

GLIDEPATH



The Journal of Wessex Soaring Association. March 2021
BMFA Club No 2759

From the Editor

I have just realised that that I called last month's Glidepath the January edition when in fact it was actually the February one. However nobody else seemed to notice, or if they did they were too polite to point out my error.

The two main articles in this edition are one from Richard Docketty on a flying wing design and a double act from Nigel Bennett and Ian Duff on the using ESCs originally intended for racing drones. These seem to have good performance at a low price and all sorts of variables on them can be programmed by a PC/smartphone. Also on the subject of programming Rod Lowe tell us he brought a 2.4 GHz TX and is finding getting to grips with setting the various options an 'interesting' experience.

From the Chair

Well, I was supposed to be having my car serviced this morning, but the garage has had to close temporarily as one of the technicians has Covid. However, my wife had her Pfizer jab yesterday (she is in an "at risk" group) and apart from a sore arm, feels fine; so bad, then good.

A few other good things are starting to happen. The sun seems to be poking its head out longer and more regularly, making the days warmer.

The Picnic Site

The picnic site may have an amicable solution on the way to provide us with access. The land is owned by the MOD and was leased to the local Council in 1971. That arrangement ended in 2019 and the control has reverted to the MOD. Terry White had been in talks with the relevant authority and hopefully a way forward can be organised via a licence for fliers to use it. More on this as and when I know it. Many thanks to all involved for their efforts in trying to allow slopers continued use of this site.

Return to the Sky

It looks like a limited return to flying can begin at the end of March, with a max of 6 people, as I write this we are awaiting guidance from the BMFA to come through. *Actually the government plan states that from 29th March 'people can take part in formally organised outdoor sports' which I assume would cover such things as our e-soaring events so we would not be limited to 6, Ed.*

CAA License

I was a little concerned as I have received several email reminders from the CAA regarding the operator's licence, as they are suggesting that I have not renewed it. I know that I have, via the BMFA, so I phoned them to check on progress. I was told that it was all in hand, but proceeding rather slowly, and that I will be notified by email. So, like a lot of things currently, we wait.

I hope all of you are well, and looking forward to some wind under the wings, I certainly am.

Slopeside by Pete Carpenter

What we believe to be the situation on each slope is as described below, however it is not always possible to contact every landowner each month and we have no wish to pester them. For Sallowcliffe and OXO please take extra care when parking, and do not drive down past the brow of the track in wet conditions or you may get stuck. If in doubt, walk onto the field and track first to check! Please use your own common sense and apply the countryside rules. Therefore if things look different at a site, particularly if it involves crops or livestock, please do not enter and contact me on pete.carpenter12@gmail.com or 01722 328728.

- 1) Winklebury (W to NE wind) - Available.
- 2) Norrington Down (S to SW wind) - Available.
- 3) Donkey Valley (SE wind) - Available.
- 4) Swallowcliffe (NW to NNE wind) - Available. No access into the field, fly from the slope side of the fence.
- 5) Quarry (W to WNW wind) - Available. Access to the slope must be via the Stony Down / Berwick St John route only. Launching and landing from the slope face is OK, but the slope is perfectly flyable from the Berwick St John field. You may encounter some paragliders as they also have permission from the farmer to fly there. In this case it is best to have a friendly chat with them and see if you can agree separate airspaces for models and paragliders.
- 6) Oxo (WNW to NW wind) - Available.
- 7) Horses/Barbara's Field (WNW to NW wind):- Available.
- 8) Daltons 1&2 (NW to NNW wind) - Available.
- 9) Crockerton (NW to NNW wind) - Available subject to rules in slope guide.
- 10) Death Valley (SW wind) - Not Available
- 11) Berwick St John (SW wind), Stony Down (ESE to SE wind) - Available. Code on gate padlock is 5823 . Please do not over fly the parked cars on your landing approach at Stony Down.
- 12) East Bowl (NEE to E wind) - Available. There is a gate with a keycode, which is 7850. The shepherd is Mr.Fletcher (red Toyota pick-up) and he has asked that anyone parking on the track put a little note on the dashboard of their car, letting him know that they are a WSA member.

