



REPRESENTING SPORT & RECREATIONAL AVIATION IN THE SOUTHWEST
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DEVON STRUT NEWS – January 2008

Welcome to the LAA Devon Strut: Co-ordinator's Comments by Pete White

Since I last wrote to you all several events have happened of which the first was the aviation show *Splash* at the NEC, Birmingham. I was able to attend on the Saturday on my way back from the Vintage Aircraft Club AGM and witnessed several of our Strut members working hard on the BAP2/ Education Strut/ PFA stand. It was quite evident that the show catered for the lighter and perhaps younger elements of flight so our BaP2 project was well placed. Jim Gale and Tim Gilmour-White proudly stood by the project and chatted to the punters about its merits whilst not far from them was Dave Silsbury surrounded by expertly constructed airframe parts to show what can be done in a garage or the dining room. Assisting or visiting the show, I saw other members of our Devon team, including Mike Mold, Steve Robson, Dave Millin, Peter Gristwood, Peter Gibbs, Paul and Mary Aston and if I have missed any one out I do apologise.

The CAA Safety evening at Plymouth on Tuesday 27th November, gave us all an opportunity to reflect on and absorb some of the recent issues that have caused aircraft accidents in the UK. It's always worth a visit when the CAA 'circus' comes to town as it does make us all stop and think a bit harder before committing aviation.

Tuesday 4th December marked an event of a more personal nature; I fell down the stairs at home and apart from the bruising, I broke two ribs. The paramedics and A&E staff at Derriford hospital were absolutely superb and with liberal doses of vinegar and wrapped in brown paper, I was sent home where I have been recovering ever since. Those who know me will realise that I have found the 'grounding' very difficult to live with, as I'm quite an active chappie. So I missed the next committee meeting and very sadly, our third evening at the Ley Arms, which was hosted by our team, and Dave Millin introduced our guest speaker, Kev Lambton, SATCO Plymouth.

After much discussion with Strut members and long debates at recent committee meetings we have come to a decision regarding our future name within the new LAA. Too many changes at once may be detrimental to our set-up and, as members have said, we are already well established under our identity, so why change it? Therefore we should stay as **The Devon Strut** for the next year and review the situation again once the dust has settled after our Association revamp to LAA. On a personal note I have favoured the name 'Wing' but as we are a democratic club I can see all sides and will be happy to follow the majority path.

After you have all been visited by Santa Claus and celebrated the festive holiday in whatever way you most enjoy, it will be New Year and time to make those resolutions and start planning your flying trips for 2008. So the next time we all meet will be on **Thursday January 10th 2008** for our Strut AGM and The Derek Boyce slide show, a review of aviation in the South West over the months of 2007. The downloadable membership renewal form for 2008 is on the Strut website homepage. Please fill in the form (including your Association membership number) and bring the completed form and your subs to the AGM or, if you know you won't be able to attend the AGM, post it to John Hope at the address provided on the form. (Details of other future meetings are listed in the Events section).

Most of the hardworking souls who make up your committee are willing to continue to mastermind the Strut activities for another year but with a couple of exceptions. Mike King, our membership secretary has found that his business has grown to such a degree that he can no longer spare the time for Strut activities. Another member moving on is our treasurer, John Kempton, who has kept an eye on the

Strut funds for us. We are all grateful for their time and dedication over the years and trust they will enjoy their well-earned rest.

So lets all look forward to a New Year full of our aeronautical dreams and fantasies becoming reality, and the weather behaving itself and allowing us to fly from dawn to dusk for everyday of the year. But most of all I wish you all peace, good health and joy to appreciate all that is around us.....HAPPY NEW YEAR.

All the best, Pete White

Radio Aerials - Sourcery or Science?

By Jeremy Harris

Looking around I've seen some pretty dodgy radio installations. Many people also seem to have problems getting their radio to work well. I often get called upon to fix radio problems and these are often the result of a poor aerial installation.

For a radio to work at its best it is the aerial that needs to be correctly installed in a sensible location. The job of the aerial is dead simple; it just converts the electrical energy coming out of the radio when you press the transmit button into an electromagnetic wave, with the best possible efficiency. It also has to do this same trick backwards, so that you can receive signals as well. One of the rules of any aerial is that if it works OK on transmit then it will work equally well on receive. So what makes an aerial work well? Is it really just magic?

