, you need to skim all the pages to get an overall sense of the content. If there are a large number of SIDs and STARs, it’s useful to work out how they are segmented (e.g. RNAV and non-RNAV, Jet vs. Prop) and linked to the different runways. Secondly, you need to read the Airport Briefing pages and highlight the points relevant to you; especially on communications procedures and preferential runways. A lot of the material is about jet push-back, parking and noise abatement, but important points can hide in “jet-like” sections. You can then use your airways route, the 24hr TAF surface wind forecast and the preferred runway information to identify the most likely STAR and IAP, and mark them with post-it tabs. Be aware that, although your filed route will terminate at the start of a specific STAR, where there are several arrival procedures from the same general direction, ATC may choose to vector all traffic to a particular one, irrespective of filed routes. Finally, you study the “10-9” Airport chart and try and anticipate the taxiways to the GA apron; an obscure designator can be hard to find on these charts and I carry A4 versions for big airports I am unfamiliar with.

Large airports can seem infested with obscure signage and markings, and it is

worth revising the “ICAO recommended airport signs, runway and taxiway markings” pages near the end of the Jepp airport manual “Introduction section”. Taxiing amongst big jets is not stress-free, and you won’t need the added stress of worrying about something like “is yellow on black taxiway location, and black on yellow taxiway direction, or vice-versa?”. The same applies to the five colours used in surface lighting at night.

Descent and arrival

Jet descent profiles are steeper than piston ones, so I usually ask for an early cruise descent and use 65% power and 500-700 fpm as a way of gaining speed in the last 30mins of the flight and reducing block times a little. I have never had a problem with excessive ATC descent rate requirements, if I’ve sensibly anticipated the need for power reduction.

Approach and landing

If there is jet traffic behind, ATC may ask for 160 KIAS to 3 DME or the best speed you can manage. If there is a published minimum speed, you need to advise them if you can’t make it. The 421C’s gear and approach flap limits are 176KIAS, so this has not been an issue. Most piston aircraft have lower limits, and clearly ATC will not expect you to breach these or compromise safety. However, a major airport is not the place to be pedantic about 1.3x V_{so} and “gear down when intercepting the glide slope”. Piston aircraft may have 3km more runway than they need, and I think one should plan and practice a non-conventional, but safe, high-speed approach technique for this kind of airport. You also should plan your touchdown to minimise runway occupancy time; avoid landing and then taxiing 500m to the nearest exit.

If conditions permit, accepting a visual approach will help ATC with spacing and may allow you to short-cut the IAP if other aircraft are not in the sequence ahead. You may, at times, want to have the option of arriving or departing VFR. At some airports, particularly in France, this will require VFR airport charts; you can download these from the national AIS/AIP site or buy the relatively inexpensive Bottlang product from Jeppesen.

Taxiing

Pre-briefing the airport chart, having a large paper copy to hand and being familiar with signage, markings and lighting are needed to make taxiing stress-free. At some airports, there are multiple handlers and multiple GA

aprons; so when you first speak to ground control, it’s useful to know your handler’s stand designator, or where they intend parking you.

Operating at a large airport, I find myself aspiring to be as professional and competent as the airline crews around me, which I think this is a good thing up to a point. However, any kind of doubt, ambiguity or uncertainty during taxiing is a signal to stop safely and ask for help. Airports take surface movement safety and runway incursion very seriously, and a request for clarification, progressive taxi instructions or a follow-me van will invariably be met with a friendly and positive response. Professional crews regularly do this; not asking for assistance when unsure is the amateurish way.



A number of retrofit MFDs and OEM glass panels offer GPS position-referenced airport charts. I use the Garmin MX20 with JeppView and find the taxiway charting very useful at a large and unfamiliar airport.

Slots


The departure time filed in a flight plan is the estimated off-block time (EOBT) at which you intend to start taxiing. Busy airports use an airport slot system to manage the number of movements at peak times. Off-peak, slots may be unnecessary, or very freely available. This slot is simply a ‘local’ airport permit to file a flight plan around a particular departure time. GA handlers will organise these, and advise you of any particular restriction or lack of capacity. Most airport slots seem fairly flexible.

The airways slot (sometimes called the ATC slot) is a calculated take-off time (CTOT), issued by Eurocontrol’s Central Flow Management Unit (CFMU), in accordance with Air Traffic Flow Management (AFTM) policy, to impose a precise delay on a flight plan filed with CFMU’s Integrated Initial Flight Plan Processing System (IFPS) when ATC capacity limits are predicted at any point along the filed route.

In practice, the slot system works as follows

-  **Case 1:** At most airports and for most GA routes, we just file a flight plan and it gets accepted by IFPS. We usually do this one hour or more in advance, but often 15-30mins before EOBT is ok. We call ATC for start-up, get our clearance and depart.
-  **Case 2:** At some airports, we do exactly as in Case 1, but the EOBT has to be filed for a time we have been allocated as an airport slot. This is usually arranged

well in advance, but the system is often flexible and ground handling services may be able to get a slot, or amend an existing one, at short notice.

-  **Case 3:** On some routes we do exactly as in Case 1 or Case 2, but, around one hour before EOBT, we can get a message advising us that our departure is subject to an airways slot time, which is always precisely defined as a CTOT. This message will come from whoever filed the flight plan for us, or from ATC when we call for clearance delivery. When subject to an airways slot, the tower cannot clear us to take-off more than five minutes before the CTOT or ten minutes after it. We have to work back from this time, and plan start-up and taxiing accordingly. Some busy airports will specify the taxi times that must be assumed. The Homebriefing service (www.homebriefing.com) is an excellent way to file flight plans online, it has the advantage of sending airways slot messages and updates in real-time by email and SMS.

I apologise for not finding a simpler and more acronym-free way of explaining the slot system. In practice, airport and airways slots are usually a non-issue for even a fairly ambitious GA flight schedule, and they add little or nothing to the pre-flight planning workload.

Clearances and start-up

At busier airports, you will often speak to a sequence of specialised ground frequencies (e.g. Clearance Delivery and Start-Up) before you start taxiing; the Jepp airport briefing plates explain these procedures. It’s worth noting your stand number before getting in the aircraft, in case you can’t see it from the cockpit.

Taxiing and take-off

Once you call for taxi, you might be cleared directly to the hold and then for immediate take-off, with other aircraft waiting behind you. ATC are used to jets that don’t stop to do run-ups, and have two crew to set up nav instruments and brief procedures. It’s worth trying to get as much ready as possible before taxiing; you can ask to reposition on the apron for power and pre-take-off checks, and, if you haven’t received your departure clearance, listen to the Ground frequency to identify and prepare the likely SID. Check the runway length available from any intersection takeoffs being offered. Note that a numbered holding point may be one of a set of line-abreast stands at a single large holding area.

To train in Spain is really quite a pain

By Jim Thorpe



Those of a certain age may remember a TV program called *Dragnet* which started with a deep American voice intoning ‘These stories really happened. Only the names have been changed to protect the innocent’. It was probably all fiction but you couldn’t be sure. Read on.

To be an instructor

It seemed like a good idea to become an instructor. Not entirely unexpectedly several UK schools offering the course treated my attempts to give them £6,000 and six weeks of my life with indifference.

I came across a school in Southern Europe which offered to do the job in three weeks. It seemed better to be poorly treated and disappointed for three weeks than for six so encouraged by their reasonable prices and recommendations from past students, an expectation of better than UK weather and even reasonable prompt answers to most of my emails, I pitched up at airport ‘X’. Another UK student arrived at the same moment. A large sign indicated the target establishment so we were off to a good start. Sadly the door was locked and we wandered around the dereliction and desolation which

seems not uncommon on airports. A call to the contact number encouraged us to think that the school existed but was somewhere else. A short walk brought us to another encouraging sign and a large building. This proved to be a place of many classrooms all eerily empty. A further phone call produced a pleasant young lady who led us to a third location some hundreds of meters away. Here we discovered folders containing much information including the details of how to find the school and the strict admonition to bring both a yellow jacket and a headset which of course I had not done. A couple

P 8 ►

◀ P 6

☁ Departure procedures (DPs)

Most departures are straightforward, and often, on first contact with approach control, you will be cleared direct to the terminating point of the procedure and to your cruise level. However, single-pilot workload is high during the first few minutes of even a simple ‘turn to X, climb to Y’ IFR departure. I find a more complicated DP as difficult as any phase of IFR flight (see example in **Figure four**). It’s worth planning these in detail, since we don’t encounter the most complex ones often in the relatively terrain-free UK. Most of us fly IFR with GPS as the primary

nav instrument and radio aids as a back-up. Unless you are confident you’ve mastered how the GPS will handle guidance and waypoint sequencing in all the obscure DP path-terminator combinations, you should forget the GPS, it will only confuse. Be aware that Jeppesen do not help, by sometimes using different waypoint designators in the GPS database from the airway manual plates.

There is a lot of terrain about in Europe, and, for piston aircraft, non-trivial DP gradients are also more common. These might require some adjustment to the usual cruise climb profile on a hot day, and

planning engine-out scenarios in a twin.

☁ Summary

Large airports can seem daunting and inaccessible. I hope this section is encouraging, despite listing a lot of differences from the typical GA IFR environment. A well-trained and current PPL/IR has done 99% of the work needed to operate safely at any large airport; it only needs some extra planning and a few operating practices that help you fit in with high-density commercial traffic.