There are also a number of public slope sites, particularly in the Purbecks that anybody can fly from. A list of these is maintained on [Christchurch Club's website](#) so please have a look there for details.

Flat Field Update

If you are the first to arrive at Chalbury go to the green box in the farm yard.

1. The field number is shown on the small plate on the box front . LEAVE THAT WHERE IT IS.
2. Remove the large red plate from inside the box and place it on the box front. It indicates the WSA are on site.
3. Also take the required equipment out of the box and to the flying field, i.e peg board, bungees etc.
4. If it is an event where you are expecting a large number of people take the corresponding field number out of the box and place it on the fence hook at the road entrance to the drive. There is no need to put the number on the hook if you are flying there alone or with just a few other people
5. The last to leave the site, ensure everything is replaced in the box, including the red plate and number on hook if used, but LEAVING THE FIELD NUMBER INDICATOR ON THE BOX FRONT.

Be aware of the field condition, e.g. after rain. Do NOT leave wheel spin marks. If in doubt, park off the lane outside the field. Leave space for farm traffic.

Be aware of footpaths across the fields, Do not launch if walkers are on the paths. Do not launch if horse riders are nearby.

No low flying over power lines. **No flying over farm buildings and the cottage, AT ANY HEIGHT, or immediately upwind of the farm complex.**

Fly SAFELY at all times. Especially launching and landing. Do not launch over cars and do not approach a landing over other flyers, fly a proper circuit.

Report any problems to the flat field rep, Doug Bowmann.

Prandtl Flying Wing from Angel Wings Designs by Richard Docketty

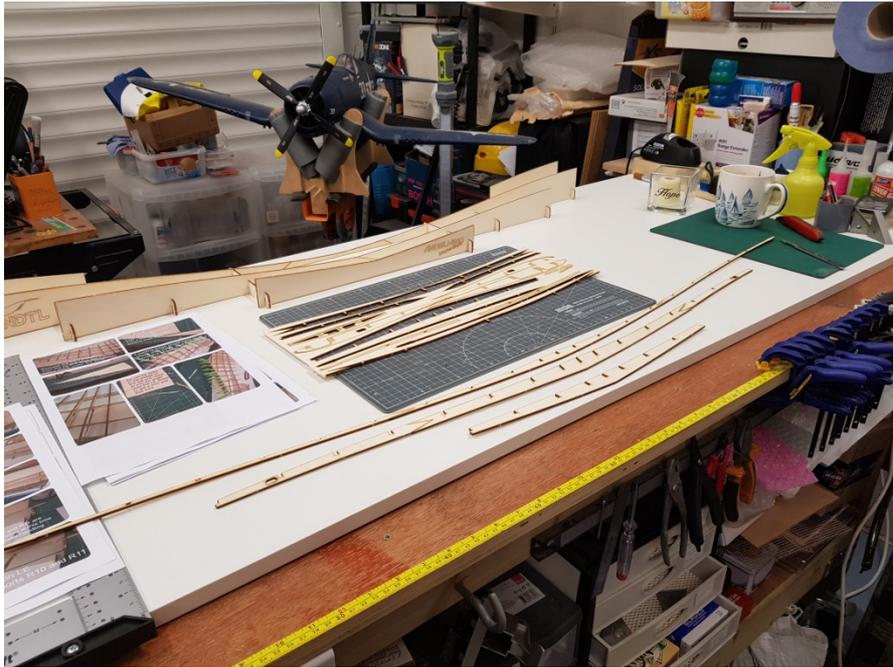


While researching the possibility of a Horten flying wing as a future build project, I found myself reading about a German mathematician called Prandtl who, during the 1930/40's worked on establishing (mathematically) how it was birds could fly very well without a vertical tail. At the same time the Horten brothers were independently working on their own flying wing and came to the same conclusions as Prandtl, building their planes with a 'twist' in the aerofoil with the effect of reducing adverse yaw and even introducing something called proverse yaw. Now, I am no student of aerodynamics, but it fascinated me that something like this existed all those years ago. Then I found that Al Bowers at NASA had been experimenting with his own flying wing with a 'Prandtl Twist' (or better known to the experts as BSLD - Bell Shaped Lift Distribution) and Youtube had videos of it in flight.

