

Newsletter

April 2019

What an Easter - wall to wall sunshine and I understand that on Easter Sunday that the field was packed. I was able to go down on Easter Monday and there were two members flying, Carl Brotherton with his PT19 and John Higgins with the Sebart SBach. I took my camera down but have to admit that I'm getting a little rusty because when I returned home, the pictures simply were not as sharp as they should have been.

I couldn't stay long as I had Judy in the car and she really shouldn't have been out. It was good to meet up with John and Carl and great to be at the field.

The little PT19 is a pretty model in the air but seemed a little twitchy in it's flight pattern. Carl blamed his own piloting skill but when I looked at some of the pictures, the ailerons did seem to have perhaps a bit too much travel.



I do love these old designs - they have such character. Nice one Carl - he said it was one of the American kit models - I think he said it was kitted by Stirling and could be built as a control line or R/C model.



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John Higgins putting in yet another immaculate aerobatic flight with his Sebart



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A VIEW FROM THE HEDGE. (By Will Sparrow)



The Wise Old Owl was telling me, only the other day, that, when asleep, sheep dream of new ways of killing themselves or, at least, doing themselves serious harm. It was his opinion that something similar applied to model aeroplanes such that when in storage, in shed or hangar, they spent the time in contemplating new ways of crashing. The arrival of spring provides the ideal opportunity for the little rascals to put theory into practice... a sort of aeronautical version of the Darwin Awards (Eh? – Jim Sparrow).

Now that the real spring has arrived (this year we have been lucky enough to have already experienced a very pleasant “mock spring”), and you modellers have been emerging from winter hibernation, the usual crop of “spring issues” have been apparent: engines that either won’t start, keep stopping or are suffering other maladies, models that have forgotten how to fly properly and modellers who can’t remember which switch does what! I have also noticed a few models that have, obviously, spent much time in deep contemplation...

Early April saw the demise of a rather nice DC 3 which rolled in on its maiden flight. Later in the month a quarter scale CAP 21 bit the dust although, to be fair, range problems had been suspected prior to its demise (!).

The warm weather has brought out a goodly crop of flight trainees, eager to progress to achieving their “A” certificates and I’ve noticed that their enthusiasm seems to be yielding some pleasing results. One such member, equipped with a small, foam, electric-powered model enlisted the help of an experienced member to test-fly his aeroplane (I’m always impressed by the amount of help which seems to be on hand). The model turned sharply left on its take-off run and, barely leaving the ground, ran into the crop. “Not enough elevator” went the cry. The model’s undercarriage was knocked off so the model had to be retired for gluing and general fettling. Now, this is where the tale gets interesting... The next day, a cold Sunday, the model re-appeared complete with freshly-glued u/c and fettled elevator. Before long, an ever-helpful instructor was co-opted to attempt to coax the model into its element. The CG was checked and the failsafe was enabled. The owner said that he hadn’t changed anything more from the previous day. Being a



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confirmed sceptic, the instructor checked the controls: when the elevator was moved, the ailerons moved in sympathy! (At this point I flew over for a closer view). The first guess was that an elevator/aileron mix had been activated – a suggestion repudiated by the owner. It transpired that the model had been set up on the transmitter's helicopter program, complete with weird heli-type mixing. This model really does deserve a prize for deep, winter contemplation! Once the model had been set up on an aeroplane program a successful flight resulted and, after a bit of trimming, the little 'plane was flying beautifully, ready to face the rigours of many training sessions.

Not all of April has been good, and a duff April has been seen as a predictor of summer: many wise sayings have resulted:-

"April showers bring forth May flowers"

"If the first three days be foggy, rain in June will make the modellers' track boggy"

All true, I'm sure.

You will be pleased to know that my favourite viewing twig is re-growing at a pleasing rate, after the trauma of the hedge "trim". I intend to put it to good use, keeping you lot in view as you attempt to make the 2019 season the one where you all manage to make the same number of landings as take-offs.