Continued in the next issue...



LOJAS 1B	31	Climb on runway heading to GMM 3 DME, turn RIGHT, 133° heading, intercept 106° bearing from GM, when passing MGA R-155 turn LEFT to MGA, MGA R-026 to LOJAS.
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Figure 4, Complex Departure Procedures

of hours of confusion and wandering about eventually produced a young and friendly instructor who spoke reasonable English and who took us for a coffee. He had no idea what our schedule might be but indicated that there was a faint chance of doing the pre-course assessment flight that afternoon.

Who's in charge?

I won't bore you with a blow by blow account but it became apparent that while on a one to one basis most people were pleasant, no one took ownership of us as individual students and no one had any overall responsibility for seeing that we completed the course. This was not a small school and students already in residence explained that it was possible to get things done but only by dint of personal intervention, not always easy considering language difficulties. There was a certain tendency for the last or loudest man through the office door to get priority.

The old joke about pilots being like jet engines except that nothing stops them whining was true of us and in the café I soon came to know students of many nationalities on courses ranging from Airbus type conversions to CPL/IR. There was one other UK guy on the instructor course so that seemed an ideal ratio with the expectation of doing some back seat learning and perhaps the allowable few hours of mutual instruction. The school could not however loan me a headset and owning about six back in the UK I was unwilling to buy another. Anyway it transpired that the aircraft had no rear headset jacks and no extension cables were on offer so I borrowed a headset from a student for use in the right hand seat till my own arrived from the UK.

Will it kill me?

The aircraft were more than hard used, had minimal equipment and managed to just remain on the right side of the point as which I would have refused to fly in them. Sadly I have to admit that my criteria for acceptability declined as time passed reaching the level of 'I don't think it will kill me so it's OK'. I accepted flying an aircraft with a tyre carcass clearly visible for several days and another, with a tail pipe which had clearly separated internally in the exhaust, was never repaired. In my defence I can only offer that I was now pretty committed to completing the course and have a fair amount of aircraft engineering experience on which to make technical judgments.

The later part of the course took place on a retractable single with a vernier/plunger throttle. Typically with this arrangement only very fine adjustments are made with

the vernier. Normal practice is to press the release button and use the plunger. However this aircraft had faults which had been present so long the standard aircraft handling practice took them into account. One quirk was that the throttle crept open all the time. No niggardly few % extra MP over tens of minutes, but a good inch of MP every 15 or 20 seconds! The two available techniques were to keep one hand on the throttle or adjust the MP every half minute or so. The other quirk was that the plunger was very sticky and all adjustments other than full open or full closed were made with the vernier. Not being designed for this purpose meant that throttle adjustments involved three or more complete rotations rather like the helmsman in ships of the Nelson era spinning the wheel to alter course. All these awkward control quirks were made more sporting by taking place completely out of sight under the huge bar which joins the yokes in Beech aircraft of a certain age.

"You have control"

While it may not have much to do with learning to instruct I felt that I had become pretty adept at dealing with all these control quirks but I was about to receive one of those lessons flying reserves for the complacent. A bizarre manoeuvre favoured in this school and supposedly an exam feature was the spiral to land after engine failure. This is a sort of bastard version of the RAF high key low key but with a quirk. You overfly the threshold at exactly 1,500ft start a 30 degree spiral keeping the threshold in sight and at 800 ft, absolutely irrespective of location, drop the gear. It seemed prudent to me, assuming one really must do a PFL in this manner, to wait till the runway mid point was made before dropping the gear but well versed in the 'if they want your privates painted blue just ask for the colour chart' approach to aviation training I was doing as instructed.

Thus I found myself at about 200ft, engine idling, gear down obviously not going to make the runway and on pressing the release button discovered the throttle jammed solid. You must make your own judgment as to the degree of post rationalisation but my belief is I felt no fear. It was obvious to me that I was going to walk away from the crash and equally obvious the aircraft would not. By the time of this incident I was thoroughly fed up with the prevailing standards and particularly fed up with this unsympathetic opinionated, aggressive and very inexperienced instructor who had placed us in this position. So in the spirit of Woody Alan's parents who, when he

was kidnapped for ransom leapt into action by renting out his room I uttered the phrase that has covered nearly as many backsides as Marks and Spencer..... *'You have control'*.

It emerged subsequently that this was not the first time the throttle had jammed. Apparently if you closed the throttle by the enthusiastic spinning action it could lock the release button at the end of its travel. Inexperienced the instructor may have been but, having had another near death experience the day before, his hand moved like lightening and he managed to unjam and open the throttle. I have to admit that I was not entirely sympathetic when he spent the remainder of the flight alternatively sucking his fingers and dabbing blood off his hand.

I should explain that another trainee with the same instructor, same airfield, same aircraft the previous day, had the engine fail just after landing on a touch and go fortunately just at the point where they were able to brake and coast off the runway. On this occasion it appeared that the electric pump switch, located near the throttle and prop controls well out of sight under the massive control bar, had been inadvertently knocked on. I would guess this had not been one of the instructor's best weeks.

Firearm offences

While I may have been less than impressed with the goings on I was not under huge financial or time pressures. This was not the case for my fellow students. A chatty character had appeared as something of a Jeckel and Hyde, one day appearing tidy and clean shaven, the next appearing rather like Homer Simpson on a bad day. It emerged that to save money he was spending alternate nights sleeping at the airport in his car. This likeable but perhaps eccentric chap was trying to revalidate his expired PPL, build the necessary minimum hours and then get a twin rating on the basis that a friend was buying a Seneca 1 and would let him fly it for the cost of fuel. As though it was the most natural thing in the world he announced over coffee that he had to train in Europe as they would not let him into the USA because of his firearm offences. It appeared that 'as you do' he had bought his son a taser gun, perfectly legal on the continent. When the police entered his home following some disturbance involving a neighbour they spotted the weapon on a shelf and 'as you do' if you are a policeman, charged his son with possession of a deadly weapon and himself with procuring and supplying said deadly weapon.

Giving up

Another acquaintance seemed pretty directed. Although a little old for that elusive airline job, he already had his ATPL exams and his CPL but needed to do his IR. He had used the school before but had taken a few of days off from his job to visit, do some hours to keep current and sort out details for doing the IR. He plainly did not fit easily into the flight schedule and had spent a couple of days wandering about. He even sat in with our instructor ground school classes to pass the time waiting to be properly told when he could fly and when he might train. Then one day after lunch there was a neat pile of course books outside the school office. We each received a text which read:- 'finally sick of being treated like an inconvenience, realised aviation just doesn't want me, giving it all up and going home'.

A third trainee, young, intelligent and focussed was building hours prior to his twin rating and IR. He already had his ATPL ground exams and had worked long hours in catering jobs to build up his funds and so was under acute financial pressure to finish on time and hence on budget. His story might fill another article but you may get a flavour of things in that he was the only one for some time who passed the IR, albeit the test took place in VMC without using screen or goggles and his HSI, ADF and DI all failed in flight so he navigated largely by compass.

Flight planning distractions

An instructor course is supposed to include 120 hours of ground school and naturally thorough pre and post flight briefings. Although the school had good classroom facilities they were located some way from the aircraft. The briefings, sketchy at best took place in a cramped operations hut which for security reasons had a locked door which was the only means of access to the apron. The school also offered courses for prospective cabin attendants involving jumping down an escape slide and using fire extinguishers. While not wishing to be prejudiced it is possible that in Southern Europe, if not worldwide, appearance plays a key role in cabin crew selection. I would be lying if I claimed, even with my mature years, that having up to 20 slim dark-haired young women squeeze past me was not a hindrance to proper flight planning. The instructor supposed to be delivering vital pearls of wisdom was also Southern European and in his early twenties. He was not disinterested in the female form and often spoke only limited English. It is perhaps hardly surprising that this was not a

wholly satisfactory learning experience.

As regards pre flight preparation I thought it wise to run the numbers for the Beech myself. Some models are relatively easy to load dangerously so I was not surprised to find that with three people and full fuel we were out of limits but I was surprised at the magnitude of the problem. To cut a long story short it appeared that the calculation was based on a weighing report years (possibly decades) old which was simply wrong, possibly because it had used an incorrect datum. Local practice was to use sample data from the flight manual producing a change in the C of G of a full six inches. Having some knowledge of the type I was able to convince myself that this wasn't actually dangerous but I am not proud of the rationalisation.

A C152 flew past...upside down at about 2ft AGL

In reality we had received very little formal ground school and in all honesty I doubt that the younger instructors had accumulated that much wisdom to pass on. 'Talk all the time, explain everything, students know nothing' more or less paraphrases the whole course. We were expecting to have to deliver one or two pre-prepared 45 minute briefings to the examiner. At the appointed time or actually, being Southern Europe, without warning after seeing me by chance in the road, the instructor said the examiner has some free time so the exam was on now! It was explained that he did not speak much English (implying he understood) but the local instructor would sit in and translate as necessary. The examiner seemed friendly and relaxed. He chatted to the instructor in Spanish. He avoided falling asleep during my riveting exposition on how to fly the circuit and it appeared I passed. Later I discovered that in fact the examiner neither spoke nor understood English.

C of A

With the flight test approaching and being a suspicious sort I eventually got hold of the aircraft documents and discovered that the aircraft's C of A was due to expire in a few days. This was a cause for panic as no aircraft meant no test. However it emerged that the aircraft were on a continuous maintenance program hence no annual as such so the C of A renewal was a paperwork formality. Great. One problem put out of mind.