What I could not find however was a Horten plan or kit which definitely had this 'twist' built into its design. They just seemed to have plenty of washout to reduce the possibility of meeting the dreaded 'flying wing spin of death' mid flight. By chance I was chatting to a good friend from the MVSA club and he mentioned that Angelwing Designs had introduced a kit called a Prandtl flying wing, and if I needed my appetite 'whetted' further, which I did not, there was even a video blog and a couple of flight videos on Youtube. Time to place an order while putting the Horten project on hold for a bit.

You will no doubt be glad to hear this is not particularly an article on how to build a Prandtl wing, but more to show you what clever people in our sport can come up with; in this case a very clever chap by the name of Marko Stamenovic. One key to achieving the wing shape is the supplied ply jig which is fixed to your building board to hold the spars and ribs in place and at the correct angles to achieve an accurate 'twist'. The following pictures hopefully give a feel for how the wing is constructed over the jig.

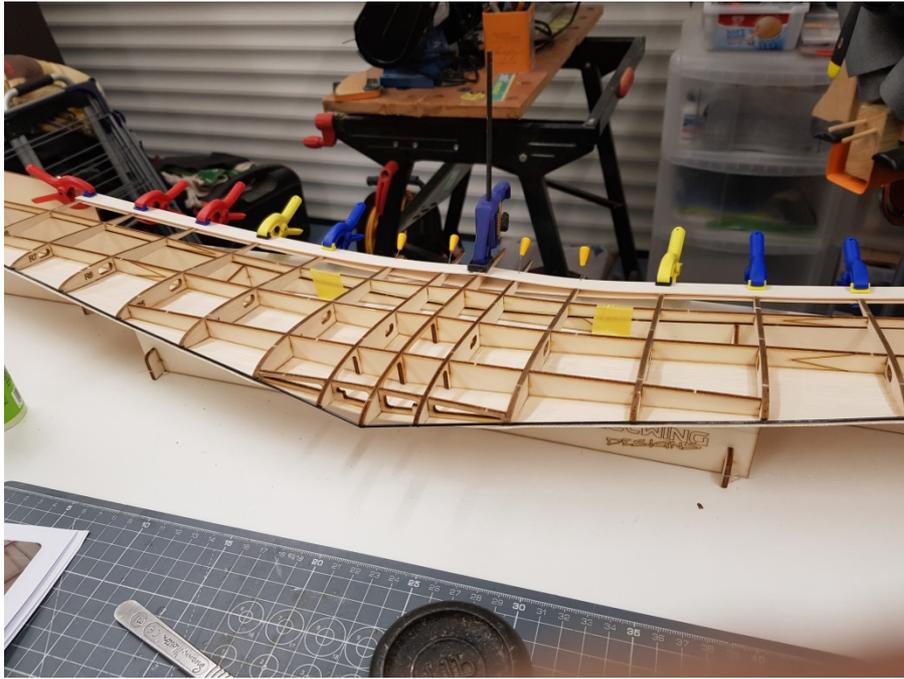
Any thoughts of maiden flights will have to wait until lockdown 3 is eased enough to allow us to go out and play again, so watch this space.



