Newsletter

May 2015

We have had very few 'nice' flying days this month which suited me for once. I had an operation on my big toe and was told to rest it until it had healed. So, it rather suited me that I could doss around for this month. I went to the first trainees evening at the field which gave me a few hours of flying on a lovely calm afternoon/evening. It's a shame that no trainees turned up on such a lovely evening.

I did get to see Mark Conlin's petrol powered Inverza fly. Talk about aerobatic - it's a lovely looking model and it's performance cannot leave anything to be desired. John Higgins is right now just finishing off his electric version which I did get over to photograph.

It looks so beautiful - it is in my opinion as pretty as they get. I'll get some flying shots of both of the Inverzas' when the weather settles down again.

May 2015

Electrical Connectors

Article by Brian Holdsworth

A connector consists of two parts containing plug and socket pair(s) providing electrical continuity for one or more wires with sufficient friction or even a spring latch to avoid unintended disconnection. Some springing is incorporated in either the plug or socket to maintain electrical contact and provide some friction. There may also be mechanical friction where enclosing shrouds slide over each other. Many types are available for various applications, but some have high mechanical friction with loose fits between the pins and sockets giving a stiff connector with poor electrical contact which is obviously undesirable! The types commonly used are not rated for many plug/unplug operations and can show significant wear in use.

Soldering wires to connectors is problematic due to the effects of heat, fluxes and gold embrittlement causing the wire to become brittle and prone to breaking, especially for the smaller wires, with the heat-shrink sleeve providing little protection - in many cases only holding the broken ends together allowing contact until vibration opens the connection with obvious consequences. This has been largely overcome for small wires by the widespread use of crimping which, effectively, produces a cold weld with good electrical properties without compromising strength. The depth of crimping is critical since too much crushes the wire so that it breaks easily, while insufficient produces high electrical resistance with the wire able to pull out of the connector. Specialized tools are needed so this is not for amateur usage - pliers will not do!

Eventually, the radio control equipment manufacturers standardized on the use of the J plug, with crimped wires, for servo connectors, although Futaba are awkward, using a variation with a lug on the side of the connector which protects against inserting the plug with reversed orientation which rarely causes damage. Servo plugs have metal sockets and receiver sockets have metal pins which can confuse descriptions! J plugs fit into Futaba sockets. A Futaba plug may be fitted into a J socket by removing the lug and chamfering one corner of the plug body though, in practice, this is difficult since the soft plastic used means that it often tears leaving the internal metal connector inadequately supported.

Electrical Connectors Continued..

The J plug with its limited wire size can handle up to about 5 amps peak and is adequate to handle the current for all but the largest servos. It is also adequate for battery connections for most installations using up to about six standard servos. However, Deans or XT60 plugs allowing thicker wires and consequential higher currents would be more appropriate for battery connectors where more or larger servos are used.

The friction means that it can be difficult to remove a servo plug from the receiver. Never pull on the wires since this is very likely to cause damage. Instead, the plug body can be rocked from side to side while pulling it out of the receiver. This usually requires some outer plugs to be removed to access the inner plugs. Short extension leads should always be used to avoid constant plugging/unplugging aileron servos from the receiver since this is difficult and likely to result in damage. Some extension leads have excessive tolerances, especially if worn, so that the plug could fall out - any leads should require significant force to plug/unplug. Where extension leads are embedded within the structure it is wise to add an additional restraint to avoid the effects of vibration causing disconnection - cotton thread is effective, looped through the plug/socket wiring and tied.

Electric flight requires suitably robust connectors to handle the high currents involved. Motors are usually supplied without connectors and bullet connectors are generally used; some have 3.2mm bullet plugs fitted which are incompatible with the almost indistinguishable 3.5mm size though matching sockets are usually included for fitting to the speed controller which is generally supplied without connectors. Increasingly, LiPo batteries are available with connectors fitted and this is convenient, avoiding the difficulties involved with soldering, especially for the thick wires used on the higher C rated capacities.

Individual bullet connectors are available in various sizes and 3.5mm and 4mm are widely used with 5mm and 6mm for the thick wires used for very high currents. The socket is a tube, blocked in the middle preventing solder running into the contact area. The plug has a central rod with a rounded tip making insertion easy; it is surrounded by a thin leaf spring

Electrical Connectors Continued..

making the electrical contact but vulnerable to damage - while mechanically dubious, it seems adequate in practice. The early examples had square ends at the wiring end making soldering difficult, since it is easy to trap debris or an air bubble when the wire is inserted resulting in a bad joint. Most now incorporate a cutaway on the side reducing this risk. A heat-shrink sleeve is used to cover the exposed connector and support the wire; this should completely cover the socket though, in practice, the sleeve is likely to shrink back leaving the end exposed and vulnerable to shorting. When not in use, the battery plug should always be covered - silicone fuel tubing works well.

