

There has been an interesting discussion going on, or at the time of writing just finished, on the RAA chat line (<http://www.auf.asn.au/mailman/listinfo/aufchat>). This is an email based chat system to which anyone can post and receive messages. You can just listen, via email, to the discussions or if you want you can participate. If you don't know what a chat line is, it's just a mailing list that posts email messages to everyone on the list and to which you can reply, if you want, for others to see your comments. Anyway, back to the point. A discussion was held on Glass Cockpits, and what's available and in use. As I have one, a couple of the people on the line asked that I write an article for the RAA magazine. Well here it is.

We decided that we would build our own ultralight in September 2002 having looked at the available GA planes and wanting something a little newer for our money. I have been a Private Pilot since 1996 and flew C172s and Grumman Tigers as I wanted to be able to go a distance, although time proved I spent more of my time flying local with only me on board. The price of hiring was going up so we started looking around to buy our own not even considering ultralights as at that time we only knew of rag and tube types. But we saw one of the new plastic fantastics and it opened our eyes. Hmmmm, we may be able to get something new and in our price range that will still go distance. To cut a long story short, and not reiterate the article in June Pac Flyer, we bought an Atec Zephyr kit.

With a new kit on the way I started to look at instruments. I only really knew of the classic mechanical/electric stuff having flown with that in GA. But when I started looking for our perfect plane I did notice one or two had some modern gizmos in them. I already had a Garmin III Pilot, to 'confirm my normal navigation was spot on or almost ' and to add a little extra help over and above the normal IFR (real ones for IMC) instruments. So I investigated further. You would be surprised at how much is actually out there but not being sold by the normal channels in Australia. With further research I believed that I could put a full glass cockpit in my VFR kit built ultralight and fly as safely as with standard instruments. I could also save weight, always important. I ended up with the cockpit shown in the photo. The Dynon picture is of the later EFIS-D10A and is showing the USA system, mine shows Knots and hectapascals.





There is only one non glass instrument, the standard compass, everything else is LCD glass. Starting at the left and working clockwise there is an iPAC with a Haicom GPS (not shown), a Dynon Avionics EFIS-D10, a Garmin GPS III Pilot, Microair Intercom, Microair M760 Transceiver, Microair T2000 Transponder, Stratomaster Ultra. The right hand panel is a Mobile phone (emergency comms on the east coast), Car Radio/CD player, and out of sight below the radio a glove box for all sorts of stuff. That's it, all of it. The weight is around 2.5 kg

If you are used to the normal range of instruments spread like poo in the paddock by the moo things then this will look a little constrained! It does take a couple of hours to get used to, but everything is in one place, you can look at the Dynon to get all flying info, or the Ultra to get basic flying and engine. It only takes one glance, not the normal hunt round the cockpit. You can fly on it straight away, but with everything in one place you feel like you should be looking elsewhere and that you must be missing something. You ARE, instruments everywhere.

Some are probably thinking. MONEY, DOLLARS, Laaarrge amounts thereof. Well, the Ultra was around Au\$2000, the Dynon Au\$3500, the Garmin \$900, the iPAC + GPS Au\$800, the Transponder Au\$3000, the Transceiver Au\$1000. Sounds expensive, but if you price up all the engine instruments you get with the Ultra and then the basic flying instruments there is not much to choose between them in costs. An electric AI is around Au\$3500 (I know you can get cheaper, but when I was looking this was the cost and is if you look most places). So for \$5500 you get all the instruments you could want, the other stuff you may or may not want, I just find GPS makes life easier and with the iPAC having the WACs, ERCLs, VNCs, VTCs and G/E frequency charts it makes positional awareness far easier. Also, picking an 'appropriate' frequency easier as I know exactly where I am on the frequency chart.