Jig fixed to building board and spars ready to be taped in place



Spars and ribs glued in place



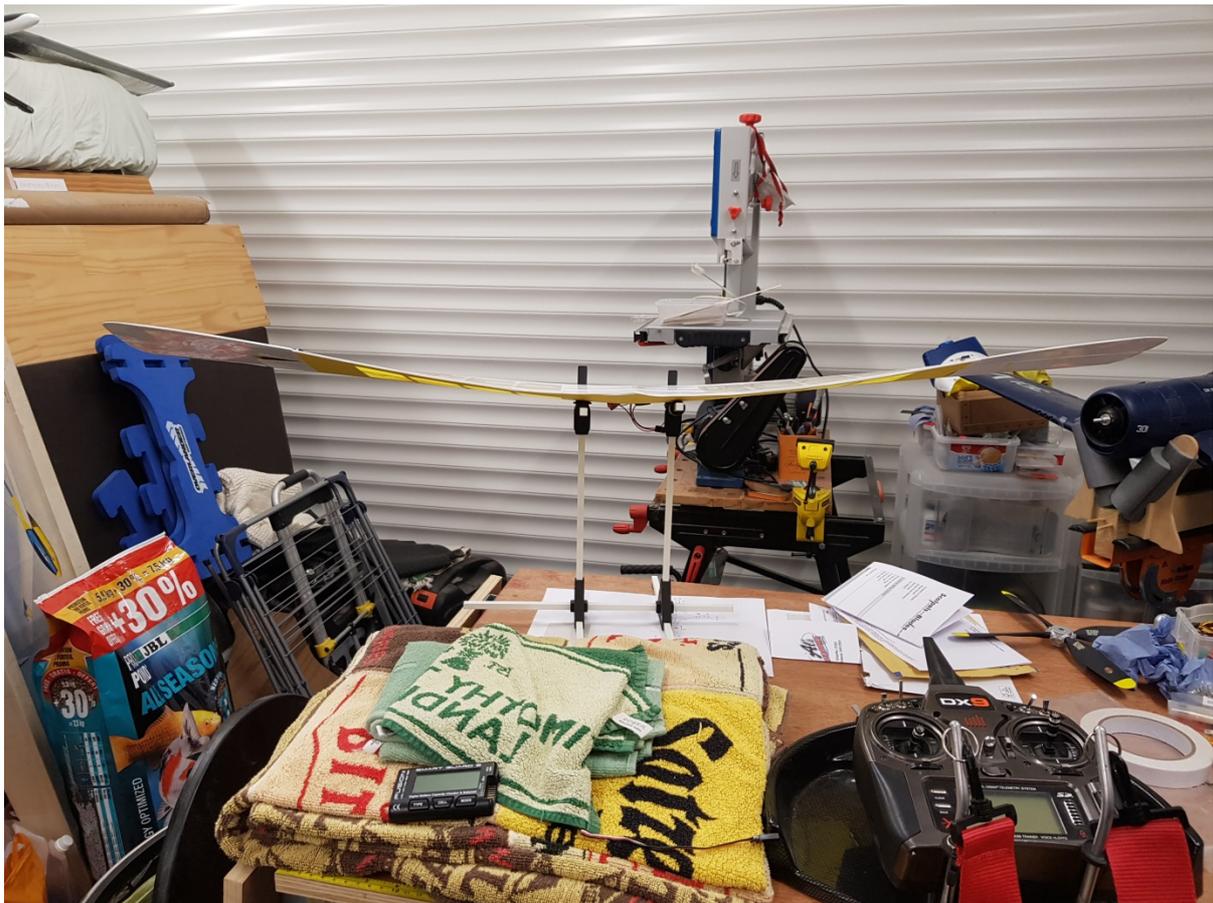
Prandtl frame complete and ready for sheeting



Sheeting complete. The elevons have their own twist to match the wing contours



Wing ready to receive electronics



Profile picture clearly showing the 'twist'. Remind you of anything?

Finally as an update from February article, the Miri is now complete and raring to get airborne as I expect we all are.