The type of aerial that we most commonly use has the rather grand title of 'a quarter wave monopole'. There is a similar military aircraft communications aerial used on airfields (and ships) that has the even grander title of 'a quarter wave monopole with a tetrahedral skirt', so perhaps we're getting off lightly here. It's really nothing more than a bit of stiff wire around 56cm long sticking out somewhere convenient on the outside.

For it to work well it needs to be electrically matched to the radio. This is essential to get the most power out (and the most power back in on receive). The simplest way to explain matching is to do the usual thing of comparing invisible electricity to something we can see and feel, like water. Imagine that the electrical energy is water flowing through a hose and out of a nozzle into a bucket. If we have a 13mm diameter tap (the radio aerial connector) connected to a 13mm diameter hosepipe (the aerial cable) with a nozzle (the aerial) filling a bucket (the air) then this is a pretty good analogy to a radio on transmit.

Imagine that the nozzle diameter is 3mm and the tap is turned on full. Two things will happen, water will very slowly fill the bucket and the hose will develop a high back pressure, maybe enough to blow the connector off the tap (equivalent to blowing up the radio). This is similar to having a badly installed or located aerial; we really want the bucket to fill up as quickly as possible and the hose not to blow off the tap.

If we now change the nozzle for a 13mm diameter one and turn the tap on then the flow rate will be the maximum possible from this set up, as all the hole sizes match. The bucket will fill more quickly and the hose won't develop so much back pressure. This is equivalent to the best possible radio, cable and aerial installation, and is what we should be aiming for. So how do we make an aerial work properly?

To work well the connectors, cable and aerial all need to have the same impedance (the diameter of the tap, hose and nozzle in the analogy above). This impedance is measured in ohms and will sometimes be marked on the cable and connectors. Getting the connectors and cable right is pretty easy; all that's needed is to make sure that the BNC connectors and cable are of the right type (50 ohm), that the cable isn't damaged and that the connectors are properly fitted. BNC connectors can be a fiddle to fit properly, and can be easily damaged if the cable gets pulled or comes loose, so are worth checking. By the way, GPS aerial cable and connectors are usually 75 ohm.

In its simplest (and arguably best) form an aircraft radio aerial is just a vertical bit of stiff wire a quarter of a wavelength long. The wavelength for any sort of wave can be calculated from the speed that the wave travels at and the frequency, or number of ripples per second. The wavelength is simply the

speed divided by the frequency (as well as radio, this sum works with sound or ripples on a pond). Light (and radio waves) travel at about 300,000,000m/s. Our aircraft radios work at between 118,000,000Hertz (or cycles per second) and 137,000,000Hertz; the middle of this band is around 127,500,000Hertz, or 127.5MHz. Therefore a quarter of a wavelength should be $300,000,000 / 127,500,000 / 4 = 0.588\text{m}$. As radio waves actually travel a little bit slower in rods and wires than they do in air a real aerial needs to be a little bit shorter than this, usually about 56cm. Any wire or rod of this length, insulated from a mount and properly connected to a bit of 50 ohm coaxial cable will make a fine radio aerial, there's nothing magical about it at all. A 56cm length of thin brass rod soldered to the centre pin of a BNC plug and insulated with a thin plastic sleeve will work just fine, there's absolutely no magic involved.

Getting the installation right is the bit that seems to cause the most problems. To work well it needs to be fitted vertically and be at least 56cm away from the nearest bit of vertical metalwork. It is very important that the earth-mounting bolt of the aerial (the bit connected to the screen of the cable) is electrically connected to a substantial bit of metalwork. If it isn't, then the aerial won't match the radio or cable and the performance will be pretty dire. In the worst case it might even blow up the radio output amplifier.