So what have I got for all those beer tokens? I have :-

Ultra

Altitude, Airspeed IAS and TAS, Rev counter, Fuel gauge, Fuel flow two CHTs, two EGTs, Oil temperature, Oil Pressure, VSI, Time, Voltage, Density Altitude, OAT, Flight timer, Total engine time, Total air time (airswitch), Time to next service, Flight log giving max speed, altituded, airswitch and engine time for the last 200+ flights, estimated flying time left at current fuel flow. Also audible alarm

when wired into the intercom and flashing light alarm if you fit one. Alarms for Altitude, High and low airspeed, Low oil Pressure, High oil Temperature, High CHT and EGT. Checklists

Dynon

AI, Rate of Turn, Slip indicator, Altitude both digital and graphic, Airspeed both digital and graphic, Compass, Voltage, Clock, Up/Down timer, G meter, VSI, checklists, bugs that can be set for altitude, airspeed and heading.

Garmin

Aviation moving map with current airspace from Jepperson

iPAQ

All the normal flying maps using OziExplorer showing current position on any of the maps and the intended track.

Radio, Intercom and Transponder are self explanatory.

I know that some of you will now be cringing. All that electrical stuff, power, no backup. Well I did think of that before I fitted the panel out. I have the main battery for starting the engine and running all the instruments, and when the engine is running there is plenty of power. But I do have a 1.2Ah battery as a backup for the Ultra and the Dynon, so if the main power goes I still have the emergency power, but I use a diode to stop this battery from powering anything but the Ultra and Dynon. The Garmin GPS is powered by AA batteries and I keep a supply of them in the glove box, the iPAQ is connected to the accessory socket so is kept charged all the time the master switch is on. If the power goes off, or I want to charge the mobile phone, then the internal battery will last about 2 hours. And of course, if it all turns pear shaped I will land the plane using seat of the pants flying. So all you have to do when fitting this stuff is to think about emergency power and what you will do if the fan stops and the battery dies, or you have to turn off the master.

One other thing that people are concerned about is, 'can you see the instruments in the sun?'. Well in the Zephyr as with many other low wing ultralights the canopy is completely clear so there is plenty of light. Well the Dynon is back lit and is very easy to read in all light condition, the Ultra does have a back light but this only shows up when it is dull or dusky. The screen seems to work by reflected light and as you can change the contrast you can always make it readable. One thing though, with all LCD screens the wearing of white with full sunlight on you will make reading it more difficult particularly if the screen gets the light from you on it. I find that using sunnies, with or without polarisation is not a problem (well with the ones I wear it isn't). In fact at times it can make the system more readable.

If you are looking at doing anything to your panel and you have an internet connection then the next bit will be of interest. The best site I have found for having a play with the different instruments on my panel was the 'Experimental Panel Builder' (<http://epanelbuilder.com/builder.htm>). They have the Atec Zephyr panel on the site so it was easy for me, see the picture below. I have used a GPS instead of the mobile, but it gives an idea of what I was aiming at. This site has many different panels with all the instruments in scale to them so that you can place them on your panel and see what it looks like. You can then follow the links provided to the manufacturers web sites to get more detail and pricing. If you find that they don't have an instrument that you know about or your panel on their site you just let them know and they will put it up. I did this with the Dynon.



I took a punt with the Dynon as when I was looking they had not released a version to the market, but had shown it at Oshkosh for a couple of years. I put my name down as being interested and followed up with them when they started shipping. I suspect that I was one of the first in the southern hemisphere to get one as setting the compass up was obviously a North American process. They could not handle the negative declination of North or the fact that we apparently fly upside down. They fixed the declination quickly, it took a few more weeks for the upside down bit. Flying north and south was ok, but east and west were transposed! Anyway, Dynon were very responsive and the instrument works very well.

You can find the equipment I used by looking at the following web sites:-

Stratmaster Ultra	http://www.lightflying.com.au/index.htm
Dynon EFIS-D10 (now the EFIS-D10A)	http://www.dynonavionics.com
Microair	http://www.microair.com.au
Garmin GPS III Pilot (discontinued)	http://www.garmin.com or http://www.skysupply.com.au/default.htm
iPAQ	http://www.ht.com.au
Haicom	http://www.ja-gps.com.au or http://www.haicom.com.tw/products.htm
Car Radio/CD player	http://www.supercheapauto.com.au
Experimental Panel Builder	http://epanelbuilder.com/builder.htm
Oziexplorer	http://www.ozieplorer.com http://www.gpsoz.com.au
PocketFMS for iPAQ PDA	http://www.pocketfms.com