Now I was ready for test but the weather did not cooperate. It was deemed too windy. I, with my vast experience, thought they were being timid but they were right. The evidence was a Caribou parked nearby. A Caribou is a military transport, with two engines, like a Hercules but about two thirds the size. This one was rocking, not side to side but fore and aft till it stabilized itself by sitting on its tail. A few moments later a C152 flew past. So what you might say. Well this was upside down at about 2ft AGL! Both these aircraft had been previously abandoned but, elsewhere on the airfield, an event I would have dearly loved to witness took place. A single took off, flipped over and landed on the nose of a Seneca. I did see the aftermath. If you can imagine a Seneca-like Concord you will have the picture. Its nose did not break off but was actually touching the floor. Definitely not a day for a flight test then!

Flight test

Eventually, days later and several hours after the appointed time, the flight test happened. The delay was partly my fault as I refused to fly since there was no fuel log and the fuel truck was unavailable until I insisted the instructor sign my flight log taking responsibility for the fuel state at which point the fuel truck magically appeared. I taxied out maintaining the centre line, watching the wing tips clearance, keeping brake use to a minimum explaining everything,.... lots of exchanges in Spanish and then the instructor went on the radio in English and cancelled the flight. How had I managed to fail in a pre-flight and three minutes of taxiing? It emerged that the examiner, sat in the back seat with little to do, had looked at the aircraft documents, which I had foolishly failed to recheck, and the C of A was out of date. A further few hours delay saw me taxiing out again, the C of A having magically appeared. I won't dwell on the test. I didn't actually hit anything or get hopelessly lost so I passed. My colleague tested and passed the next day although his first effort was foiled for half a day by a blocked runway as another school's aircraft had screeched home with its gear up.

During the stay I shared a flat with a local airline pilot who was converting to another type. Over a glass of wine, while recounting the inconsistencies on his own course, he summarized his view quite succinctly 'If you want good training stay in the UK and if you want to be safe never fly *****' (airline name obscured to protect the guilty!) As the popular song might have it 'To train in Spain is really quite a pain.'



Challenging Long Distance Flights

By Jim Thorpe



Cessna Grand Caravan. Photo: Everts Air Alaska

A small group of members have been discussing the possibility of gaining access to an aircraft suitable for a round the world trips. The project is intended to accommodate different approaches. Some were attracted to a single round the world trip over several months. Others envisaged a series of linked trips with the aircraft being collected en route using commercial flights. Some trips might be a group effort others by a single pilot taking their own family and friends. After a fixed period (to be agreed at the outset) during which everyone's ambitions could be realised the aircraft would be sold. Of course these long trips are possible in almost any aircraft but our concept was to de-stress the process as much as possible. This really came down to three things reliability, comfort and range.

Cessna Caravan

If at all possible it's best to avoid AVGAS. Availability is patchy in some parts of the world although this can be overcome with routing and planning. One strong possibility is the Cessna Caravan. It is not the fastest but is very reliable and rugged. Having a single engine is a plus as not all potential participants have twin ratings. Three of us arranged to do the type rating. In one of the anomalies so rife in the aviation world to fly a Caravan on the G register you need a type rating but the insurers will give you cover almost irrespective of pilot experience.

On the N register you can fly without a type rating but the insurers will insist that you go for an intensive course at Flight Safety. They may also specify significant accompanied flight hours and recurrent annual training. Actually it's not a type rating it's a class rating. It's a slightly strange system so a Cessna SET Single Engine Turbine class rating gives you the right to fly all single engine Cessna turbines of which as it happens there is only one or two if you count the Silver Eagle conversion of the P210 of which more later.

The Caravan really is like flying a Cessna 182 except is big and at first starting a turbine is scary since you can do really serious (£100,000 serious) damage in the first 20 seconds. The type rating test was sensible and pragmatic. For example 'this aircraft is designed for short strips; choose a short strip, take me there and show me a real short field landing and take off'. I learnt that if the grass is dry and you don't keep moving the exhaust is hot enough to set fire to the grass. I also learnt, this time not by experience, that if you engage reverse thrust and the ground slopes down you can sit the aircraft on its tail. This aircraft is a real contender for the long distance touring ideal. In the luxury cabin versions it has all the comforts that non-pilot partners appreciate including a flushing loo, a microwave and unlimited baggage capacity.

The bad news is of course a £1.1m

purchase price new, few available second hand and the impossibility of chartering, at least in a luxury configuration.

Silver Eagle

The next phase of investigation was another Cessna product the Silver Eagle. This takes a pressurized Cessna the P210, normally powered by a 300 HP Continental, completely rebuilds the airframe and installs a new Allison 450 HP turbo prop. Normally turboprop conversions of small airframes don't work well because MAUW limitations prevent an adequate fuel load. This is exacerbated if the conversion involves a big PT6 engine because the fuel consumption is high. The Silver Eagle is a great compromise since it burns only 24 USG per hour (as opposed to 40 for a bigger turboprop) and can carry enough fuel for 6 hours.

Courtesy of one of our Swiss members we got the chance to try one. They really are impressive. One anomaly of this conversion is the loss of the yellow arc so the top of the green at about 160 knots becomes the new red line. This is no big deal at FL180 where the aircraft is at its best but you need to throttle back significantly if cruising at the lower levels. A turbine, particularly with a pressurized cabin is really quiet and the reduced vibration really makes a difference. Almost all turbines come air-conditioned since the pressurization air, even with its own intercooler, is almost always warm.

Cessna Silver Eagle. Photo: O&N Aircraft Modifications, Inc



All in all we thought this to be a fantastic personal aircraft and excellent value but rather cramped for long distance travel particularly for large pilots. Entry through the single door is slightly awkward and all in all we felt it lacked partner appeal. This we believe is an important consideration if long periods away from home are envisaged and divorce is to be avoided.

At least in theory the big Thielert diesel engine conversions are interesting prospects. If one takes a pressurized airframe like the Cessna 414 in re-engined form it should have a range of over 2,000 NM which makes trans-pacific flying without ferry tanks a possibility. Of course there are the negatives of spending a lot of money on a 30 year-old airframe and untried engines. We considered buying an aircraft and operating it for a year or so with its original 100 LL engines to allow time for someone else to prove the reliability of the big diesels and this remains a possibility. However the complete lack of response of Thielert to enquiries is not encouraging.

Extra 500

Finally we looked at the Extra 500. This is a little known six-seat pressurized airframe with the same Allison engine as the Silver Eagle. It is manufactured by the Extra Company in Germany who are better known for their aerobatic aircraft.

Some 20 airframes have been flying for several years with the 350 HP water cooled continental engine. This is a rather unique aircraft in that it has a long range (1,500 NM), is reasonably suited to short strips and is a modern, relatively spacious and comfortable aircraft while remaining just about small enough to be considered a personal aircraft.

It has the same modest fuel consumption as the Silver Eagle, hence low level trips are viable. Its performance is somewhat worse but this is the penalty to be paid for the heavier, larger and more comfortable airframe. On the negative side one would be an early adopter, albeit the airframe is

well tried and the engine is very common indeed. Depending on its market success and perceptions of its value relative to the various VLJs the potential for very serious depreciation is hard to estimate.

That's the point we have reached. There are a few members who are attracted to the idea of doing a round-the-world trip or a number of long trips, either together or sequentially, in some degree of comfort. The chosen aircraft may end up being purchased for the purpose and then sold on or it might suit some or all of the participants as an ongoing shared aircraft for general use

Funds are available so equal capital participation is not critical but however this is organised it is not going to be a cheap operation.

Interest?

Of the options considered so far, the purchase of a Cessna caravan, using it for a fixed period and then selling on seems practical (at least in aviation terms) as does the purchase of a new Extra 500 with a view to retaining a group ownership in some form. If you think any of these ideas is of interest drop me an email with a contact number and we can have a chat. We would also be interested if anyone owns or knows of a suitable aircraft for sale or lease.

Chairman@pplir.org



Extra 500. Photo: Extra Aircraft

Pilots' Talk

Compiled By David Bruford

Dates for your diary

19th April 2008 – AGM

PPL/IR Europe's Annual General Meeting will be held at Liverpool John Lennon Airport on the 19th April. The day will offer the usual opportunities to listen to a couple of interesting speakers and make or renew friendships with other members over an excellent buffet lunch. All members are very welcome. More details will be published nearer the date, contact Steve Dunnett meetings@pplir.org if you need any more information.

26th to 27th April 2008 – Aviation World 2008

Held at the world famous venue of the Shuttleworth Collection, Old Warden Aerodrome, near Biggleswade, Bedfordshire the show covers all aspects of aviation and includes access to the Shuttleworth Collection of historic aeroplanes. Adult admission in advance £12, on the day £15, accompanied children up to 16 years free. Telephone: +44 1780 755131 for tickets and www.shuttleworth.org for more information.

13th to 15th June 2008 – Aero Expo Wycombe

Andrew Lambert, andrew.lambert@ems-uk.com as well as organising the main seminar programme is our local organiser for PPL/IR Europe's information and recruiting stand.

27th to 29th June 2008 – Jersey International Air Rally

Changes to this annual event mean that attendees have the choice of a "full weekend package" or the entry fee and Saturday night prize giving dinner "basic rally package".