Take a look at the picture of the aerial installation in Fig 1 opposite, fitted to an X'Air. This is a pretty typical aerial installation that now works fairly well, but it does show two potential problem areas. The first is the position. This aerial was originally mounted even closer to the fin (to the rear of the pulley shown) and angled back at a rakish angle. This resulted in pretty poor performance at certain frequencies, due to poor matching caused by the close proximity of the fin. Moving the aerial a few centimetres further forward transformed the performance of the radio (although it's still a bit too close to the fin). The second potential problem is the location, right on top of the aeroplane, which is less than ideal, although most people seem to automatically try and fit them on top.



Figure 1. X-Air installation.

So Where Should the Aerial Be?

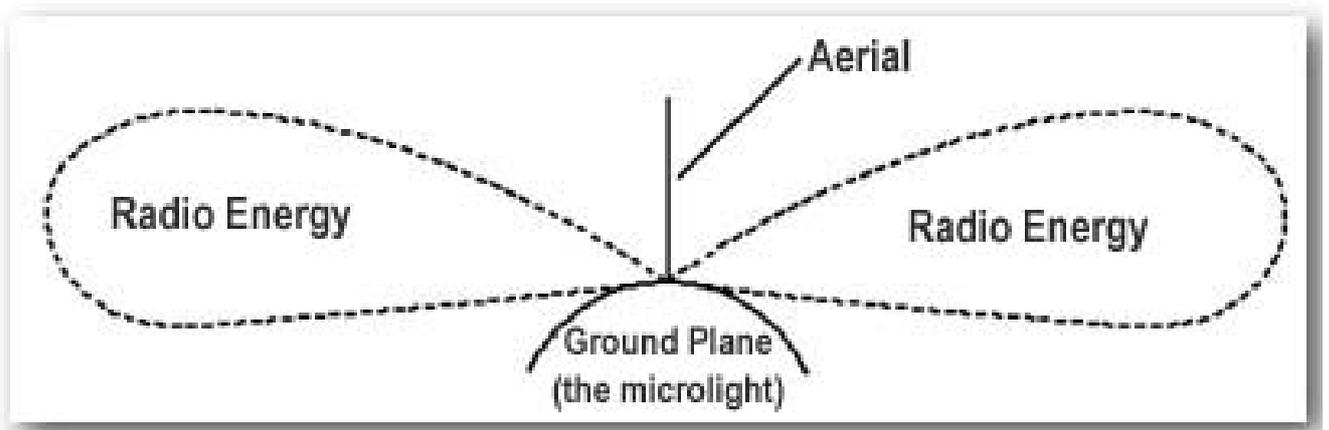


Figure 2. The pattern of radio energy transmitted or received by top mounted aerial

Fig 2 shows the pattern of radio energy transmitted or received when the aerial is fitted to the top of an aircraft. The real 3D shape of this diagram is a bit like a squashed doughnut; the radio energy will be about the same all the way around the aerial, when viewed from above. The first thing to notice about this is that the radio waves get sent mainly upward and outwards from the aerial. Not much actually goes downward at all, which is a bit odd when you think that we normally want to talk to people on the ground. If the aerial was fitted underneath and pointing downwards then more of the radio energy would go where we want it to most of the time.

Most of us don't have an undercarriage that's tall enough to allow a 56cm long aerial to poke straight down, so we have a bit of a problem. Luckily, another useful quirk about the way an aerial works gets around this. Most of the radio energy comes out of the part of the aerial nearest the mount, the end bit really only needs to be there to get the thing to match properly. This means that it's perfectly OK to bend the aerial into an L shape, so that it takes up less space. Fig 3 shows an aerial fitted to a Sky Arrow; it's a standard quarter wave but shaped so that it's bent back about a third of the way from the base. As long as the base bit is roughly vertical then the aerial will still match OK. Sticking the aerial underneath also reduces the interference problem, as it's generally easier to find a location well away from headsets, the engine, the GPS and all the other things that make a radio's life difficult.

