New International Electric Glider Rules by Peter Pine

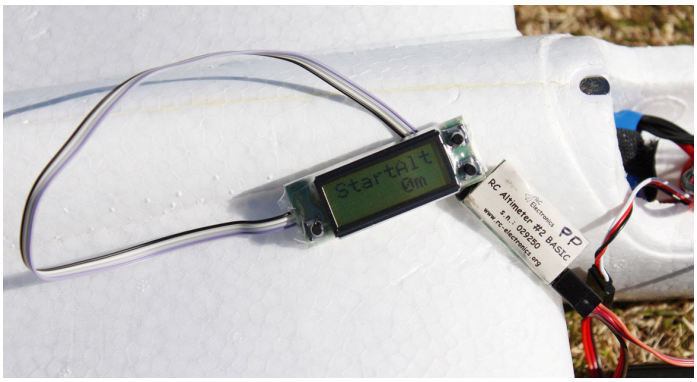
You no longer need a high-powered electric glider to compete in a thermal flying competition. The F5J rules that have just been accepted as provisional rules by our international governing body shift the emphasis away from a fast climb. The key to the event is to fly for 10 minutes in a 10 minute window by climbing for up to 30 seconds under power, with a reward for starting the gliding phase from as low a height as possible. There are no motor or battery constraints but on-board data logging of altitude is essential.

Like many of our events, each second of flight time scores a point. However the price for powered climb can be severe. The aim is a 200m climb or less; you are penalized 0.5 points per meter that you climb up to 200m and 3 points per meter that you climb over 200m, all of which must be completed within the first 30 seconds after launch. Obviously, it is better to climb less than 200m if you think you can achieve 10 minutes from a lower height. Minimizing motor time has no benefit. In other words, use the 30 seconds to look for lift, switch off and fly that thermal! If you start from only 100m you will be penalized 50 points. If you actually climb to 200m, you will be penalized 100 points. If you climb to 300m you will be penalized 400 points, so don't bother! The rules set the penalty height as that achieved 10 seconds after you switch the motor off. This is to prevent a high-powered climb with a zoom that gains extra height after the motor is switched off.

So, how do we know what height you achieved 10 seconds after you switched off the motor? And how do we make sure your motor turns off at 30 seconds in to the climb? Enter the **Alti #2 Basic** height limiting device and data logger. The original unit was designed to switch your motor off at a pre-determined height or after a certain time had expired. The most common setting was 200m and 30 seconds; parameters which have been emulated in the new rules. But you could select other parameters if desired, like 20 seconds and 100m for example. A hand-held device called an **RC FXJ Programming Card** was developed to program this device in the field (change the parameters) without the need for a computer. You can see these units on the manufacturer's web site
http://www.rc-electronics.org

When the new rules were being developed, Martin Bell of http://www.electricsoaring.co.uk, in conjunction with the manufacturers, developed new firmware for the Alti #2 Basic that complied with the new requirements, and also modified firmware for the hand-held reader to read out the desired information in the field without the need for a computer.

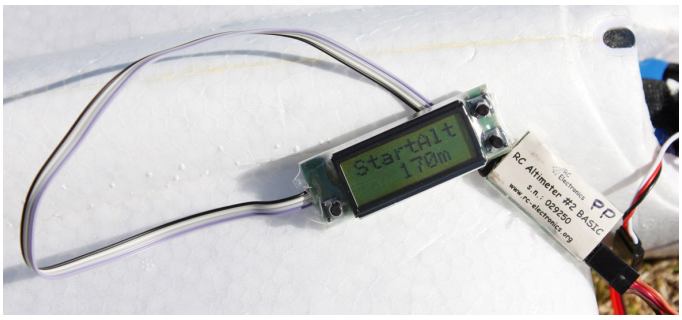
This is now how it works. You install the modified Alti #2 Basic in your model between the ESC and the receiver – it has JR type plugs that fit most gear. I found it easy to have an extension lead coming from my receiver in to the canopy area where the ESC is located. I can then insert or remove the device at will. Once you arm your receiver the start altitude is set to zero automatically – see the read out in the photograph that shows **StartAlt 0m**. You can now run your motor only once. If you want to check your motor, try it before installing the device.