For further information contact either the Jersey Aero Club on info@jerseyaeroclub.com, Telephone +44 1534 743990, the rally manager, evelinehawkin@hotmail.co.uk or see www.jerseyaeroclub.com/rally.php.

28th June to 6th July 2008 – PPL/IR Europe Scandinavian tour

Anthony Bowles gajb@corsock.com is organising this tour (see website). Route Bergen, Tromsø, Kirkenes, Helsinki, Stockholm, now omitting St Petersburg. 14/15 aircraft have expressed interest.

28th June to 2nd July 2008 – International Malta Air Rally

The annual International Air Rally of Malta will be held for its 39th year in June/July 2008 and offers the opportunity for some friendly flying rivalry, good laughs and some excellent trophies in the friendly and beautiful island of Malta. More details on www.geocities.com/maltarally/main.htm or email to George Kissaun at kissaung@mail.glabal.net.mt.

Amy Johnson Scholarship

The closing date for applications for this £2,000 scholarship is 29th February 2008. It assists a woman pilot towards a CPL/ATPL or other advanced rating. Enquiries and applications to Mrs M. E. Tucker, 12 Church Lane, Merton Park, London SW19 3PD.

Royal Aero Club Trust bursaries for 2008

The Royal Aero Club Trust has opened its bursary scheme for young people for the 2008 season. Each bursary, of up to £500 pounds, is available to anyone between 16 and 21 years of age wishing to progress their interest in either air sports or aviation. The closing date for applications is 31st March 2008.

The Royal Aero Club Trust has been running the programme for eight years and a wide range of bursaries has been awarded. Activities available in the programme include gliding, ballooning, paragliding, hang gliding, parachuting, flying microlights, motor gliders, fixed wing or light aeroplanes and helicopters, building

and flying model aircraft. Bursaries are also available for PC or Flight Sim pilots wishing to have their first experience of an air sport.

Applicants must be UK citizens, resident in the UK, and training and flying can only be conducted at clubs, associations or training establishments in the UK. Applications, which must arrive at the Trust by 31st March 2008, are to be submitted by post through a sponsoring organisation, club or association.

Full details, rules and an application form are available on the Royal Aero Club Trust web site www.royalaeroclubtrust.org.

192 airfields now accept safety diversions



Blackpool International airport has just joined Charles Strasser's campaign on behalf of AOPA, to get all airfields to accept the CAA CAP 667 9.2(c) recommendation and not to charge GA aircraft making an emergency or precautionary diversion landing there. The list is still growing.

The full recommendation states: "There were a number of fatal accidents where a timely diversion or precautionary landing could have avoided an accident. In the UK there is a 'culture' of pressing on and hoping for the best rather accepting the inconvenience and cost of a diversion. This 'culture' needs to be changed, firstly by educating pilots and secondly by persuading Aerodrome owners that there should be no charge for emergency landings or diversions. It is recommended that all Aerodrome owners be persuaded to adopt a policy that there should be no charges for emergency landings or diversions by general aviation aircraft."

As of the 29th October 2007, no less than 192 airfields have agreed this potentially life saving measure. More at www.aopa.co.uk.

PPL/IR Europe Membership

PPL/IR Europe Memberships expired at the end of December 07. Your Membership/Aircrew Card expires at the end of January 08. This allows us a month to process all of the renewals and issue new Membership/Aircrew Cards. Chasing renewals takes a huge amount of time and is carried out by Sali, our Membership Administrator and our only paid helper. To keep the costs down, it would help enormously, if you could please renew your membership as soon as possible.

You can renew your membership via the website (www.pplir.org) or, if you would prefer to pay by cheque, please send it to: PPL/IR Europe, The Business Centre, Llangarron, Ross-on-Wye, Herefordshire HR9 6PG. Please be sure to include your name, address, contact telephone number and, if you know it, your membership number.

Alternately, if you decide NOT to renew your membership, it would be most helpful if you could send a quick email to let us know (memsec@pplir.org) so that we don't spend precious resources needlessly chasing you. It would also help if you told us why, so that we can monitor our performance.

Last year we appealed for voluntary contributions, to help the work of PPL/IR Europe. Our Chairman, Jim Thorpe, has asked me to thank you for your generosity. The money given was put to good use and the voice of PPL/IR Europe is now reaching many of the relevant decision makers.

Our very specialist perspective is just not taken into account unless we make our presence felt. We continue to hammer away at getting the IR simplified and although the outcome is likely to fall short of the ideal, significant progress is likely. GPS approaches are gradually working towards becoming a reality and we have been active at every stage of the struggle, now about to enter its fifth year.

Following flight trials, we appear to have persuaded the CAA that GA aircraft can navigate to PRNAV standards and thus averted a potential ban on GA in the London TMA. Next year the priority is a drive for new members and efforts to encourage more pilots to get an IR, be it EASA or FAA. In addressing the various issues, we sometimes tend to talk up the difficulties of getting the rating, so please try to do your bit and encourage anyone you know, to think about getting an IR.

If you feel able to make a voluntary contribution this year, it would be very much appreciated and there is a space on the Renewal Form for this purpose. If you

decide to pay by cheque and would like to include a donation, please include it in your renewal cheque. You don't need to send a separate one.

Membership for 2008 is £60. This includes our first membership fee increase for several years, but still represents excellent value for money. As Jim mentioned in last year's renewal letter "Considering that an hours flying time will easily cost in excess of £200, you only need one useful routing tip from the forum, or a piece of advice on maintenance or technical issues, to cover your subscription cost many times over."

We do hope that you decide to renew your membership.

For those of you who have already renewed, and for the donations we have received – a big thank you. If you have any questions, or queries, please do not hesitate to contact Sali on memsec@pplir.org, or myself at andrew.lambert@ems-uk.com.
Andrew Lambert, Membership Secretary

Gassing about the environment

The European Commission announced that it will press on with the process of including aviation into emissions trading after the 36th Assembly of the International Civil Aviation Organization ended without clear agreement on a way forward to reduce greenhouse gas emissions from international aviation.

The European Parliament environmental committee backed EC proposals to bring aviation into its emissions trading scheme, but proposed amendments to see lower carbon limits imposed and the scheme introduced to cover all arriving and departing EU flights two years earlier than planned.

The European Region Airline Association reacted to these amendments claiming that they will impose significantly higher costs on air transport. A report by Intertanko, which represents the majority of the world's tanker operators, says maritime transport emissions have risen sharply in the past six years and that Global emissions of carbon dioxide from shipping are twice the level of aviation. However, it was argued that the much greater tonnage carried by each ship, compared with aircraft, means that shipping is still a greener form of transporting freight.

The European Commission released the results of the first EU-wide call for research proposals in aeronautics and air transport under the EU Seventh Framework Programme for Research (FP7). The 36 innovative projects selected in that first call are aimed at greener, safer, more secure air transport and improved cost efficiency in aeronautics.

TAG leases Farnborough

TAG Aviation signed the head lease in 2003 and has now acquired the freehold for Farnborough Airport (EGLF), home of the Farnborough Air Show from the UK's Ministry of Defence. Fans of the Farnborough Air Show need not expect a change of venue; TAG says it intends to keep the airport as the show's long-term home. TAG says it will invest in the airport to transform it into a full-service business aviation centre under a plan to be made public in 2008. Also in 2008, TAG will begin to operate European air-taxi service Blink's 30 Cessna Mustang very light jets as they are delivered. In the USA, TAG recently agreed to pay \$10 million to the FAA as part of a final resolution for its role in the operations of AMI Jet Charter.



Eurocontrol statistics and forecasts

European traffic grew 4.7% in September year-on-year. Low-cost carriers and business aviation continue to grow strongly and now make up respectively 20% and 8% of total flights. Eurocontrol forecasts that the number of flights in Europe will grow by around 5.4% in 2007 and 4% on average per year over the next 15 years.

Student call sign prefix

A recent Air Information Circular requires solo students to prefix their first call to Air Traffic with "Student" before their call sign. Air Traffic is asked to make appropriate allowances.

First Angel Flight mission flown in Eclipse 500 VLJ



Van Nuys, CA – 20th October 2007. The mission, arranged by Angel Flight West, was to fly a patient from El Monte, CA back to her home near Chico, CA, where she is recovering from treatment of her illness. Flown in a newly delivered Eclipse 500 jet,

the flight was completed in an hour and twenty minutes, a fraction of the seven hour drive that the patient would have had to endure had the Angel Flight West pilots not been able to help.

The mission was piloted by Eclipse 500 owner Ron Lebel and Ben Marcus, co-founder of jetAVIVA the company employed to manage Lebel's jet.

"To fly an Angel Flight mission is a great way to help people while having fun and maintaining our proficiency. Ben encouraged me to join Angel Flight West; Ben has been an Angel Flight member and volunteer for 13 years. I look forward to flying many more in the future," Lebel said.

Angel Flight West is a non-profit organization that arranges free air transportation in response to health care and other compelling human needs. Angel Flight West links volunteer private pilots with people in need whose non-emergency health care problems require travel to and from medical facilities throughout the thirteen western states. Angel flight West pilots donate the cost of all flights. For more information about Angel Flight in Europe, see www.angelflight-europe.org.

Resurfaced P-38 may be world's oldest



Investigators and historians have confirmed that an aircraft wreck that emerged from the sands of a Welsh beach over the summer is a P-38 Lightning, not an unmanned drone as first reports indicated. Ric Gillespie, executive director of The International Group for Historic Aircraft Recovery visited the wreck last month and was able to positively identify it from a serial number. He said it may be the oldest P-38 in existence and the oldest surviving 8th Air Force combat aircraft of any type. "In that respect it's a major find, of exceptional interest to British and American aviation historians," he told The Associated Press.