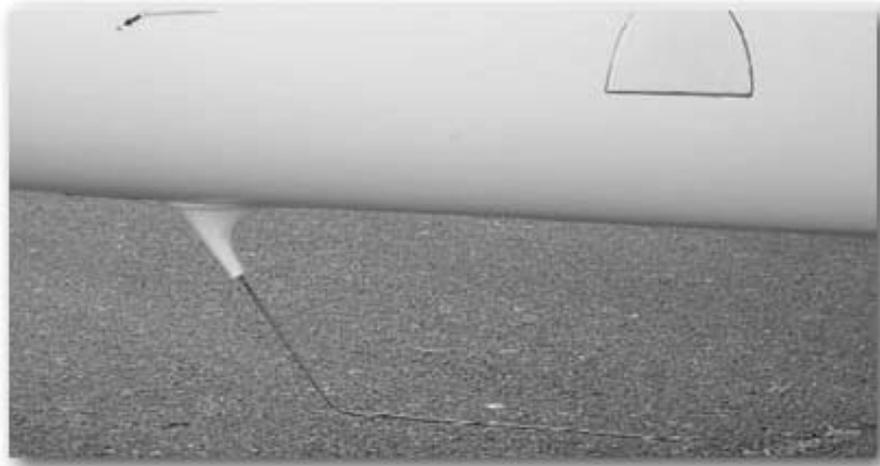


Figure 3. Sky Arrow installation

Which aerial is best?

Well, it's probably easier to suggest those that aren't going to be best first. Short, flexible, rubber aerials are pretty atrocious for efficiency, although they can work if you're not too fussy about ultimate performance. They are around 10 times worse than a full quarter-wave rod type but their saving grace is that they are pretty difficult to break and

sometimes easier to fit in a restricted space. Shortened aerials with a base loading coil, either a spring like coil or a lump at the base, are also less efficient than the full-length rod type.

Some aircraft have few convenient places that a conventional rod type aerial can be mounted. The best solution for these might be one of the aerials with a built in ground plane. These don't need to be fitted to any metalwork, but do still need to be mounted vertically and well clear of other vertical metal bits to work well.

Some Installation Tips

Mount the aerial vertically and as far away from any other bit of vertical metal as possible, but at least 56cm away. Make sure that the mounting makes really good electrical contact with the aircraft metal structure; anodised aluminium is an insulator, so needs to be lightly abraded and greased before fitting the aerial.

Get the aerial (and radio) as far away from the engine and GPS as possible. GPS units are excellent sources of interference, as are the unshielded ignition systems that we commonly use. Also try to keep the aerial well away from your head to avoid nasty squealing noises in your headset caused by radio waves getting back into the microphone circuit. There is also a slight health issue here; radio waves of quite modest power and the human brain don't mix too well.

Try to fit the aerial underneath if possible, perhaps in a way similar to the Sky Arrow photo. I've fitted a standard aerial like the one in the X'Air photo, but bent it about a third of the way down and fitted it underneath my Minimax.

Ensure that all the connections are well made and of the correct type. Route the cable where it is clear of sources of interference and unlikely to be damaged. Coaxial cable can easily be damaged by being crushed or bent at too tight an angle.

After installation and before you press the transmit button it is well worth doing some simple checks to make sure everything is as it should be. With the radio disconnected, use a multimeter on the resistance range to check that the outside of the BNC connector on the aerial lead isn't shorted to the inner pin (but if you have an unusual aerial that has an inbuilt ground plane or matching circuit be aware that these sometimes do show as a short circuit, check the manufacturer's information).

Also check that the outside of the BNC connector is making a good connection with the ground plane (the metalwork of the aircraft). If possible, borrow a voltage standing wave ratio (VSWR) meter from a radio amateur or communications engineer. This will quickly determine whether the aerial and cable are matched well and give a good indication as to the effectiveness of the installation and the approximate transmit power.

Finally, many thanks to Julian Harris for the X'Air picture and also to Sky Arrow UK for the Sky Arrow picture. (*Acknowledgements to the BMAA Magazine – Microlight Flyer*)

EASA Pilot Licensing - Roger Hopkinson, Chairman PFA / Chairman NPLG Ltd, 10/12/2007

There is much discussion on the EASA licensing arrangements. The following are extracts from a posting (Sunday 9 December) by David Roberts Chairman NPLG Ltd 2002-2007 and V-P Europe Air Sports to explain the current position. David has been leading this through Europe Air Sports.