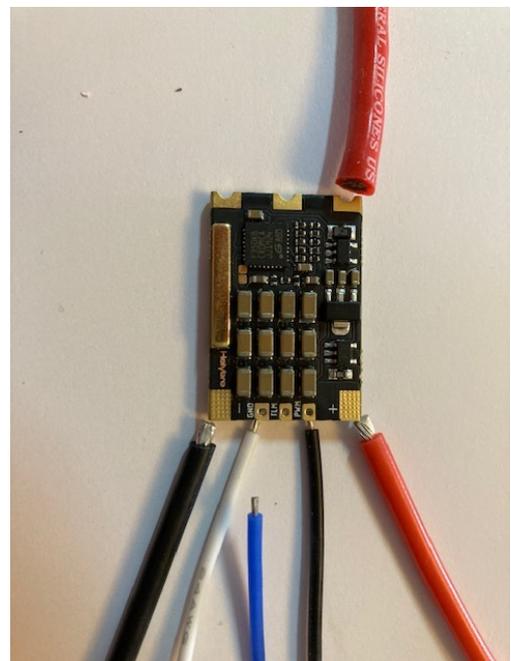
Racing Drone ESCs by Nigel Bennet and Ian Duff

Nigel writes,

Having occasionally watched FPV drone racing on Youtube, I marvelled at both the speed and the accurate control of these devices through the various chicanes and obstacles that form part of the race course. When one realises that all the control movements are done through control of one or several of the motor speeds, their speed controllers must be a bit special.

Last summer Ian Duff told me that in the F5j world were experimenting with drone ESCs, because their technology was way more advanced than in the ones that we use, in terms of size, weight and smooth motor control; and they were cheap. He said had a program for setting up these devices, so I duly bought a Holybro Tekko 32 F3 metal 65A esc; they do a 35 Amp version as well. It costs £24, though most others ones are cheaper and reputedly is one of the best quality ones available. It weighs 12g, measures 18 x 27mm, and looks like a piece of jewellery.

The downsides are there is no built in BEC so you need a separate S BEC, and there are no wires soldered on though it does come with wires in the package. One or two alternatives do though have the soldering already done. A word on the soldering. One needs at least a 40 amp iron because to get the solder to melt on without too much heat



flowing into the ESC, each connection needs to be done quickly. I tried first with a 25 Amp iron and was worried at the length of time it took and the temperature the rest of the ESC was reaching.

Ian kindly programmed it for me for prop braking and start up, and I bench tested it with a motor and an S BEC. It worked very smoothly to throttle increases, stayed very cool and is now installed in a 2.3m model waiting for our glorious spring to start (*and one assumes lockdown to end, Ed*).

Ian continues,

For me, it all started with what I thought was a wind up by a good friend of mine at a F5j competition. I thought he was trying to distract me and win the competition, as he was waving a minuscule ESC under my nose claiming that it was better than the 70amp commercial ESC I was using, runs cooler and was significantly cheaper. I entirely misjudged his motives as it looked like no ESC I had ever seen and way, way too small.