The P-38 was built in 1941, reached Britain in early 1942, and flew combat missions along the Dutch-Belgian coast. According to The Associated Press, Second

Lt. Robert F. "Fred" Elliott, 24, of Rich Square, N.C., ditched in the shallow water near the beach after running out of fuel. Shifting sands covered the wreck, and its location was forgotten until erosion uncovered it this year. Now named the Maid of Harlech (from a town near the beach), the Second World War fighter will soon be recovered and restored to original condition, as was another P-38 well known to warbird and air show buffs as Glacier Girl. In an interesting twist of fate, it turns out the Welsh aircraft and Glacier Girl probably left the factory within days of each other and were both part of Operation Bolero, the U.S. Army Air Force's first major mission to help the war in Europe.

Gillespie plans to lead a team to excavate the airplane in the spring. Meanwhile, sands have covered it again, helping to keep its location secret from anyone who might disturb the wreck.

Honeywell's business aviation outlook

Honeywell's Business Aviation Outlook forecast released last month anticipated a record 1,000-plus new business jet deliveries for 2007 and better than 1,300 business jet deliveries next year. The company expects the total number of new jet deliveries through 2017 to be near 14,000. New orders for jets in the first half of this year have risen 100 percent over the same period in 2006 with a relative explosion of demand in Europe. NetJets alone has added 589 European customers since 2005. International orders are expected to account for roughly half of new aircraft deliveries through 2012. The demand abroad is driven by charters, the strength of the Euro, and wealth expansion in Eastern Europe and Russia. According to Honeywell, those factors have coupled well with one primary force in the markets - replacement of aging aircraft.

Looking ahead, the future of very light jets is positive if a bit hazy. For Honeywell, the "very light personal" moniker encompasses the likes of the Eclipse 500, Adam 700, Diamond Jet, Cirrus' The-Jet, and more. Examples of a "very light jet," in Honeywell's view, include the Cessna Mustang, HondaJet and Embraer Phenom 100 and other jets costing more than \$2.5 million. Honeywell has conducted survey research and sees a total demand potential of 6,000-7,000 very light personal jets over a ten year period, plus 3,300 of the pricier very light jets. The company's view of the air taxi business remains guarded, seeing that

segment as one yet to be proven.

Honeywell's research leads the company to believe that an additional two thousand very light personal jets may be added to that segment's total as components of fractional ownership companies, or as the core fleet aircraft of air taxi operations - stretching the overall demand over ten years to 8,000-9,000 through 2017. But as for actual use of the personal jets, "We see them as entrepreneurially flown," said Honeywell spokesperson Bill Reavis. "We survey 14,000 flight departments worldwide and they don't even list VLJs," said Reavis. "They are looking for a three-to-five person capacity, longer range and a potty."

Norwegian pilot quits, citing "security madness"



Picture the last time you flew commercial and stood in line to remove your shoes before reporting to the gate. Now imagine being an airline pilot in uniform, and going through those same lines up to 10 times a day. In Norway, some airline pilots are running out of patience with the system. One pilot delayed a departure when he refused to take off his shoes and reportedly shouted "I am no terrorist!" Another senior pilot chose to retire early, citing "security madness" as the reason. "He is happy to be retired and finished with this," Tom Erik Liverud, head of Widerøe airline's pilot union, told the newspaper Adresseavisen. "This is a marked contrast to some years ago when pilots were sad to give up their dream jobs when they passed 60."

The security demands are all for show and in some situations are counterproductive, Liverud told the newspaper. "All a pilot needs to crash a plane is his hands. It feels meaningless to use so many millions of crowns without even carrying out a risk analysis," he said. The Norwegian Airline Pilots Association has said flight crews should have the same privileges as customs officers and police, who are allowed to freely pass through airport security checks when on duty.

GAMA announces third quarter figures

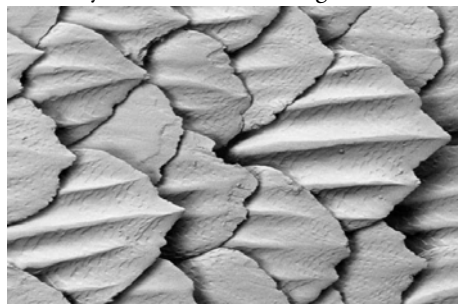
Shipments of piston engine powered airplanes manufactured worldwide decreased to 1,857 units in the first three quarters of 2007, down from 1,975 airplanes last year. Turboprop shipments increased 14.5 percent growing from 256 airplanes at this same time in 2006 to 293 units this year. Business jets were also up with shipments totalling 759 units, a 20.9 percent increase. The General Aviation Manufacturers Association (GAMA) have released the third quarter numbers for general aviation shipments and billings. Compared to this time last year, total shipments rose 1.7 percent to 2,909 units, while industry wide billings for new airplanes rose to \$15.1 billion. "This is the third consecutive quarter where growth in the piston market has wavered. We are encouraged, however, by the industry's commitment to strengthening this segment with the introduction of products that will bring new pilots and new customers into this market," said GAMA President and CEO Pete Bunce. "The good news is that our manufacturers in this segment have not reported a noticeable decline in interest in the piston market."

First nine months shipments of airplanes manufactured worldwide

	2006	2007	Change
Pistons	1,975	1,857	-6.0%
Turboprops	256	293	+14.5%
Business Jets	628	759	+20.9%
Total Shipments	2,859	2,909	+1.7%
Total Billings	\$13.2B	\$15.1B	+14.1%

Shark skin research could reduce airplane drag by 30%

It may seem obvious that the surface of an airplane should be as smooth as possible to minimize aerodynamic drag, but that's not really the case. A bit of roughness can



Shark skin magnified 650 times under an electron microscope

CAA Safety Evenings

Date	Area/airfield Location	Organiser	Phone
04/03/2008	Sleap, museum building	Mike Sain	01939 232882
05/03/2008	Caernarvon Aerodrome	Roy Steptoe	01286 830800
06/03/2008	Swansea (Check with organiser)	Robert Preston	07919 661200
12/03/2008	Perth, Scottish Aero Club	Keith Boardman	07785 244146

break up the boundary layer and improve efficiency. Sharks, with skin formed of rough scales called denticles, can slip through the water at speeds of up to 60 mph with minimal drag. Consequently, The Lindbergh Foundation awarded a grant to Dr. Amy Lang, at the University of Alabama, to study whether the surface texture on the skin of fast-swimming sharks, capable of bristling their scales when in pursuit of prey, could be mimicked and used to reduce the drag on aircraft. "If we can successfully show there is a significant effect, future applications to reduce drag of aircraft and underwater vehicles could be possible," said Lang. The technology has the potential to increase aerodynamic efficiency up to 30%, with savings of billions of dollars and substantial reductions in fuel burn and emissions.

Dr. Lang will perform water-tunnel experiments to measure the flow over and within a bristled sharkskin model (2cm size scales), which achieves similarity with real sharkskin (0.2 mm size scales) by a corresponding scale down in velocity of the experiments. She will also obtain drag measurements over a sharkskin model in a Couette flow facility containing high-viscosity oil. Her work is also supported by the US National Science Foundation.

Pilots on anti-depressants "safer"

The first study on the safety records of pilots taking anti-depressants suggests they're no more likely to crash an aircraft than those who don't need the drugs. The study was done in Australia, the only place it could be done since it's the only country that allows pilots to take anti-depressants and keep their medicals. "There was virtually no difference in the number of incidents or accidents," Professor Kathy Griffiths, a mental health researcher from Australian National University, told a mental-health conference in Australia. "But importantly, there was a tendency for more accidents in the period prior to pilots going on to anti-depressants, but not once they were on them."

Use of anti-depressants is medically disqualifying in all other jurisdictions, but Australia has allowed them since 1993

and up until 2004 the medicated and un-medicated pilots groups each had five major accidents. The un-medicated had 15 incidents compared to 18 for those on the drugs but that wasn't considered a significant difference. "This really confirms for the first time that the longstanding liberal policy of supervised anti-depressant use introduced by CASA to allow medicated pilots is a good one," said Professor James Ross, a co-investigator and former aviation medical specialist with Australia's Civil Aviation Safety Authority (CASA). "But it does raise a lot of questions about what is happening in all these other countries, where presumably people secretly take medication unsupervised, or they just fly depressed, increasing their chance of incident."

Painting the town red

Singapore air force officials were red-faced last week after a ground test by the elite Black Knights air demonstration team left a lasting impression on its neighbours.



According to air force officials quoted by the Straits Times, the Black Knights were trying out a new dye intended to create a red smoke trail from their F-16s. However, it also turned about 200 tons of un-harvested vegetables, numerous cars, and anything else in its path (including a pet cat) varying shades of red, after high winds carried the smoke over the neighbourhood.

It took a week for the air force to fess up that the mess was caused by the test, which was carried out at Tengah Air Base. "We are currently conducting further investigations and have suspended all such trials. Standard aviation dye was used in this trial," air force spokesman Col. Darius Lim told the newspaper. He stressed the dye doesn't pose a health hazard but farmers whose crops were coated have been told to destroy the 10 truckloads of leafy greens they were growing. There's no word on the health of the cat.