WS

An Appeal

Have any of you had problems with your Phoenix flight sim recently? Mine no longer allows me to fly a powered model - the motor simply no longer works. I can only fly non powered models. I know that some of these later Windows 10 updates have bugged printers belonging to members of the photographic club, (our club laptop no longer allows Pics2Exe programme) and perhaps it's Windows 10 which has affected my Phoenix programme.

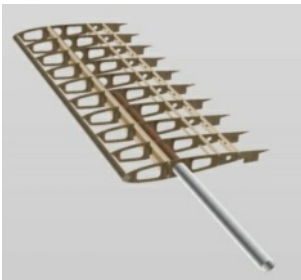
Any ideas would be most appreciated.

Article & Photos by Jim Sheldon

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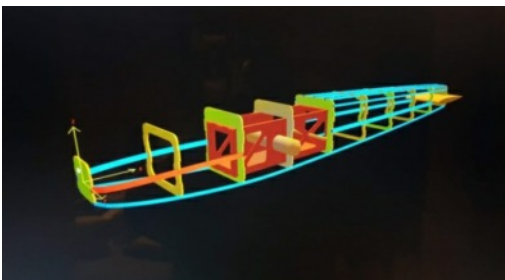
“An idea”

Last year when Jason, Jake, Paul, little Dave and myself were at Jetpower Germany we started to discuss Jason’s new cnc laser cutter and that he wanted to design a complete model. After great deliberation over the odd beer we decided he would have a go at doing something like a Stik, but maybe with center wing unlike the original high wing Stik. Everyone agreed I should be the guinea pig putting the first one together (thinking about it I’m sure I was bullied).



A few weeks later Jason made a start on the model starting with the wing.

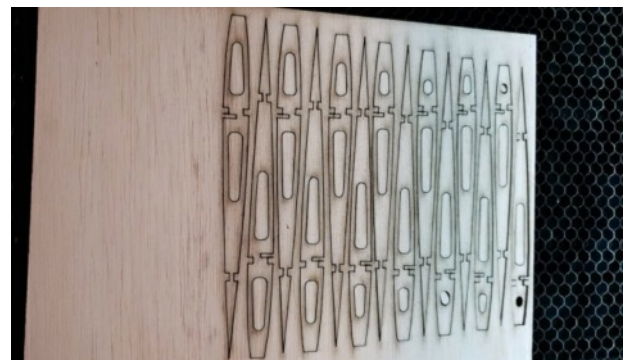
Although he has specific software for building model aeroplanes, it still takes many hours on the computer to design and draw.



Once the wing section was completed the fuselage was designed, again lots of hours on the computer!

With lots of drawing and designing still to do, Jason started to do some cutting (the easy bit) so I could make a start on the build.

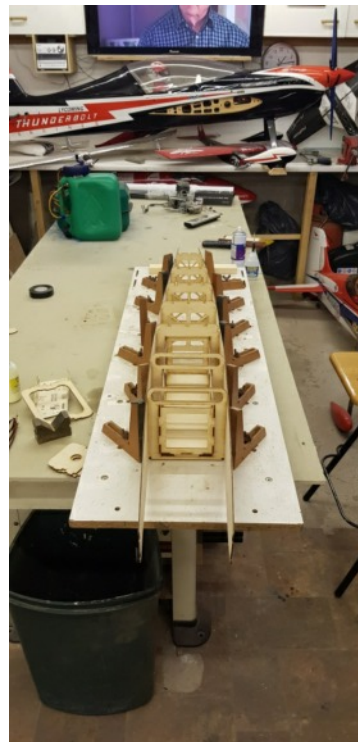
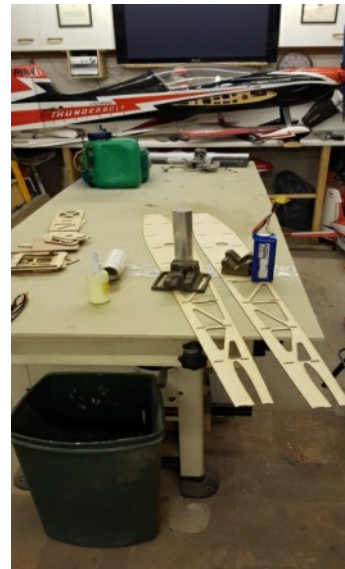
On the evening he started to do the cutting I called round. “Wow” it’s truly amazing how fast and accurate his machine is. Less than one hour later I was on my way home (full of coffee) with all the ribs, fuselage formers and sides.