Quote:-

1. All pilots flying aircraft (not just aeroplanes – see ICAO definition of the difference) within the scope of EASA in future, in the EU Member States – from probably 2009-2010 – will have to have either an EU LAPL or an EU PPL.

2. UK Pilots flying solely non-EASA aircraft (i.e. Annex II aircraft such as vintage / historic aeroplanes, hang-gliders, microlights, and a few other categories) beyond that date, to the best of my 'inside' knowledge, will be able to continue to fly on the UK NPPL (SEP or TMG or Microlight), but this is restricted to UK airspace, VFR, day only. No IMC rating on the NPPL. It remains to be seen whether, post EU licences in place, NPPL (M) will continue to get mutual recognition across the EU, and likewise NPPL (SEP) flying Annex II aeroplanes.

3. The driver for the UK NPPL when being developed in 1999-2002 was the reaction to the JAR PPL (A) for those who wanted an entry level licence for light aviation and a less onerous medical standard than JAR Class 2 (which excluded many pilots from flying, totally unreasonably in terms of medical incapacitation risk).

4. The EU LAPL and PPL will be subdivided into (a) Aeroplanes (b) Helicopters (c) Gliders / Sailplanes and (d) Balloons / Airships.

5. The LAPL will be almost the same as the UK NPPL for SEP and TMG in terms of licence training requirements.

6. The EU PPL (A) – not the LAPL – is being constructed to be ICAO compliant. The primary difference however will be the medical standards. For the LAPL they will almost certainly be proposed as virtually the same as the UK NPPL – i.e. DVLA 1 and 2 equating broadly to car driver or public service vehicle medical standards, the former being for non-pax carrying in the UK. The ICAO compliant EU PPL will be a medical standard less onerous than the current JAR Class 2, but ICAO compliant.

7. The proposed licences, I am almost certain, will have cross-crediting provisions (hours credits) between the different LAPL licences and between the LAPL and the EU PPL licences.

8. UK Glider Pilots, until now and since WW2, have not been required to have a UK State (CAA) licence at all – the training system has been run successfully by the BGA on a self-regulated basis. The medical standards for UK gliding, for many years, have been the same as what is now the UK NPPL (SEP and TMG), and the gliding accident record attributable to medical incapacitation has proved to be statistically very insignificant (the data goes back to the 1960s). In case anyone doesn't know it, the British Gliding team has been the No.1 in world ranking for the last few years.

9. Gliders have now been subjected to 'regulatory capture' by EASA in 2002 because they are not in the Annex II exclusions. Ipso facto there needs to be a EU licence for some 8000 such UK pilots, and

the JAA never developed (thank goodness) a JAA GPL. Other EU countries have had state issued glider pilots licences, so those will convert to the EU ones.

10. The other factor is that at the lower weight end of GA (up to 2000 kg MTOM) is that EASA recognise the need for an economic but safe entry level of pilot's licence to get people started in recreational and sporting aviation. This is particularly for those who do not enter as the starting point of a career in CAT, but see the 'basic LAPL' as an end in itself. Also for those air sports such as gliding and ballooning where the next level (a full EU PPL currently equivalent in training terms to the JAR PPL) with the associated medical standards, is more than is required for this purpose. EASA has taken note of the strong growth in ultra light aeroplanes (microlights) in the last 20 years compared with 'conventional' light aviation / GA, and want to re-invigorate this sector through the licensing.

11. Those of us who have been involved closely at the coal face with these developments over the last few years see the two tier structure that will be proposed by EASA (and it is embodied in the Essential Requirements of the EU Regulation to extend EASA's scope to Licensing and Operations which is going to the EU Parliament on 11 December in Strasbourg) as a recognition and correction of past mistakes by the JAA in setting the bar too high for light / recreational aviation.

12. Given that the LAPL is constructed as a VFR licence, then the next step up to EU PPL will provide the IFR route. But, as I have said elsewhere, EASA needs to recognise the safety value of the UK IMC rating until such time as the full EU PPL has a more pragmatic IFR compared with the JAR IFR. The UK has led on the IMCR in the past. What is needed now is for the rest of Europe to follow. Not so easy though in the face of other interests (CAT).