EUROSTUFF



By John Pickett

German VAT refunds on avgas

It is reported that the Fiscal Court of Dusseldorf has ordered the German customs office to refund taxes imposed on Avgas. The case before the Court involved taxes on Avgas used in light aircraft operated by a private limited company. The light aircraft were engaged on flights after maintenance, and flights for the purpose of conducting proficiency checks on pilots. Private flights are specifically excluded from this ruling.

This raises many questions for it appears that aircraft operated by private limited companies may claim back the equivalent of VAT/TVA on Avgas consumed by its aircraft on all flights other than private flights. The finding by the Court has far reaching implications. It appears that a private owner of an aircraft, being used for private flights, is not entitled to a refund of the tax levied on Avgas. However, if the aircraft is being used for business related activities a refund can be claimed! What is certain is that there will be a lot more paperwork involved.

AOPA Germany recently summarized the situation: "Under the terms of the agreement all flying for business related activities, corporate flying, commercial flight schools and aerial work will receive the refund." In monetary terms this means a refund of about one Euro per litre of Avgas used.

What is general aviation?

The debate about the scope of General Aviation (GA) continues.

- ☞ EASA considers that GA means: "all non-commercial activities of aircraft other than complex-motor-powered aircraft."
- ☞ The International Civil Aviation Organization (ICAO) defines GA as: "an aircraft operation other than commercial air transport operation or an aerial work operation."
- ☞ Meanwhile the General Aviation Awareness Council believes that "GA is considered as all civil aviation other than that carried out by the commercial airline industry."

Whilst the EU has charged EASA with a remit of better regulation in GA this currently only applies to airworthiness and environmental compatibility of products. Shortly the scope of the remit will be extended to include air operations and flight crew licensing.

With regard to flight crew licensing, EASA is being extremely selective in seeking to impose better regulation on a small part of the GA industry. EASA is excluding all commercial activities of aircraft, some aeroplanes including all over 5,700kg MTOW, and those with turbojet engines.

This effectively excludes flying training including instrument training, aerial photography, air ambulance, pipeline/electric cable patrols, air taxi, crop spraying, "joy" flights, and ballooning - not to mention a wide range of helicopter activities.

EASA maintains that it wants to improve the stagnating, difficult economic prospects of GA in Europe. By selecting a small part of GA activities for attention is it likely that this strategy will be effective?

Galileo

The British House of Commons Transport Committee has published a report into Galileo. Gwyneth Dunwoody Chairwoman of the committee said "What taxpayers in the United Kingdom and other European countries really need and want is better railways and roads, not giant signature projects in the sky. The government must stop this folly and endeavour to bring the European Commission to its senses."

The report accuses the EU of "sleep walking" into the multi-billion Euro project. Following the collapse of the private-public partnership the funding is currently showing a shortfall of 2.4 billion euros and consequently the taxpayers will have to pick up the bill!

Matthias Ruete, Director General for Energy and Transport at the European Commission has confirmed that the shortfall will be met out of the EU agricultural budget! He says this would ensure a full 30-satellite Galileo cluster could be up and operating by mid-2013. That is already five years later than originally planned! The shortfall will require a major restructuring of the already agreed EU budgets of 2007 through 2013 and probably beyond.

Opposition to the Galileo project is not confined to the British Transport Committee. Professor David Last told delegates to the Royal Institute of Navigation NAV07 conference that the original reasons that had convinced European governments that Galileo was worth funding had been exposed as myths. Independence from the USA and the American Department of Defence in particular, and the idea that owning your own satellite network brings you massive industry benefits, he said, had been proven to be fallacies.

Meanwhile GLONASS, the Russian equivalent to GPS continues to launch more and more satellites. Three satellites were launched on the 26th October 2007 and as IP went to press Russia was about to launch a further three satellites. GLONASS is aiming to achieve global satellite coverage by 2009. That is four years ahead of Galileo's anticipated date for full operational status.

GPS sales

The sales of GPS based satellite navigation receivers are set to rocket next year. ABI Research recently produced a forecast that from 2008 to 2012 that sales of satellite navigation devices will grow at the rate of 22.5% per year.

Sales of personal navigation devices have increased rapidly. But by 2012 it is estimated that 23% of all GPS-enabled devices will be personal digital assistants (PDAs).

German personal navigator

The German company JENRO has just released "My MobileSat Nav" which is not just another personal navigator but a device that fits into a shirt pocket and is "aimed at anyone who wants to get from A-B without an A-Z". The device connects to a mobile phone via Bluetooth and enables real-time navigation giving immediate

voice activated directions and on-screen mapping. The company says that that pedestrians and drivers can use this personal navigator. Maybe pilots as well?

Iridium approved by ICAO

The International Civil Aviation Organization (ICAO) has approved the use of the mobile satellite service “Iridium” for use. The ICAO decision means that member States can now certify Iridium to meet the international requirements for redundant communications when flying over ocean and desert regions. In addition Iridium can be used for air safety communications. Iridium Satellite is the only mobile satellite service offering a gap-free, pole-to-pole coverage of the entire globe.

Mode S alternative?

Meanwhile another company Chronos Technology has launched GPSWatch. The equipment will provide permanent monitoring of GPS signals at the point of *use* (my emphasis). This part of GPS technology is already used by the mobile phone industry in determining location based charging. By knowing where the phone of an individual subscriber is located at any time, the mobile phone network operator can use differential charging.

GPSWatch takes the technology into a vast and controversial phase. The concept that it is possible to know the exact location, at any time, of any GPS user is awe inspiring and extremely scary.

EASA update

The European Aviation Safety Agency (EASA) recently published its end of year “state of play in general aviation” presentation. This provides an update on EASA’s drive to develop a new “concept for better regulation in general aviation”. The presentation restates key principles of proportionality and participation and focuses on the development of better rules for airworthiness and maintenance and for pilot licensing.

In respect of continuing airworthiness and maintenance, EASA propose to introduce regulations to extend pilot owner maintenance, to study the possibility of using assessment bodies, to develop standard modifications and repairs, (possibly like the FAA system) and to have proportionate rules according to the mass and kind of aircraft.

Pilot licensing proposals including the creation of a European private pilot’s licence issued by national aviation authorities (NAAs) or assessment bodies. The licence would cover the full scope of aircraft and include competence-based training. A core feature would be that the basic common licence would have ratings attached for different categories of aircraft, operations, a simplified instrument rating, instructor ratings etc.

Medical requirements would be based upon risk assessment and consideration given to allow General Practitioners to issue medical certificates based on an assessment following a self-declaration signed by the pilot.

There would be no arbitrary restrictions on access to airspace or airports built into the licensing rules and a bridge would be established with the standard (JAR) FCL-PPL.

EASA suggests the title LAPL for the basic light aircraft pilots licence and intends to introduce Licence Implementing Rules covering:

- ⌚ Common requirements.
- ⌚ Specific requirements for the basic LAPL, with separate categories

for aeroplanes, helicopter, sailplanes and balloons.

⌚ Flight Instructor and Flight Examiner licenses.

⌚ Medical requirements.

Comments and suggestions are sought concerning the contents of “light” implementing rules, which are still to be defined. EASA is seeking opinion of stakeholders in particular on:

⌚ Type of aircraft and need for an upper limit.

⌚ Ratings that could be attached.

⌚ How to perform medical assessments and the possible role of General Practitioners.

The full presentation can be found here: www.easa.europa.eu/doc/Press_Room/A-NPA%2014-2006%2010%2012%202007.pdf

EASA powers to levy fines

The European Parliament has stated that EASA should have the power to fine organizations and individuals that fail to meet safety requirements and should have similar powers to the United States Federal Aviation Administration.

The proposed amendment to legislation will mean that EASA will have the power to instruct the European Commission to impose fines. The imposition will be an alternative to the outright withdrawal of a certificate or licence.

If an organization or an individual intentionally or negligently breaks regulations, EASA can order penalty payments to be made. In addition periodic penalty payments can be demanded to compel those in breach of the regulations to be forced to take action to comply.

The European Parliament is reported as taking this action to address the anomalies in safety standards throughout the EU.

EASA could become both judge and jury if insufficient safeguards are not put in place. The right of appeal is a basic human right and further details of the proposals are awaited with trepidation.

Affect of ICAO Annex 1 amendment

Recently there was considerable discussion in Germany and other States of Europe, about the ICAO requirement for English language proficiency. A prior requisite to a pilot gaining an Instrument or IMC Rating is that a Flight Radio Telephony Operators Licence (FRTOL) must be held. The recent Amendment 164 to ICAO Annex 1 requires that from 5th March 2008, pilots be proficient in the language used for radiotelephony communication. On international flights the language used is English and pilots flying internationally will be required to be proficient in English.

In the UK there are nearly 42,000 pilot licences in issue and most of these have an associated FRTOL. Prior to the implementation date of 5th March 2008, the CAA will issue to all FRTOL holders the necessary page for their licence demonstrating they have achieved the required language proficiency.

That is a lot of trees!

FNPT2 for helicopter IR renewal

The UK CAA has confirmed that the Flight Navigation and Procedures Trainer/FNPT2/MCC GAS78 may be used for the renewal or revalidation of an Instrument Rating (Helicopters) Proficiency Check.

GA Simulation Ltd of South Brent, Devon, UK has become the first FNPT Operator to have this facility available in their Agusta 109 STD. The saving in cost is considerable for those pilots wishing to renew or revalidate an A109 Instrument Rating.



or some combination of these) then in theory you can fly the whole route in icing conditions - but why? Flying should be enjoyable.