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The next evening I made a start gluing the fuselage sides, each side comes in two pieces which fit together perfectly so I laid them on a flat surface with a plastic sheet underneath and ran thin cyano into the joints.

It wasn't long after that I laid the sides into a building jig and started to fit and glue the formers into position using epoxy. Everything fitted perfectly thanks to Jason's hard work. Putting it together was the easy bit.



Once all the formers were in position and glued, I soaked the top 3mm balsa sheeting in water for approx 20mins, then shook off as much water as possible. I then loosely placed

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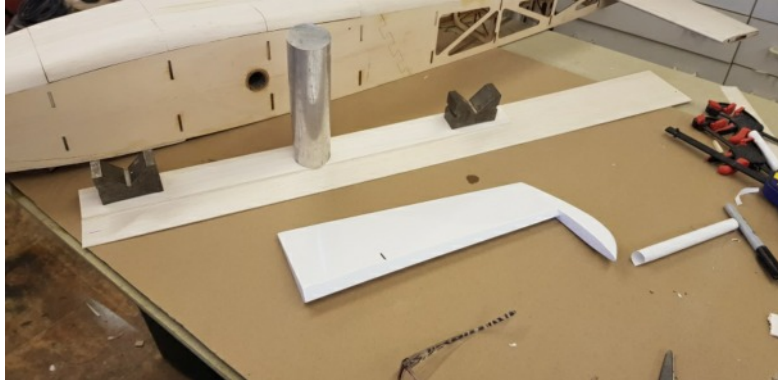
the top sheeting over the fuselage pulling it around and down with tape and clamps, then left it to dry overnight.



The next evening the top balsa sheeting was glued into position. I had also made a start on the tail.

It didn't take long to put the tailplane together then the ailerons, flaps, fin and wings. Again, everything went together really well. The wing ribs all have building tabs on them so all that is required is a flat surface. If built on a flat surface the wings end up perfect with no twist whatsoever.

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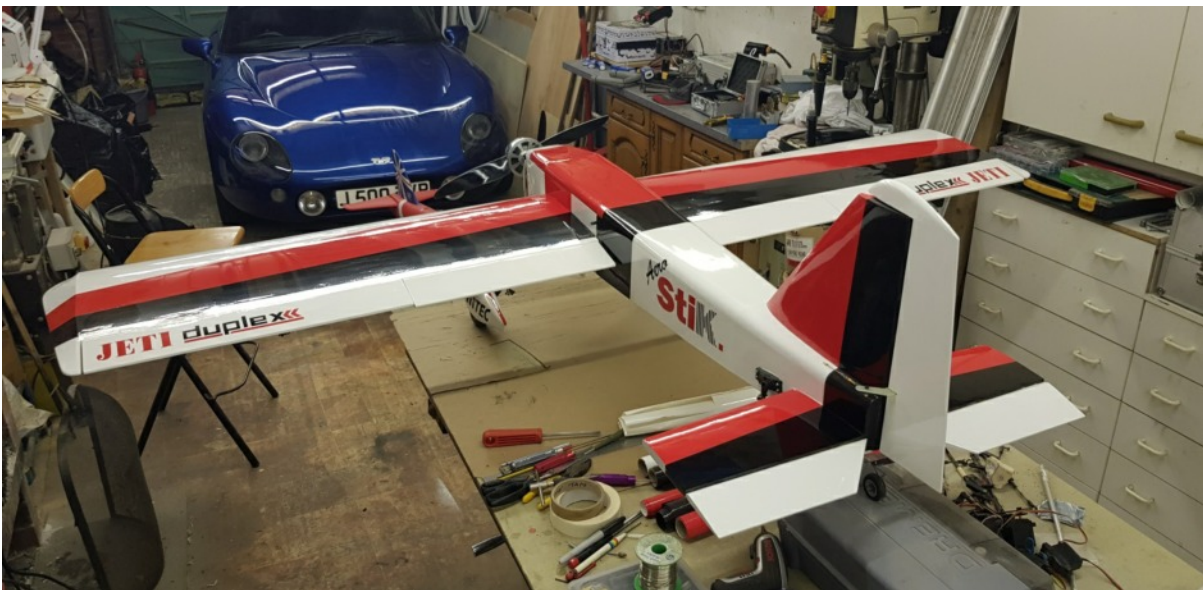
At this stage I was really happy with the look of the model. Now to decide what to call it. A few names were discussed and we decided on 'Aero Stik' which I think is a great name as it's close to the look of a Stik but with a centre wing. Hopefully it will be very good for smooth aerobatics, just how I like to fly.