13. The transition arrangements ('grandfathering') for national and JAR licences to EU licences have to be worked out and will be decided at national level (i.e. in our case UK CAA). To suggest that one is a safe pilot if one has an IMC, or by implication an unsafe pilot if one doesn't have an IMC, is completely fallacious. It is a question of having a licence structure that allows for the many different and varied activities in aviation, related to risk (to third parties), combined with removing some of the artificial barriers to entry that have grown up over the years as a result of overzealous rule-makers and the controlling instincts of governments, and other political factors. At EASA, some of us from the 'user community' are trying to bring back some of the freedoms we had many years ago, and roll back the tide of bureaucracy. And in reply to a question: 'Will there be "Grandfather rights" for UK Glider pilots, or will they all have to take written exams and flight tests?' As best I can tell, again from the 'inside', there will be grandfathering but the route is still to be worked out as there has been no UK state-issued GPL to be grandfathered. Already well on the case with colleagues in the BGA..... We worked out a satisfactory solution over the last 3 years with considerable sympathetic & constructive help from EASA, CAA and DfT on the 2400 strong BGA (not CAA) C of A'd UK glider fleet, so probably similar principles apply. - DGR

Members' News & Aeroletters

Keith Wingate, never comfortable to be away from his workshop for long, has acquired a stalled Skybolt project (photo right) from a builder in Cornwall. He's fitting a two-seat sliding canopy so the single bubble canopy that came with the project is for sale. Keith also has an alternator, surplus from his previous Taylor Titch project, for sale (See Adverts section).

At Dunkeswell, Dave Silsbury has done the final assembly of his Jodel DR1050M, mating the fuselage, wing, tail and u/c. (Project photo page update to follow).



Escapade Progress: Alex Janaway

Hi Mike, Francis Donaldson checked my Escapade the day after the Strut meeting he attended – the same day we left for holiday in Australia! Last week I received the long list of reasons why I am not able to receive a permit to test, yet. 12 points: Most significant is the fact that EASA have not written rules to cover fuel injected engines which are not mechanically controlled and I have to come up with a way to cover the rules with an electrical system that does not work the way the rules were written for, i.e. I don't have magnetos!!! Of course, the engine stops when the power goes off. It's run with a ruddy computer!

I have to figure a way of restarting and running an engine if the battery goes flat or the generator packs up, when the main fuse blows and then also when the engine is on tick-over with the same conditions. The engine manufacturers, ULM, have come up with a cct diagram but it's so complicated with two complete battery systems and change-over bits that the fault liability is horrendous. And I don't think it will work anyway.

I've had words with Francis this afternoon (20th Dec.) and he is (I think) willing to accept an alternative suggestion of mine if I can prove it works. So am now waiting for ULM to get back into their office so that I can get some current usage figures from them to enable me to start the cct diagram. Francis was happy with the actual engine. He tried like hell to make it misbehave but it was perfect and never missed a beat. So it stays in the garage looking pretty until I sort something out. The rest of Europe seems to accept it all. And they have to abide by EASA too, I suspect !!!! I'm not too bothered. It's too bloody cold!

Have attached a couple of photos of Aussie flying I did. The Skyfox was into a little strip south of Brisbane. The runway is the little bit of crushed tarmac. 15 ft wide. Take off was interesting after the visit !!!! Regards, Alec



[Note: Escapade owners have their own website www.escapees.co.uk - Ed]

Maintaining the antipodean link, Jon Pote has rubbed salt into the wound that is the current damp and mirky UK weather by sending us a shot from the recent summertime Raglan - Black Sands fly-in on the west coast of NZ's north island. It shows the healthy representation of Jodels in NZ including Murray Belfield's D11 'MMB that he flew to Australia and back a couple of years ago. (Pete, haven't they heard of Aeroncas?)



Strut members based at Eggesford enjoyed a North Devon beach party with a difference in November- see <http://www.supercub.org/phpbb2/viewtopic.php?t=14725> for more photos.



Earlier this summer Charlie & Anna Huke bought RV8 G-CEGI from Will Greenwood. Some check ride, I understand! (Coach-on-coach) – with acknowledgements to Dan Seagrave for his stunning photo.