You launch your aircraft as the hooter sounds the beginning of the 10 minute window. You can switch off at will any time up to 30 seconds in to the flight. Some brave fliers have even tried switching off at 50m when they perceive thermal activity – as pointed out, the lower the better! If you keep running your motor, it will be automatically stopped by the device after 30 seconds and you cannot start it again – the device will not allow you to.

You then try to land right on the spot landing marker just as the 10 minute hooter sounds; do not go over time or you will loose your landing points which are worth up to 50 points. You will not be able to achieve this unless you find lift; even if you climb to 200m it is unlikely you will fly for 10 minutes without thermal assistance. If you have to land earlier than 10 minutes because you cannot find lift, you land on the spot of course to achieve landing points.

Before switching off your model or disabling the power set-up, the hand-held device is plugged in to the Alti #2 Basic and reads out the height gained 10 seconds after you switched the motor off. The height is rounded down to the nearest meter by the device – it is as simple as that! See the photograph showing that I climbed to 170m. Once you disconnect your power the information device is reset to 0m ready for the next flight.



Let me put this into context. I took my Radian to my local flying field and conducted some tests. On the first flight I switched off at 139m but did not find any lift. The flight was all over in 3 minutes 20 seconds – what a low score! I retarded the climb on the second flight by feeding in down elevator and allowed the device to turn off the motor at 30 seconds – I had reached 130m and landed at 9:17. On the third flight I climbed as fast as I could and allowed the device to turn off the motor at 30 seconds. I then achieved a 9:52 flight and when I checked the height reached it was 197m! On the fourth flight I switched the motor off early at 170m and achieved a 9:58 flight. You can see that not all flights will be maxes – and you can see that **you can enter this event with a Radian!**

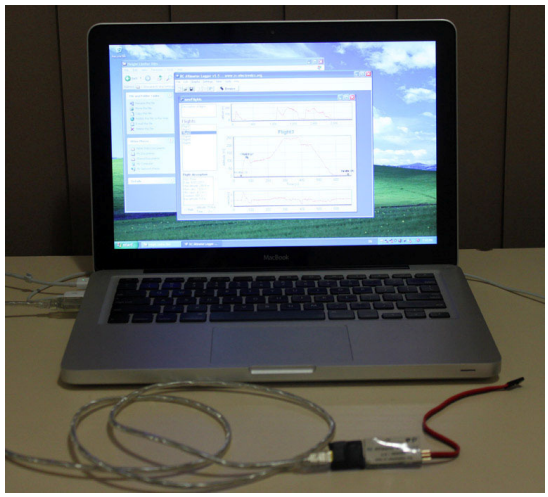
In the photo showing the Radian on the ground, you can see that I was within 2m of the spot. Assuming that I achieved that spot landing each time (and I did not really!), the last flight was my best score of 558. Even though I climbed higher than on flight 2 and incurred more penalty, I flew 41 seconds longer and this made the difference in the score. It is a balance between flying as much of the 10 minutes as you can and starting at the lowest height possible, but a low height is no good if you do not do the time. That makes it a real pilot's event – you choose your tactics and you gain the results!

AEFA provides devices for you to practise

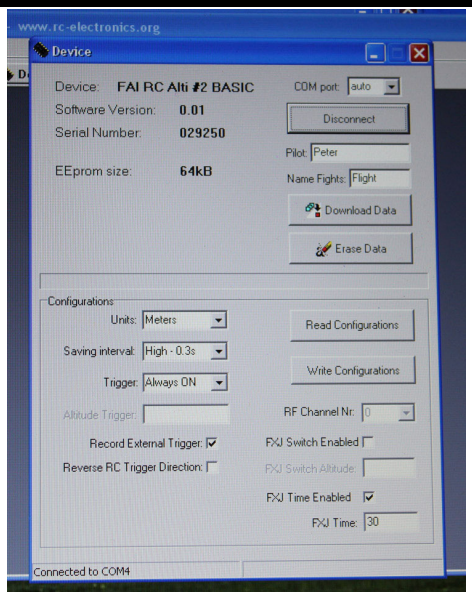
To promote this event and develop a team of competent, Australian, F5J pilots to try out for the first World Championship in this event, The Australian Electric Flight Association has investigated what equipment is available off-the-shelf now that meets the requirements of the rules. As a result we have purchased 10 Alti #2 Basic devices and a hand-held reader. We thank Martin Bell for providing firmware upgrades and advising us about the way forward. The AEFA will make these devices available to members for loan (with F5J upgrade) and eventual purchase (if desired) so that you can practise the task. Rob Watson and myself are the keepers of the devices – you simply need to send us an e-mail to request a device.

