Newsletter

January 2020

Happy New Year to you all. At last I have taken the advice of friends and have arranged some respite care. I've got 2 hours every Friday which I spend down in my cellar at last building a model aircraft once more. Judy is just upstairs with her 'sit in' carer. Great.

The model I'm actually building right now is the Super 60 which I've been itching to get started for a long time now. It's a Ben Buckle kit and only time will tell whether the amount of balsa is adequate for the build and of the correct quality. Anyway, it has been very satisfying so far - a lot of cutting and fitting but that is the joy of working with balsa.

I'm just trying to decide what size LiPo to make provision for. According to the 4 Max website, one guy is using a 3700mah 3S LiPo which seems a bit big? I don't want 20 minute flights and from my experience so far with the other Super 60 I have, doesn't require much power to fly. That one (converted from I.C.) flies happily for 10 minutes on a 2100 3S and still has around 40% plus left when it lands. So why do you need such a large lump of power source?

I'm never going to rush to complete it - for me it's just therapy enjoying the construction. I'd just like to have it ready to fly when the weather smiles on us once more.

I know that John Prothero has been going through the wars of late with his health I keep an eye on the Club's Facebook pages and see that he's been enjoying himself flying an electric control line model. I also see that he's ensured that our Club has been given a prime spot once more at the upcoming Cleveleys Classic Car Show. Thanks John for once again promoting the Club.

When the field dries out a bit I will get down to get some pictures - I've been told that at the moment it's a bit squelchy underfoot. Roll on the dry weather.

A VIEW FROM THE HEDGE. (By Will Sparrow)  nuary 2020

You must admit that the number of good flying days of late can be counted on the fingers of one hand. Sunday, 1st December, the first day of advent, however, required that one more digit be called into play; it was, indeed, a beautiful day for doing what you all love; flying model aeroplanes. Okay, the day was cold, and frost lay on the ground, but of wind was there none. Yes, a beautiful day. A couple of hardy members turned up early and more followed later. Because of the conditions, light models (that sit on top of the grass rather than sinking into it) and/or models with big wheels were the order of the day. All in all a goodly start to the winter flying season.

With the winter solstice behind us and the days beginning to lengthen, the spirits in the hedge dared to lift, despite the continuing bad weather. To help lighten the mood, and since there was no model flying to watch, we decided to have a seasonal hedge quiz. All the hedge's small birds were invited to take part. The Wise Old Owl agreed to set the questions (at this point I did point out that his target audience was a bunch of sparrows, the odd robin, a few pairs of tits and a small contingent of finches: I implored him not to make the questions too hard) and a friendly great tit, who went by the name of Dave, agreed to act as question master. Come the day, the birds, in a spirit of camaraderie, formed small, mixed groups of twos, threes and fours all eagerly awaiting the first question. "How many legs has a centipede?" intoned Dave. Dozens of confident faces looked up as Dave continued, "How many wings has a biplane?" Dave was beginning to warm to his task and the birds were (for the most part) still looking confident. "Complete the following statement: birds of a feather ----- together". As the quiz continued, the questions started to become a smidgen harder and more than one feathered head was starting to be scratched. "What are the names of Santa's reindeer?" Why is Eric, the brown-nosed reindeer, so

A VIEW FROM THE HEDGE Continued/....

called?" "The number one is the only number to have its letters in reverse alphabetical order, but which number is the only one to have its letters in ascending alphabetical order?" At this point I noticed two things: several birds were asking each other what alphabetical meant (and quite a few more were nodding sagely and pretending that they did know)… and Dave, the great tit question master, was starting to sweat as he realised that the WOO had not given him the answer sheet! The WOO was, of course, teasing Dave and slipped him the answer sheet just before the feathered multitude started clamouring for the answers. All in all a great time was had, the winning team was given a big, fat worm to share between them and every bird, with lightened heart, made his way back to his own twig to await the coming of Christmas day.