In Europe, cloud tops can be anywhere from below 1,000ft to FL450. However, anything above FL200 is likely to be seriously convective and then all bets are off as far as height goes. Fortunately, the top of "organised IMC" rarely exceeds FL160 and this is what enables long distance IFR flight, at Eurocontrol levels, in non-deiced unpresurised aeroplanes with oxygen. You just need an aircraft operating ceiling of FL180 and benign conditions at the two ends of the flight through which to climb and descend. Flying VMC on top, the horizontal visibility is usually unlimited and anything nasty (CBs) can be avoided visually.

This strategy fits in perfectly with the Eurocontrol IFR route system. The MEAs on many routes will place you squarely into freezing IMC much of the year, but ATC always allow a climb request "due weather".

Some pilots say that nobody should fly IFR in anything less than a de-iced twin / King Air / jet but this is nonsense. The capability for prolonged flight in icing conditions merely reduces the percentage of preplanned flights that are cancelled on the day. De-icing gives you the ability to climb and descend through thick layers of freezing cloud (e.g. solid IMC all the way to FL180) and the ability to accept an ATC holding instruction placing you into prolonged icing conditions. However, holds are extremely rare in GA IFR flight and de-iced aeroplanes also tend to be radar equipped which facilitates close-in tactical CB avoidance. It would be a very different matter if one was flying a Cessna 150 which cannot even climb to the MEA on many IFR routes.

It's worth mentioning at this point that UK pilots flying under the IMC Rating are often unable to fly VMC on top because much of the UK is covered with Class A airspace whose base is below the typical cloud tops. For flights within the UK, this is really the key advantage of the full IR over the IMC-R and is particularly relevant in the winter when the full IR enables the enroute section to be flown out of icing conditions.

Where do clouds form?

Everybody knows that clouds form where the humidity reaches 100%. The rest needs some understanding of meteorology which I will largely skip over - partly because it isn't my area of expertise and partly because I set

out to produce an easy-to-digest collection of practical advice for pilots. The theory is anyway of little use without a website on which one can push buttons and actually get the data.

The **cloud bases** are to some degree predictable from the convergence of the reported surface temperature and dew point and there is even a formula which has been known to occasionally work: temperature-dewpoint spread multiplied by 400ft, so if the surface temperature is +10°C and the dewpoint is +4°C you might expect the bases to be around 2,400ft. This works with some cloud types better than others.

Cloud base forecasts are widely available in TAFs and other aviation data. These tend to be reasonably accurate because they are normally produced by full-time weather professionals who have access to a wide range of ground observations. They are also easy for the pilot to verify at the time by looking at the relevant METARs, or simply looking upwards into the sky.

The **cloud tops** are much more difficult. Obviously this boundary will again occur where the humidity falls below 100% but the conditions where this happens depend on many factors such as the convective energy within the cloud. There is also much less data available to the meteorologist: instrumented balloons ("ascents") are launched at 00:00UTC and 12:00UTC and these return accurate data but only for a few locations in each country. The mainland USA has a comprehensive system which takes in weather radar data, satellite data, and pilot reports (PIREPS) but Europe either has nothing of the sort or the Met offices keep it very quiet.

Weather Models

There are several weather models around the world but probably the most relevant to UK and European pilots are the UK Met Office (UKMO) and the U.S.-run Global Forecasting System (GFS).

All UK pilots will know about the free chart products from the UKMO: F215 (UK) and F415 (near Europe). These charts are produced about 12 hours ahead. The Mean Sea Level Pressure (MSLP) charts run several days ahead and are the only free product from the UKMO which goes past 24 hours with any relevant detail.

The UKMO runs a commercial policy on everything beyond the above data. I have used numerous commercial forecasters (those on premium rate telephone numbers, to check my own assessment of difficult weather conditions for a go/no-go decision) and it's obvious they have access to data

which goes way beyond anything openly available.

This leads to GFS. This weather model is totally free. The output from it is numeric and needs to be plotted into something graphical. One of the many websites that do this is NOAA (The National Oceanic and Atmospheric Administration Air Resources Laboratory, <http://www.arl.noaa.gov/ready/cmet.html>), which generates nice clear graphical data for three discrete future time periods: 0-84hrs, 0-180hrs, or 192-384hrs (the last one is obviously largely fiction). In fact nearly all of the free aviation weather websites use GFS data.

The SigWx form is what most commercial pilots use for an instant general briefing. This goes from FL100 upwards and the data for it comes from the World Area Forecast Centre (WAFC) in London. In October 2007 the SigWx form was modified to no longer show fronts and cloud type - a curious move probably driven by the jet (upper airway) customer base.

Where is the Cloud Tops data?

The UKMO forms F215 and F415 and the SigWx chart give cloud tops as straight numbers. The F215/F415 go up to FL100 only and show near-Europe only. The SigWx chart shows weather above FL100 and is thus the first choice for enroute conditions. However these forms are generated only up to about 12 hours ahead.

If a pilot wants data further ahead than the SigWx chart, or wishes to cross-check the SigWx against something else, this gets more complicated, and leads us to thermodynamic diagrams.

The "gold standard" for working out where there is IMC, and lots of other stuff like temperatures, is the **Tephigram**; whose very similar counterpart, the **Skew-T** is shown in **Figure one**; this particular sample is real data generated by a balloon ascent.

This most useful chart plots the dew point and temperature (the left and right heavy

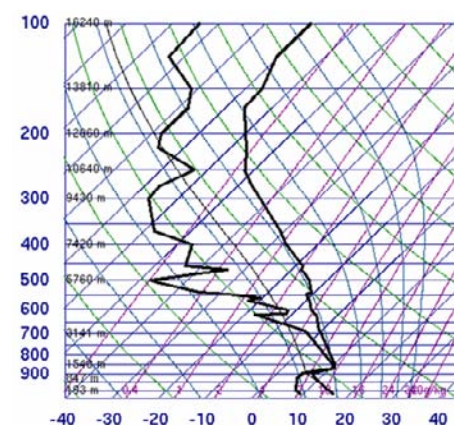


Figure 1

black lines respectively) against altitude in millibars (shown on the left-hand side of the chart). Where the two lines get close or meet, you can expect IMC, roughly according to the following rules:

- <1°C means 7-8 octas cloud
- 1-2°C means 6-7 octas cloud
- 2-3°C means 4-5 octas cloud
- 3-5°C means 2-4 octas cloud
- >5°C means clear.

On the above example, it is immediately obvious where the two lines meet and one would expect the cloud bases around 3,000ft (900mb) and the tops gradually dispersing around 8,000-9,000ft (750mb-725mb), and blue skies above that. The 0°C level is around 10,000ft (the blue 0°C line running upwards diagonally to the right intercepts the plotted temperature line at 700mb) which is perfect for a climb up through the cloud without a risk of icing.

The balloon ascent data can be found at the University of Wyoming website (<http://weather.uwyo.edu/upperair/sounding.html>). Select Region=Europe and Type of Plot= GIF/Skew-T. It's bizarre that one has to go to a U.S. university website to get ascent data from UKMO probes but much of the aviation weather scene is like that - an organisation releases some data only to its commercial customers but at the same time has international obligations to release it to other parties who in turn very usefully put it on a website... If would be funny if it wasn't so important.

A forecaster can work out all kinds of other things from these charts e.g. stability - the likelihood of significant vertical development like CBs. A Google on "tephigram" or "skew-t" comes up with an unlimited amount of reading material on the interpretation. In fact the atmosphere has very few secrets left - at that spot and at that time - after the balloon probe has gone up through it. Forecasters generate all the well known data like TAFs and the F215/F415 forms from tephigrams generated by the ascents and the computer models.

Unfortunately data for 00:00UTC or 12:00UTC (appearing on the Wyoming website an hour or two later) is of limited use for most long flights which tend to depart in the morning.

The \$64M question: can we get forecast tephigrams for an arbitrary time in the future? Yes - any computer model can be used to generate a tephigram, or of course any other type of chart. Unfortunately the UKMO offers this "3D" data only to commercial users. This is a shame, since the UKMO weather model is probably the most accurate for the UK and nearby areas. There

is only one known free source of forecast tephigrams; the Swiss Meteoblue website (<http://my.meteoblue.com:80/my/>) whose development was reportedly the PhD project of a University of Basle student. **Figure two** shows a random example of a Meteoblue chart.

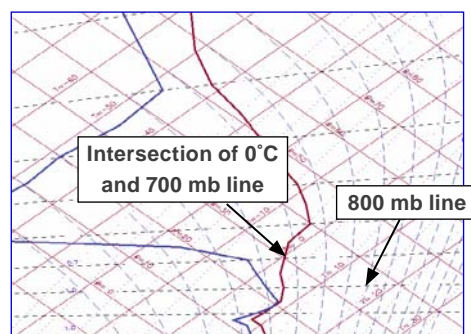


Figure 2

This is a Tephigram which is plotted slightly differently to a Skew-T but the basic idea is the same. This one shows mostly IMC up to about 800mb (roughly 6,000ft) and clear skies above. The 0°C level is at 700mb - excellent flying conditions and climbing up through the 2,000-3,000ft of cloud should not present icing hazards.