The use of individual connectors has obvious advantages where batteries are connected in series for high cell counts, since they can be simply daisy-chained together. However, there is a significant potential to short a battery if confusion creeps in and the wrong plug is inserted in a socket. Especially for larger batteries, the available power is well into arc welding territory so that a short could instantly melt the connector with the trapped air expanding to spray molten metal over the hand! A simple technique to reduce this risk is keep the battery plug covered until the battery socket has been neutralized by inserting the plug from the charger, controller or other battery.

Blue EC3 contains two 3.5mm bullet connectors (limited to ~3200 batteries) and is fitted to most EFlite equipment. It is compact with orientation via the plastic body shape which is rather soft but ribbed for a good grip. The pins are soldered to the wires before being inserted into the body to latch in place which is not easy.

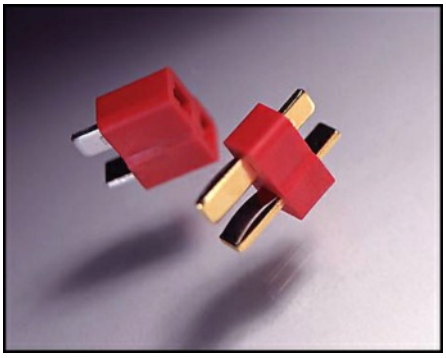
Red connectors containing two 4mm bullet connectors, adequate for all but the highest currents, are available from Hobby King and are fitted to many Turnigy LiPo batteries. Each half contains a plug and a socket with suitably sized ribbed plastic shrouds sliding over each other making the connector rather long which may be an issue in some

Electrical Connectors Continued..

installations. They are available with the pins already fitted into the body which simplifies assembly.

Yellow XT60 is compact with orientation via the plastic body shape and a deeply embossed surface giving a good grip. One half contains two sockets and the other two cylindrical plugs which are slit to provide effective springing. It is fitted to some LiPo batteries though its small diameter solder sockets restricts its use to smaller sizes (up to ~3200). A three pin variant in a triangular format (MT60) is available for connecting motors to speed controllers but is bulky and has the disadvantage of not permitting easy motor reversal (normally achieved by swapping any two leads) so that testing before final assembly would be wise!

Red Deans uses substantial flat pins with one half in the form of two plugs with a spring leaf down one side and the other as two sockets where the body contains square holes with a pin along one side. They are relatively easy to solder since the wire is laid along the pin with good access but are stiff in use and prone to jamming on insertion if the relatively square plug end catches on the socket end. They tend to wear and, especially if the spring is damaged, can become loose giving high resistance or even disconnection. Unplugging is not easy since the body is short giving little area to grip though some are ribbed which helps. Several LiPo battery ranges are available with these fitted. Some have black T plugs which are compatible with Deans but with separate pins fitted into the body after the wire has been attached; this fitting is not easy, and examples have been seen where the pins have not latched into the body so that they can be pushed out when the plug is inserted, with the consequent potential for intermittent connection or shorting if both pins are pushed out.



A VIEW FROM THE HEDGE. (By Will Sparrow)

No sooner had I finished dipping my beak in the berry juice to finish last month's missive, when I was forced to witness the sad demise of yet another fine aeroplane. This time the victim was a large, electric-powered Sukhoi. I've seen this model fly on many occasions and have always been impressed by the way it performed its smooth, slow, graceful aerobatics. On the fateful day the poor thing had only been in the air for a couple of minutes when it started to roll and pitch in an uncontrollable manner. The model's fate was as inevitable as night following day; the model dropped out of my sight and crashed in the rock-hard turnip field to the north of your strip. The model was a right mess and will never fly again. Yet another example of the modern, only-one-crash-allowed aeroplane! On a positive note (!) the model met its violent end in a safe, well-away-from-people area and not a single turnip was harmed.