The last Sunday of 2019: the day of the giant blackbirds! Not, as you might think, a couple of avians on steroids, back from their daily workout, but a pair of large (4m), all-carbon gliders. One was a second-hand purchase by one of your members, the other was owned by a chap hoping to become a member. The finish on these all-carbon models is awesome – way beyond the capabilities of normal modellers (is there such a thing? – WOO). The price tag attached to these beauties would also necessitate said normal modeller having to sell a kidney or (more likely) find another part-time job for his wife! The prospective member also had a couple of other gliders in his quiver – again, all at the high-tech end of the spectrum. His discus-launched glider, after a shoulder-wrenching throw, reached a good height but was soon down in the zero thermal conditions. The next machine to taste air under its wings was a hot-liner – and I mean hot! To see this multi-kilowatt model hit 400ft in two seconds, (He's not joking. – JS) issuing a noise like tearing calico, was something to behold. If I'm honest, these sort of models put the willies up me; that prop would not just give a modeller a cut finger, it would take his arm off. Food for thought?

A VIEW FROM THE HEDGE Continued/….

As the old year ended and the new one began, the hedge was visited by a small group of birds who were "just passing through". As you know, we hedge-dwellersare a pretty friendly bunch and will always find time to chat with visitors and share their news. These birds told us of the custom, common among humans at this time of year, to plunge themselves into cold rivers, streams and even the sea. Some, apparently, do it to raise money for charity, others do it because they like the experience. The visitors said that they did the same, on a regular basis, and urged us all to "give it a go". This offer met with a muted response from the listening sparrows. I think ducks are weird!

The New Year also brings with it the New Year's resolution. I'm sure that most of you will have sworn to stop buying lumps of Chinese foam, masquerading as model aeroplanes, and to build your own models from traditional materials instead (get real, Will – WOO). In the hedge, a group of us have sworn to become vegans; we've been at it for a while now. Only this morning, having had my morning berry, I was sitting on a twig when a grub, on an adjacent twig, looked me full in the face and stuck his tongue out. He had obviously heard of our new-found veganism and felt cloaked in complacent immunity. He was wrong: I ate him! Being the honest bird that I am, I made my way to the communal area of the hedge and confessed my lapse to the rest of the group. My mate, Jim Sparrow, owned up to having ditched veganism a couple of days ago. The rest of the group looked sheepish, then, one by one, they too owned up to having done the same as Jim – one had only lasted ten minutes. A wave of euphoria washed over us as we set off on a celebratory grub hunt. Are you modellers still holding firm or has a euphoric wave washed over you too…?