The next step was the covering. I decided to cover it in film from Hobbyking (supplied by Jake).

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Just a couple of things to do before its first test flight.

The engine is a DLE 30, servo's are mainly Hitec, the undercarrage I made from aircraft aluminium I had lying around.

Radio is all JETI DUPLEX with full telemetry. The wing span is 2110mm. The length is 1500mm and the finished weight with full tank of fuel ready to fly is 14lb-14oz.

I'm really looking forward to test flying this model, hopefully all goes well. I have enjoyed building it so much that I already want to do another one.

Hopefully soon there will be another 4 or 5 Aero Stik's flying down at the club. If anyone fancies building one I'm sure Jason will cut one out for you.

I have lots more pictures and building instructions for finishing the model should anyone want more information.

Talking to Jason my next one will have a 10 foot wingspan, powered with a 120cc twin or even a small turbine. That should be fun! Watch this space.

Jim Sheldon



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“A” Book(let) at Bedtime?

For all those members looking towards their “A” certificate (and for other folk just wanting to stay in touch) there are a few BMFA publications that are well put together and are worthy of a read. Some are a must with regard to the “A” certificate, some are interesting in their own right.

- The BMFA handbook (sections 8 through to 24).
- The club flying field rules.
- The R/C Achievement Scheme: Test Standards for Chief Examiners and Club Examiners. Guidance for Test Candidates.
- “A Flying Start”. An interesting booklet covering all the things you should have learnt during your training.
- The latest list of Compulsory Questions (and answers) for use from May 1st onwards.

All these are available via the BMFA web site.

Happy reading.
John Higgins



Servo Specifications

April 2019
Article by Brian Holdsworth

Information on servo current consumption has been unavailable with any quoted values dating back to the earliest equipment and leading to misleading claims. Recently, however, Hitec have updated their website, adding what seems to be relevant and usable data. It would be helpful if other brands would also publish such data...! As the meaning of some parameters may not be obvious, the items will be identified with indications of interpretation and some related information. Published values are rounded up or down, usually in a favourable direction (!) and production tolerances can be significant, so that reliance on exact values would be unwise. Many servo types have been counterfeited and these usually demonstrate markedly inferior characteristics to the genuine items - a bargain off EBay etc. may well be faulty or counterfeit!

The weight is usually quoted in grams, sometimes with its imperial equivalent in ounces. A metal-gear servo will be several grams heavier than its plastic-gear equivalent. Particularly for small servos, the quoted weight may be for the bare servo without output arm and any mounting grommets - some very small servos even exclude the power lead and connector!