The Meteoblue site appears to be based on GFS and a mixture of other data and enables all kinds of charts to be generated, including the vertical conditions along a straight line flight as in the example below. Unfortunately the site uses client-side Java and in common with many such websites runs with varying degrees of reliability according to your operating system and other factors. Often, one gets a blank page and has to press F5 (refresh) to get it to work. It has plenty of quirks; for example to obtain the "Cross Section" chart shown below, one has to choose Condensate for the first plot option and Temperature for the second; reversing the two crashes it.

Comparison

Let's do a comparison of the three data

sources we now have: Meteoblue, SigWx and the actual ascent. **Figure three** shows a Meteoblue forecast 30 hours ahead for a planned 12:00UTC flight from Shoreham (EGKA) to Ljubljana (LJLJ) across the Alps.

This chart shows cloud to around 550mb (16,000ft) at three points along the route - feasible for an unpressurised aircraft with oxygen and a 20,000ft ceiling. The 0°C isotherm is also visible and I have placed yellow dots on it to make it more obvious. The red bits are obviously below freezing and one would not fly in them; flying below would be a problem with terrain clearance so the only way is straight above the whole lot. Crucially there is little or no cloud around the departure and arrival which is exactly what you want for the climb and the descent.

The corresponding 12:00UTC SigWx chart shows a rather different picture to Meteoblue. The planned flight is superimposed in yellow in **Figure four**.

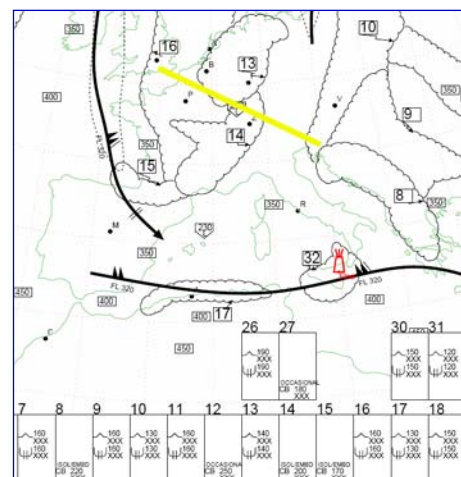


Figure 4

Area 16 in the SigWX chart shows tops to FL160; Meteoblue shows nothing. Area 14 shows tops to FL200 (Meteoblue isn't far off there) and tells us these may be CBs. Finally, Area 10 shows tops to FL130; Meteoblue shows nothing there but this is more of a

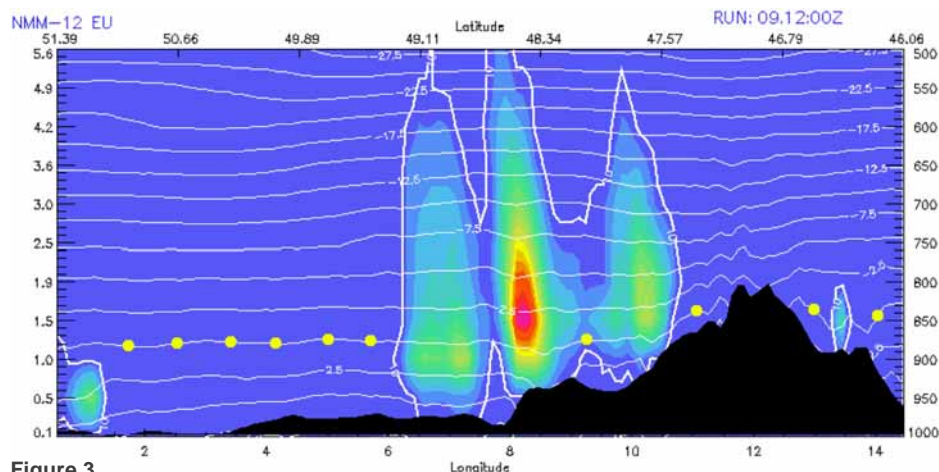


Figure 3

Cloud tops
continued from page 19

timing issue because the whole weather system is moving to the SE. Clearly, the big surprise is Area 16 which appears to require a climb through a thick freezing layer. Are we being unfair to Meteoblue because that was a 30 hour forecast whereas the SigWx is much closer? In fact the Meteoblue chart done a few hours before the flight looks essentially the same as the previous one.

On the basis of the foregoing, and putting this together with the MSLP chart showing the occluded fronts all over the place, I would have probably scrapped the flight. Please note this analysis does not take into account the flight time of around five hours; the picture in active weather like this would be expected to change significantly during the flight.

Other Methods

There are various other websites that process GFS data into something from which cloud tops can be inferred. This well known U.S. Air Force (<http://ows.public.sembach.af.mil/>) site offers various graphical products including an icing chart (under Flight Hazards). The following example again corresponds to the above flight and was generated 30 hours beforehand and indicates light icing from FL030 to FL140 which - give or take a few thousand feet - is a good confirmation of the data from Meteoblue but it shows no evidence of Area 16 in the SigWx.



Figure 5

Another useful tool for the IFR pilot is weather radar. In the past this was available only as a premium chargeable service and that was just for the UK. In fact the data is still tightly marketed by a consortium of European weather offices, but various websites now carry enough of it to provide a useful picture for Europe. The most interesting one is Meteox (<http://www.meteox.com>), which combines several radar data feeds and delivers it through an advertising-funded website with a delay of 30-45 minutes.

Meteox radar does not tell us the height of the tops but experience suggests that anything showing RED on Meteox is a definite no-go and contains convective cloud to at least FL250. Weather showing as heavy white bands has been regularly observed to be at FL200 when flying to one side of it. It would be easy enough to use the Wyoming ascent website to get snapshots of weather depicted on weather radar and do comparisons. **Figure six** shows a radar image corresponding to the 12:00UTC flight discussed above.

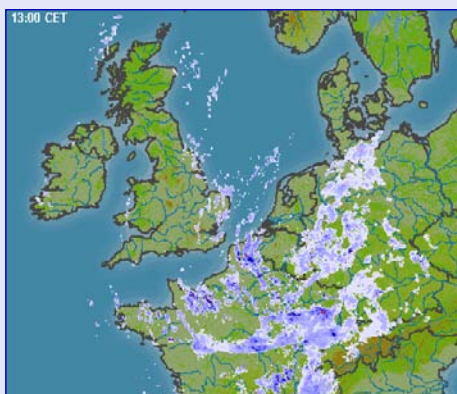


Figure 6

Meteox has a nasty catch: the coverage stops suddenly at non-participating country boundaries, or radar head distances, and these boundaries are not indicated on the image. In this case we have no coverage of Italy or Austria; separate websites need to be consulted for these. Some Italian radar data can be seen at www.eurometeo.com/italian/radar and I have a collection of radar website links listed here: www.peter2000.co.uk/aviation/.

Finally, there are websites that show satellite images with cloud top temperatures. If one has a good idea of the temperature/altitude profile, this should yield the approximate cloud top height. An IR image can give temperatures directly, and the example shown in **Figure seven** again covers the same flight.

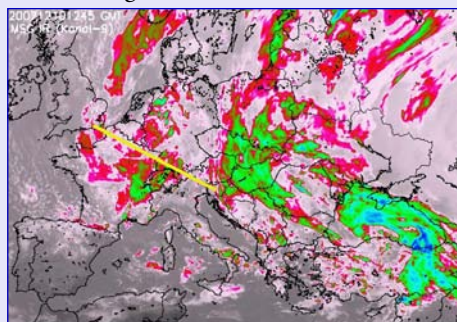


Figure 7

The satellite image shows high level cloud over N France (the SigWx Area 16) with tops around -20C which (referring to the well known Form F215/F415) would be around

14,000ft but this is so widely scattered it would not be an issue. It also shows very high cloud tops (green, around -40C) in Area 14 but again this is localised and one would have flown a little to the east of it. Unfortunately the above image is made available some six hours late.

Which data should I use?

As the above demonstrates, there can be a wide discrepancy between the different sources, and between any of them and reality. The balloon ascents are of course accurate at the time and location but are likely to be useless where there is scattered convective weather unless one goes to the next level of analysis and interprets the lapse rates. One would perhaps expect the SigWx (the professional pilots' favourite) to be the most accurate but it isn't - a jet pilot climbing to FL350 does not care if the tops are at FL150 or FL200 so there is no demand for an improvement which could come only from the application of more technology for observations.

The Meteox radar data is surprisingly good in this kind of difficult weather. On other occasions (e.g. the photograph on page one) radar would show absolutely nothing, but then you don't really care anyway because there is nothing up there of relevance.

A simple sanity check on anything coming out of the GFS model is to check it against the timing of the fronts shown on the UKMO MSLP chart. Forecast tephigrams should show the expected cloud thickness and other changes at the appropriate time. It seems to me that weather forecasting is a lot more accurate in what happens than when it happens, so fixing the timing better is always worth doing.

The go/no-go flying decision is usually a process of checking off factors which may compromise the safety or comfort of the flight. I have normally been conservative (due to carrying passengers who do not want turbulence) and would normally scrap a flight which would pass through a frontal system, but there is no flight-safety justification for such a simple rule. Perhaps the best process is to review all the sources available and provided that any high cloud (above the aircraft ceiling) is likely to be scattered, the flight should proceed. However it is apparent that the techniques presented in this article are likely to work well for conservative pilots but less well for those who are willing to push the boundaries of icing and turbulence.

For an online version of this article, see www.peter2000.co.uk/aviation/tops/.