WS

Mind the Gap

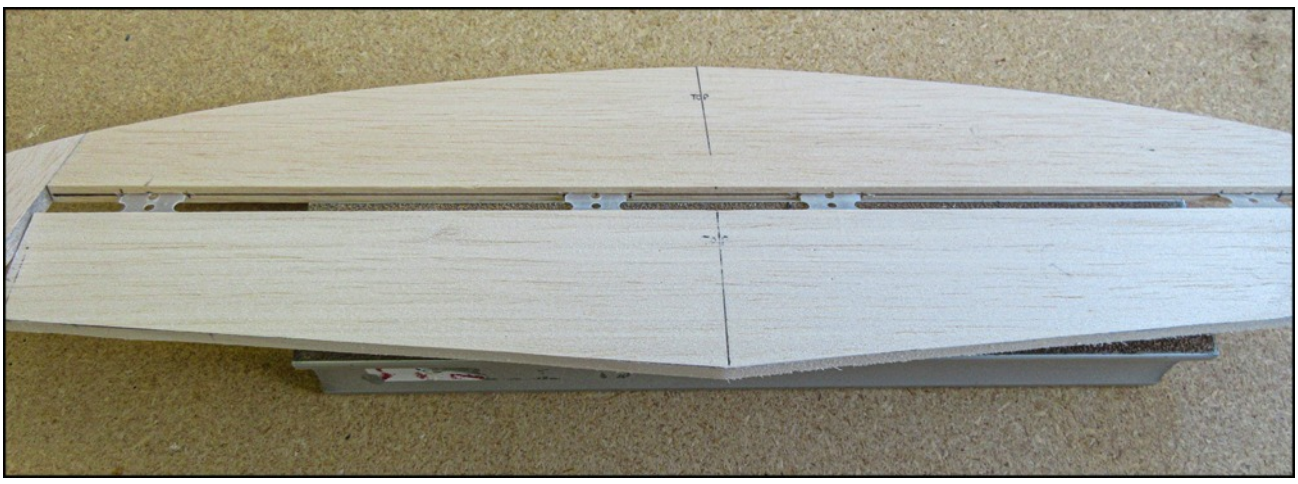
January 2020

As most folk know, control surfaces do their job best when the gap between them and their wing/tail plane/fin is as small as possible and the two components align properly. Back in the bad old days when modellers used to build their own models, a beginner's first trainer was likely to be the first model he had ever built. Very often the gaps, where the control surfaces fitted, were large enough to drive a bus through! All these models flew – if not very well in some cases! Nowadays, few build their own models, but, just in case someone might be tempted to build a model (or even replace a damaged tail or fin on an ARTF) let me share with you my method of fitting control surfaces.

I'm assuming the job in hand is a simple tail plane made from 1/4" balsa – if you are used to doing proper shrouded hinges on your 1000 hr scale model or fitting gap seals to your latest 5 meter glider, then this piece is not for you: you already have your own methods!

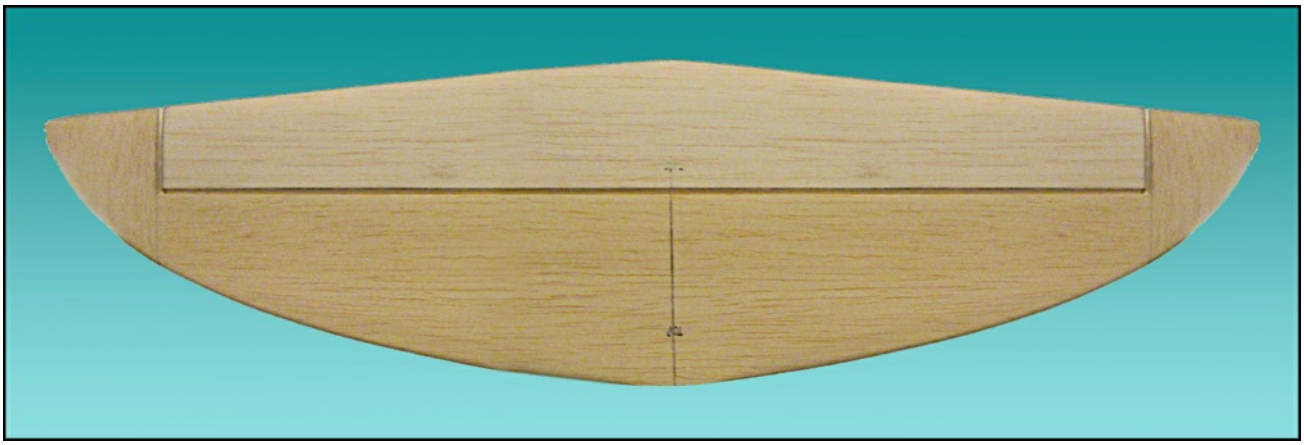
Let's assume that you have cut out your tail plane and elevator. What's the first thing you do? That's right, you draw a centre line on the square edges of the mating surfaces of the two components, mark the position of your hinges, then dry-fit your chosen hinges. In a perfect world you would see two, perfectly aligned components… I bet you don't, though!

In the real world we put the ensemble on a flat surface and, using a sanding block, sand one side perfectly flat. Flushed (I really must stop using puns!) with success, we now turn things over and do the same with the other side. Blow off



Mind the Gap Continued/... January 2020

the dust (you're not doing all this in your living room, are you?) and stick a length of masking tape along the hinge line on both sides of the tail plane/elevator – this, together with the hinges, locks everything together.



Now is the time to create some shavings and dust as you shape the tail assembly to your desired section and profile.

Finally, remove the tape, pull the two bits apart and remove the hinges. Now, put a bevel on the elevator's leading edge using a razor plane and/or sanding block. Re-assemble the two components and check for free movement. When you hold the tail up to the daylight you should only be able to see the merest crack of light.

If you feel so inclined, you could also incorporate anti-warp strips, ply stiffening pieces and ding-proof the fine edges with ply strips or carbon fibre. How far do you want to go?