Dimensions are another area where some variation in meaning is apparent. Length is usually quoted excluding the mounting lugs. The width is often rounded down so that the actual value may be slightly greater, especially as the case sections often bulge slightly at their junctions. This may be critical where, for example, aileron servos are being fitted into a thin glider wing with minimal clearance, often not helped by production variations in the thickness of the wing skin. Even the height needs interpretation since some small servos quote the case height, excluding the output shaft and servo arm. It is common for the height to differ between otherwise equivalent servos, which could cause installation difficulties if insufficient margin has been left round the servo. "Micro" and "Standard" servos generally have equivalent lengths across the brands, though most Futaba servos are slightly longer and deeper than their equivalents, so that some surgery may be needed to widen the spacing between the mounts in an ARTF model.

The height of the mounting lugs on the case is rarely documented, though some provide a three-view drawing from which it may be measured. This can vary considerably between otherwise interchangeable servos. If high, the servo will sit low on its mounts, which would cause problems if there is insufficient clearance; packing pieces between the mounts and the mounting lugs may be needed. If low, the servo will sit high and there may be insufficient



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Article by Brian Holdsworth

clearance between the structure and the servo arm and attached linkage, needing surgery to lower the mount in the airframe to avoid binding.

For larger than micro servos, rubber grommets are fitted on the mounting lugs to provide some resilience against the effects of vibration. There is a brass eyelet in the grommet so that the mounting screw may be tightened without crushing the grommet. This eyelet must be fitted so that its wider surface is pressed against the mounting beams to spread the crushing load. If fitted the other way, the sharp edge will cut into the beams, negating its intent. The servo needs to be fitted so that it can move within the resilience of the grommets without the case touching the beams. This is difficult to achieve, and the case usually presses against one, or even both beams, so that vibration will be coupled into the servo, negating any beneficial effects of such mounting grommets. Some JR servos (now out of production), used a square grommet with a ridge protruding alongside the servo case so that, if properly fitted, the ridge filled the gap between the case and beam, cushioning contact; in practice, the ridge was often crushed rather than being pushed into the gap. A consequence of any form of resilient mounting is that the effective servo positional accuracy is reduced by the significant lateral movement under load. Unfortunately, many installations result in effectively rigid mounting with high vibration coupling, but reduced servo accuracy from the movement within the grommets - the worst of both worlds!

The earliest servos used metal gears (usually brass), but these had considerable backlash and wore quickly. Some backlash is essential, so that jamming does not occur as the gears expand when warmed. Cheaper, moulded plastic gears became available needing little backlash, since they expand less than their metal equivalents, and their resilient nature means that they can distort under load and avoid jamming. Their performance was generally superior to that of metal gears and their use became universal. They are vulnerable to broken teeth, especially from shock loads such as the rudder being knocked in ground handling.

Replacement gear sets are available for some servos - an indication of the manufacturer's expectations! Access can be awkward since the servo case screws have tiny heads, often using an odd cross-head format, and sealing varnish leaks into the threads, jamming them - they are not intended to be opened! Fitting the new gears can be tricky, especially for the output gear (the usual casualty) where the shaft for the feedback potentiometer is pressed through it. With no access through the generally sealed potentiometer body, pressing the gear over the shaft can bend the wiper and/or damage the potentiometer surface. Care



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must be taken to find and remove all the broken bits of gear teeth, otherwise they are liable to get onto the new gears and jam the servo - problem!

Tougher metal gears with a hard coating have become available, and their wear rates are considerably lower than for the original items. Their backlash is still greater than that of plastic and they can be noisy. Plastic gears have some advantages for up to standard-sized servos, but their increasingly poor quality means that metal gears are generally used in recent introductions for all but the smallest servos. The metal-gear version of a servo is more expensive, but usually has a better motor and amplifier producing greater torque etc.

There are considerable variations in the characteristics of the plastics used and some are very poor. The better performing types seem to have disappeared - maybe the others are cheaper!