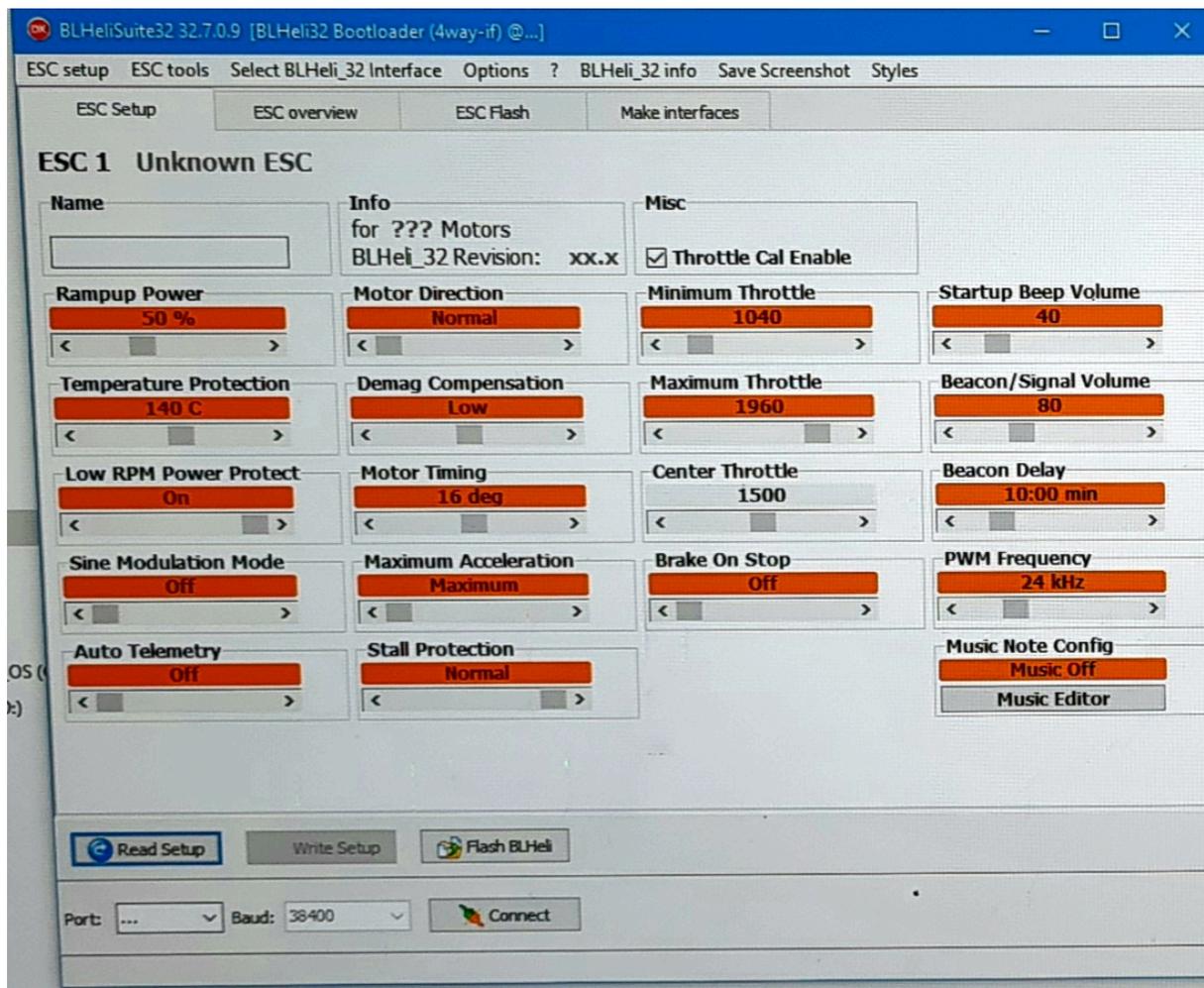
Turns out he was right and I was wrong. In the year and a half that I have been testing this new generation of micro (drone) ESCs everything he claimed has proved to be the case. The marked saving in weight and volume of these units does not appear to compromise performance, quite the reverse, but what has impressed me more is the ease and far greater scope for finer tuning through detailed programming the ESCs. Clearly the drone guys have not been idle. Gone are the days of counting beeps and chimes and moving throttle sticks or even using programme cards. It is like going from analogue to digital. To put this into context, a 70amp micro drone ESC costs around £17 - £22. Compare that to a similar rated good quality E-soaring ESC and we are talking about that costing anywhere between £150 - £180. You can see why I was a sceptic at the start.