It's time to cover your handiwork, glue in the hinges and fit your tail plane, secure in the knowledge that no bus will ever get through your model's gap!

John Higgins

January 2020

Article by Brian Holdsworth

Glider Set Up

A body in motion has kinetic energy which is defined as half the product of its mass and the square of its ground speed. It also may have potential energy, defined as the product of the mass, height above ground and "g" (the gravitational constant). Gliding flight converts potential energy into kinetic energy to maintain flight by gradually losing height to replace the energy lost to drag. The converse also applies and an excess of kinetic energy can be converted into increased height and hence potential energy, sometimes referred to as a zoom. This suggests that greater mass would produce better gliding duration; unfortunately the greater lift required to support the increased mass also increases drag, requiring more potential energy to compensate, cancelling most or even more than the apparently improved performance - everything costs!

For an aircraft, airspeed is a critical factor for maintaining flight. Ground speed is the airspeed reduced by the headwind component of any wind so reducing the kinetic energy. If that headwind is greater than the airspeed, ground speed would be negative so that the kinetic energy would also be negative. Similarly, a tailwind increases ground speed producing increased kinetic energy. The proportionality to the square of the ground speed can make these effects very significant. An inevitable consequence of passage through the air is drag which reduces kinetic energy.

Drag has two main sources. Parasitic drag is produced by the passage of the air over the aircraft and is proportional to the square of the airspeed. Induced drag is an inevitable by-product of lift generation and is proportional to the square of the airspeed and the angle of attack (angle between the chord line

Glider Set Up Continued/.....

Article by Brian Holdsworth

and the oncoming air). Thus, drag increases rapidly with increasing airspeed. Complicating the analysis, induced drag rises rapidly with angle of attack so that very slow flight can have a disproportionally high drag. Glide performance is heavily dependent upon scale effect with several varying optimal flying speeds for minimum sink, maximum ground speed etc. Determining these speeds is difficult, even for full-size gliders with their ability to use sophisticated measuring instruments over extended periods at heights where reasonably stable air movements may be obtained. Model performance is even harder to determine with little feedback to the flyer and greater sensitivity to the considerable air movements at low altitudes from turbulence, thermal/sink activity etc.

Fast flight for a glider can be useful even though the inevitably increased drag reduces duration. There are several competition classes where a glider is required to fly round a speed course marked by pylons in the shortest time possible, which requires both fast flight and sufficient manoeuvrability to negotiate the pylon turns tightly to minimise the distance flown, while avoiding excessive loss of energy. In practice, adding ballast to increase wing loading is the most effective technique. For all usages, it is sometimes desirable to move quickly from one area of the sky to another to take advantage of suspected lift, or to move away from an area of sink.

As covered earlier, the airspeed for a glider with positive pitch stability is controlled by elevator trim, so that applying down trim from the baseline setting will increase the airspeed and hence the perceived speed over the ground. Flight depends upon the lift generated by the wings supporting the aircraft. This lift is proportional to the square of the airspeed and the angle of attack.

If the airspeed is increased, the required angle of attack for level flight reduces and the aircraft adopts a more nose down attitude. For typical wing sections considerable lift is still generated at zero angle of attack, but the minimum induced drag for an under cambered section is a little above zero, increasing sharply towards negative angles which are thus best avoided.

Glider Set Up Continued/.....

Article by Brian Holdsworth

Where flaps and/or flaperons are available, a small improvement may be achieved by applying reflex (raising the surfaces slightly above neutral). This has the effect of reducing the lift so that, to maintain the lift for a given angle of attack, the required airspeed is increased moving the drag curve to a better position, reducing the drag. The benefits are quite small and only become significant at relatively high speeds. Some of the more exotic sections show little benefit or even increased drag with reflex.

It is debatable whether flaps should extend to the wing root, producing interference drag with the fuselage side, or stop short with a fixed portion, producing a small vortex from the sudden transition (as for Crow covered earlier). For models with their significant scale effects, any differences will be small so practical convenience usually dictates. A low-mounted tail plane would be within the wing downwash area, confusing attempts to observe reflex effects. Excessive pitch stability would increase drag at higher speeds, so a setting with only slight stability can be helpful, remembering the need for sufficient hands-off stability at altitude in lift - compromise again!