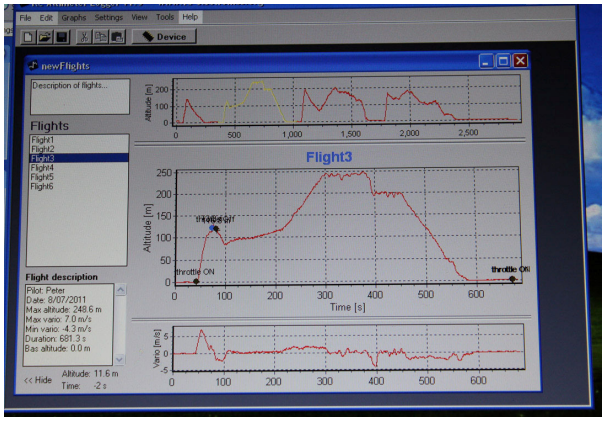
How can you monitor your flights?

As there is only one hand-held reader (which will be used at competitions), you will need to link your Alti #2 Basic to a Windows computer so that you can download your flight data after a flying session. I even loaded Windows on to my Mac (sacrilege!) so that I could use this program called **PC_RC_Altimeter_Logger v1.5.7.exe**. On the manufacturer's web site it is called **Windows (RC Altimeter #2 series).** The program can be either downloaded from the manufacturer's web site, or we can send it to you in an e-mail. The device is linked to the computer using the same cable as you use with your digital camera (mini-USB to USB cable) – see the photograph.



You then open the program and the window shown in an accompanying photo appears. Click on the connect button and the device details appear on screen. Click on download data – takes a while – and you then achieve the next screen that shows your flight log. There are two spurious flights thrown up – Flight 1 and Flight 6 did not exist. I had four flights and they were Flight 2 to Flight 5. You can see in the photo that I have clicked on Flight 3 (my second flight) – the one where I climbed to 130m. Look at the data displayed at the lower left and you will see that I climbed to 248.6m in a thermal. I then contacted a second thermal on the way down (as you can see from the graph). The throttle on and "ten seconds after throttle off" positions are marked by black dots – click on these two and the height gained is displayed. The top graph shows the four flights I made for comparison. I'm not sure how to read the bottom graph which is labeled Vario (m/s). Go back to the Window that revealed your device and click on Erase data – that clears these flights ready for your next outing. That is how you can monitor your practice after the event – at worst, take your laptop to the field.





Hyperion Emeter data

If you have an Emeter with an RDU, and you can fit the RDU in to your electric glider, you can also use that to practise the F5J event. The RDU will read out height gained data after the flight when you connect it to your Emeter.

First Australian F5J Event

The AEFA will hold the first F5J event at Picton on 2 October (Sunday of the long weekend) in conjunction with Macquarie Model Soaring Club, and the kind assistance of Richard Solomon. Borrow a device, practise the event and come to Picton to help in the first event!

Feedback from overseas

As Ray Pike mentioned in a previous newsletter, the Italians have tried the event and found it to be a real pilot's game. One brave flier turned off at 50m on his last two flights and still achieved 10 minutes in a low-lift situation. This made everyone else sit up and take notice, as he was 75 points ahead of those who climbed to 200m!

It is likely that large, lightweight gliders will fare well in this event. Feedback from Singapore is that Pulsar 3600 gliders fitted with MVVS motors took out the first three places at a recent event. Even so, if you have a glider with a moderate climb that thermals well, you are well placed for F5J – give it a go!

Some features of the rules

- Each flier is allowed three models of up to 4m wingspan
- One helper (plus a team manager) is allowed
- After 4 rounds of 10 minute flights, one round will be dropped in each flier's score and the top fliers will proceed to a fly-off
- The CD will nominate from 2 to 4 fly-off rounds of 15 minutes max
- The CD will nominate launch and landing direction
- Timing ceases when the model first touches the ground
- No spikes or arresting devices are allowed for landing
- Landing points are 50 for within 1m, 45 within 2m, out to 5 points for within 10m.
- Full F5J rules can be found on the AEFA web site www.aefanet.com. See 'F5J' at the bottom of the main menu.