It turns out that anyone who can solder wires and has a rudimentary experience of using a Windows based PC system can programme the ESC without too much difficulty. If I can do it ... So what do you need aside from the ESC? A fairly up to date windows PC (I happen to use Windows 10), a suitable software programming suite, a BEC, a USB cable and an Arduino board; that is it. The Arduino board cost me £3.50 but it can be used repeatedly. I had the USB cable and BEC lying around so the outlay was minimal, circa £20 for the ESC and Arduino board. Initially you have to solder a positive and signal wire (with a standard r/c plug on it) to the Arduino board and programme it using your PC via a download file. There are a number of helpful YouTube videos which detail step by step how to flash the Arduino board with your chosen programme. I happen to use the 'BLHeli 32 software suite' to programme the ESC as it is well regarded and used widely within the drone community and it is free (no adverts either). There is also now an Android version available which allows you to tune the ESC settings on the field through a smart phone. I have not tried this but sounds interesting.

Depending on the micro ESC you buy, some come with the power input wires and Rx wires and plug attached but in all cases you have to solder three wires to points on the ESC enabling a link to the motor. Being one for an easier life I use Adria ESCs which have the input and Rx wires pre-soldered.

After joining the ESC to your receiver's throttle channel (the Rx is powered by a remote NiMH battery pack) and to the motor, switch on your Tx. Assuming your Tx and Rx are bound, attaching the LiPo to the ESC results in a series of beeps. After calibrating the ESC to recognise the maximum and minimum points of your Tx's throttle channel, as you do with all new ESCs, you are now ready to programme the micro ESC. I disconnect the Rx battery pack and substitute the BEC as the power source for the Rx from here on.

You link your ESC to the PC via the Arduino board and after calling up your BLHeli 32 programme screen on your PC, Windows 10 automatically finds and loads a suitable driver. The BLHeli 32 window on your PC now allows you to interrogate the ESC, read the set-up, write a modified set-up and/or flash the ESC by simply clicking on one of three buttons. Once you have flashed the ESC you can then play with the digital settings on the BLheli 32 programming screen to tune your ESC. Once you are happy with your preferred settings, you click the "write set-up" button. See the screen shot below which was taken early on as more variables have now been added, but it shows how simple it is.



Amongst the variables available, and of interest particularly for e-soaring applications, you are able to fine tune;

- How the motor power ramps up
- Motor direction
- Motor timing
- Max acceleration
- Min, max and centre throttle positions
- Braking (to smooth the folding of the props)
- Beacon delay (lost model)

I tend to use a standard set-up I have and then tune that according to the particular motor size and prop combination. I understand that BLHeli 32 are looking at an expansion to the programme to allow for telemetry applications and regularly update the programme suite to keep up-to-date with drone developments. At the moment, I just can not see me buying another e-soaring commercial ESC again.

Hyperflight has stocked up on the micro drone ESCs and some of them appear to have the BLHeli 32 software already loaded as well. Having the software on board cuts out the need to flash the ESC via the Arduino board but it will still need to be programmed using a PC/smartphone; mind you that is the fun part. If it helps, I am happy to lead a short and practical workshop for club members regarding programming BLHeli ESCs if there is any interest after we get out of the lockdown.

A Venture into the Unknown by Rod Lowe.

Well scrontle me prejonicles if I aint bin and gorn and bought a 2.4 Tx. One of them there Radiomaster TX16s.

I have no idea if there are any others in the WSA who may be considering getting one. For those who would wish to analyse technical details first to help with making the decision, it is black!

The fact that I have no previous knowledge of OpenTX means a bit (no, a lot) of head scratching and I will be trying to make sense of the various YouTube tutorials. Most of which seem to be too fast for my addled brain and have to be repeated again and again. Perseverance will be required to learn my way around what to me are amazingly huge menus, before I even start to do any programming proper.

Have I bitten off more than I can chew? Will it end in tears? Will it all end up on the scrap heap or even worse, Ebay? For the answers to these and other questions watch this space.

Calendar

Sorry but the crystal ball is still rather murky again. We may be able to restart events on 29th March, but everything depends on the R number. Never before has there been so much public interest in something that is effectively a term in a differential equation.

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