Aircraft Insurance – Onrisk Claims Experience

Most of the Devon Strut will know that last month I had a t/o accident with my Bolkow aircraft, damaging it beyond economical repair. I was insured with Albion Insurance Company Ltd. through Onrisk Ltd, whose initial premium was much less than any of the quotes that I had obtained from their competitors.

Unfortunately I have had to test out their claims handling and procedures, which I am glad to report to you all have been first class. My case was handled extremely efficiently and fast, Onrisk taking only four weeks to settle my claim.

I asked Onrisk to give me an insurance premium quote for a replacement aircraft, which they have done and I do not feel that they have “loaded” the quote unreasonably. I am very sad and depressed at losing my aircraft but thought that my positive dealing with Onrisk might be of interest to any of the Strut members who have or are thinking about insuring via Onrisk.

Regards, John Kempton

The OnRisk stand at Splash in November was most prominent as you entered the show and they certainly looked busy. The Strut has received a Christmas card from Jane Roberts and all the staff of OnRisk Insurance, wishing us all a great Christmas and New Year holiday and thanking us for all the business we have given them in 2007.

First Flight of a Homebuilt by Rhymair

The only world for an aircraft is the air
For up there she becomes a beauty, queenly fair.
Up there in the sunlit skies above
The man who built her falls in love,
For she has done two wondrous things
Since he spread her wings
She has touched the sky
She has learned to fly.

January Free Landings

Pilot: Andrewsfield, Old Buckenham, Panshangar, Shobdon, Weston (EIWT), and White Waltham

Flyer: Bodmin, North Weald, Sherburn-in-Elmet and Sturgate

Today's Pilot: Bagby, Lydd, Netherthorpe and Sandtoft

Other Events Coming Up:

1st Jan 08 Popham - New Year Fly-in - Tel: 01256-397733

12th/13th Jan 08 Icicle 2008 at Sywell. 01285 869806 and at www.bmaa.org/event.asp

23rd March Henstridge - Wessex Strut Fly-in - Tel: 01963-32101/ 01963-364231

FOR SALE:

Aeronca Champ 7AC G-ATHK,

7400 hrs total time. Continental A75-8 (approx 13 litres per hour). Tail wheel flying at its simplest. Currently hangared at Compton Abbas. Two seat (back and front) with 3 hours endurance. Aircraft comes with a new Icom handheld, new exhausts, many spares and valid permit to fly. £13,600 For more details please email. David Fraser david.agf@virgin.net or 0773-6965080 (photo by Howard Curtis)



Alternator – 60 A, to suit C90 / O-200, surplus to Titch project. Offers: Keith Wingate 01548-857513

Jodel D112 G-BARF for sale. Recent re-cover, based Rhigos, S Wales. £10,700 ono John Price 01685-875271

Next Meeting:

Thursday 10th January 2008, 7.30 for 8.00 p.m. Ley Arms, Kenn, Exeter. <http://tinyurl.com/2zw3dq>

Strut AGM and Slide Show by Derek Boyce.

The Ley Arms is reached by exiting the A38 at the Kennford junction, adjacent to the Shell petrol station and following the minor road eastwards for 1km from Kennford into Kenn village.

Future Meetings

Thursday 14th February '08 **Polly Vacher.** Aviatrice extraordinaire will be our valentine for the night.

Thursday 13th March '08 **Bill Leary.** AN2 Club. Discover this big biplane and how to fly one!

Thursday 10th April '08 **Rob Midgely.** Shell Oil's technical expert.

n.b. The March and April meetings have been swapped due to a European conference commitment of Rob Midgely in March.

Tailpiece

A 747 that fits in a bedroom of your house? It can be done. Graphic artist, John Davis of Coventry built a 747-400 simulator in the spare bedroom of his house. Over eight years he spent £15,000 building the life-size model out of wood, including an auto-pilot system, throttles and a weather radar. He has quit his job to run a flight simulation business from home saying, 'I've always wanted to be an aeroplane pilot but I was never any good at maths. So this is the next best thing!'