For some reason, Futaba used a very soft plastic and their gear teeth were prone to bending so that they could skip under load or jam; however, they rarely broke! Their servo arms were flexible and wore quickly. Their connectors, uniquely, have an orientation lug down one side which has to be removed if required to fit into the otherwise universal J plug sockets; cutting away this lug can be difficult since their soft plastic tends to tear, which would leave the contacts unsupported and vulnerable to shorting. The output shaft bearing wore quickly and they were the first to introduce a ball bearing to overcome the problem - other brands followed, presumably for marketing reasons since few showed problems.

JR used a very tough plastic, where their bearings and gears seemed almost indestructible, even when used on helicopters which generate considerable hammering loads on the servo gears due to the cyclic variations during each rotation of the rotor blades. Hitec used to advertise that some of their servos had "Karbonite" gears, but this seems to have been dropped - perhaps it was just an advertising gimmick inspired by the popularity of the Superman films of the period and "Kryptonite"!

The inclusion of ball bearings is usually mentioned in the documentation, with large servos often using multiple ball bearings to handle the loads.

For servos larger than standard size (~40 gm), a plastic case can cause problems with heat dissipation due to its insulating properties. Also, plastic mounting lugs become increasingly vulnerable to breakage due to the greater forces involved. Thus metal cases are preferred



Servo Specifications Continued.....

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Article by *Brian Holdsworth*

for these larger sizes, though the top part of the case, containing the gears, may still be adequate in plastic, since it dissipates little heat and the forces would be taken by the bearings.

Most servo motors have ferrite magnets and seem generally adequate and reliable. Some use Neodymium magnets, brushless or coreless items but benefits are marginal for their increased complexity and cost.

The specification of the output shaft may be included, though such details are of little use for most. There is a wide variation of diameter and spline count, so that it is generally best to fit only the arms which came with the servo. The differences are often small enough for it to seem that the arm from another servo type can be fitted, but it may have a different spline count or be too tight, so that the splines are damaged, or too loose meaning that it can slip under load - problem! Most plastic-g geared servos use a self-tapping screw to secure the output arm with sufficient friction for retention under vibration. Metal-g geared servos use a small bolt into the tapped output shaft, with a shake-proof washer to provide some friction to avoid it vibrating loose. Plastic output arms should have enough friction on the splines for retention. A metal output arm will be a relatively loose fit, and additional locking may be desirable to avoid the bolt coming loose, allowing the arm to become detached - problem! Threadlock such as Loctite could be used, though this needs to be a type intended for small sizes otherwise the bolt can become effectively welded in place - cyano is inappropriate for that reason. Applying a blob of PVA glue on the head of the fitted bolt, spreading onto the arm, can be sufficiently effective, but still capable of being removed - a thick type such as EvoStik Resin W would be better than a thinner type, such as Aliphatic or DIY store own-brand, which may run into the thread and permanently lock it.

A trap for the unwary is that many cross-type output arms have slightly different arm lengths. The difference may only be 1mm which is difficult to see unless two output arms are super-imposed. Where dual servos are used such as for ailerons or flaps, it is essential that their arm lengths are identical to achieve matching surface movements. Similarly, matching servo types should be used to avoid differing positional performance, especially under load.



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Club Instructors

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

Shows 2019

9th June

Cleveleys Classic Car Show

14th-16th June

Weston Park Model Show

6th - 7th July

Cosford LMA

10th - 11th August

Elvington LMA

31st August - 1st September

Much Marcle LMA

Club Events

22nd June Fly In

21st July BMFA Scale event

Scale and Aero Show Trophy Event - TBA

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In Conclusion

A heartfelt thank you to all you members who have contributed to this newsletter. In fact I have another excellent article which I will save for next month's issue but I'm very grateful also for that. The more you members could share your experiences, the more interesting the newsletter becomes. I am still looking for more articles so please, please, put pen to paper if at all possible.

I promise to try to get down to the field again very soon to shoot more 'flying' pics.

May the gorgeous Easter style weather return once more. In the meantime, I wish you all happy and safe flying.



Memories of the last 'Fly In' - Mark Conlin with his giant Decathlon