The optimal reflex angle will be small, a couple of millimetres or so at the trailing edge, and barely visible. For an under cambered section, a good initial setting would be to raise the flaps/flaperons to take out most of the undercamber, as indicated by a straight edge along the wing underside touching the flap lower surface leaving only a small gap in front of the hinge - this is probably good enough for most, since optimising the angles is difficult! Generally, flaperon movement should be less than that of the flaps to reduce the effects of drag from the disturbed airflow at the tips.

In the early days of aeromodelling, most models were small, free flight and launched by towline or rubber motors. A trimming technique used by some contest enthusiasts to trim for maximum duration, and hence minimum sink rate, was to fly around dawn during a period with high atmospheric pressure and clear overnight sky so that the air would be flat calm, in the hope of achieving repeatable results. A series of flights would be made at a flat field from a short towline (30 feet or so) using a stopwatch to compare duration

Glider Set Up Continued/.....

Article by Brian Holdsworth

while making small changes to CG position and tail plane trim. Such techniques are impracticable with current larger models.

Repeated flights to compare reflex changes would be difficult and probably ineffective, except perhaps for the dedicated enthusiast. By making in-flight adjustments, it may be possible to compare changes to reflex angles and so improve performance. Some of the more complex transmitters allow a knob, slider or additional trim button to be linked to a menu parameter allowing its value to be changed dynamically - if the manual and user interface can be interpreted! Where the transmitter supports linking the flap/flaperon positions to a knob or slider, it may be convenient to temporarily configure the controls accordingly even though normal usage would be simpler with switched operation. A mixer could apply a small offset to the surface to allow comparison between its on/off values; some transmitters allow a knob/slider for the master to produce variable control or the closed throttle could be a suitable switched source, requiring multiple flights while the mix value is optimised.

Alternately, the model could be flown with the transmitter in editing mode for the required parameter, so that changes may be made by pressing the appropriate buttons etc. Such usage is dependent upon the ease and certainty with which such changes can be made, since it is obviously undesirable to look away from the model in flight. Physical up/down buttons are generally easy to identify by touch and unambiguous in operation. Rotational controls such as rollers or dials, combining rotation for change and press to enter or exit editing, can be very sensitive in operation with the considerable risk of inadvertently closing the editor and re-entering editing mode after scrolling to a different parameter, possibly in another menu, with obvious potential for problems. Touch screens with editing buttons on the screen would be difficult to use without looking down at the screen.

To allow adequate visibility for assessment, the glider needs to be flown reasonably low and close with only a light wind to minimise turbulence effects. As the reflex angle is increased, the fuselage angle with respect to the ground will increase, This angle will be very small and an obvious change indicates far

Glider Set Up Continued/.....

Article by Brian Holdsworth

too much reflex. As a small amount of down elevator stick is gently applied, the speed will increase and the effect become more apparent. For contest usage around the speed course this might be double the baseline speed, but general use would be considerably less, especially as there is a significant potential for damaging flutter at high speed. When the down stick is released, the natural stability will cause the model to pull out into a zoom. In most cases, reflex will reduce the zoom rate slightly when near optimum; this is a very inexact science and accurate results are not possible. When satisfied, an equivalent down trim should be applied when reflex is selected. Ideally, switching reflex on will produce a smooth transition to faster flight, maybe 20% above baseline, with a slight zoom into a smooth recovery as the model slows when the reflex is switched off.

Club Instructors

Jason Reid, John Higgins, Chris Vernon, Mark Conlin, Brian Holdsworth, Jim Sheldon, Paul Cusworth, Andy Harrison, Justin Goldstone , John Prothero

Upcoming Events

Wednesday 5th February *Indoor Quad and small helicopter Slalom*

Wednesday 4th March *String along and bring a video evening*.

Wednesday 1st April *Back to basics - Safety Talk*

In Conclusion

January 2020

As ever, I am so grateful to you gentlemen who have contributed to this newsletter. Please, if you have a current project, share it with your fellow members. I am forever looking for contributions.

I have taken no pictures throughout December/January since I was unable to attend any of the functions.

I wish you all happy and safe flying.