For us hedge folk, the first of May – May Day – is a bit of a special occasion, a bit like your Crinklemas or Bonfire Night. I'm told (by the Wise Old Owl) that the origins go way back into the mists of time when the world was very young; it's all to do with celebrating fertility, apparently. Anyway, we always make a bit of a "do" of it. On May Day eve we had a right good celebration with plenty of grubs and invertebrates of all kinds and more than a few beaks-full of fermented berry juice. As May Day dawned I witnessed a sight that I had never seen before. The flying strip was populated with a dozen or so nubile young maidens, clad in the most revealing of diaphanous robes. The maidens were swaying sensually to an eerie, almost mystical, music that seemed to come from nowhere but, at the same time, seemed all-pervasive. Their motions quickened as the dawn sunlight emphasized their alluring forms and reflected, jewel-like, from their gleaming hair. I glanced to my right to see my mate, Jim Sparrow, clinging tightly to his twig, his eyes out on stalks. I awoke with a jolt… I must have had a really bad caterpillar the night before! Jim was still snoring gently, eyes tightly shut.

The May bank holiday dished up the usual gales over the weekend but redeemed itself on the Monday when, following strong winds in the morning, the weather morphed into perfect flying conditions come the afternoon: light, next-to-nothing wind and warmth. Many modellers were there to take advantage of the opportunity – some, who normally fly in the morning, turned up in the afternoon and some who had arrived in the morning stayed all day! One new model that took my eye was a splendid, petrol-powered Inverza 33. The engine in this model proved reluctant to start but, eventually, and after much energy-sapping flicking, it burst into life after having been threatened with an electric starter! The model, resplendent in its blue/yellow colour scheme, looked a picture in the air too with its engine, not quite on song, making the sort of noise that all models used to make before the electric revolution. My spies tell me that another of these models is due to make an appearance shortly. I can hardly wait. All in all a splendid afternoon's flying; trainees were training, "B" practitioners were practising and sport flyers were… sporting. Come 5 o'clock they all departed, sucking on their Werther's Originals and humming merry tunes…

A VIEW FROM THE HEDGE Continued/…...

Wednesday, May 13th saw the start of your club's evening flying meetings; it was a really nice evening too, taken advantage of by a goodly number of members. I would have expected more of you to have taken the opportunity for a spot of evening flying. Perhaps the word has not got around yet? If you do decide to come on Wednesday evenings do be aware of the sun as it makes its way westward; anything flown to the left of centre can become a silhouette very quickly.

It is a known fact that things that happen slowly are not really noticed at all. This fact was brought home to me only the other day when the hedge was visited by a distant cousin of mine, Methuselah Sparrow, whom I had not seen for many years. This aged bird has a grey edge to his feathers and his beak shows signs of prolonged use but, for all his failings, Methuselah still has a keen eye for detail and a razor-sharp memory. As we sat, side by side, watching the action on the strip he was immediately struck by how large the pits area had become and, compared to days of yore, how close the modellers in the pits were to the pilots who were flying and to the models that were being flown. This important safety issue had not struck me before, but I had to concede that he had a point. When things happen slowly they are not really noticed at all…

WS

Brian Holdsworth's own designed model lining up for a landing.

Buddy Box Usage

May 2015

Article by Brian Holdsworth

Buddy boxes are used for training purposes by linking two transmitters of the same brand as a Master/Slave pair. The associated options are generally listed under "Trainer" in the manuals, and are often poorly documented causing confusion. In some of the recent sets, options in both transmitters may need to be set before reliable operation can be achieved.

It is evident that there can be significant control neutral and throw variations between transmitters, even of the same type. Accordingly, some setup effort may be needed so that they match. This is especially important for the trims and careful ground testing will generally show any differences in the form of a visible or audible servo twitch on changeover. Some implementations have options to allow the slave to be used as a basic four channel set with all programming taken from the master. In practice, it is likely that the slave transmitter will need to be programmed with matching parameters in a dedicated model memory and the appropriate options selected.

Spektrum is currently the only brand implementing wireless linkage where the master is a DX6, DX7 or DX9 (presumably also an updated DX18) with the two transmitters being bound via appropriate options; the slave can be any Spektrum transmitter although DSM2 support has been omitted from the DX7 and will, presumably, be removed from the others by any update. All the manuals are insistent on updating before a transmitter is used implying, that, as purchased, parts of the functionality are suspect - this seems particularly likely for trainer operation since, when first introduced, there were reports of problems including total loss of control. The manual descriptions are poor but those for the DX6 and DX7 are better than the others. Particular attention is needed to enable/disable trainer mode in both transmitters where appropriate. There have been reports that a master transmitter used with the trainer option enabled, but without its linked slave transmitter active, can be erratic in operation.

There is considerable potential for problems when using a lead to connect two transmitters. The leads are prone to falling out, especially if trodden on (!), but there are more serious potential consequences if incorrectly used.

Buddy Box Usage Continued/...

Article by Brian Holdsworth

Even though leads were available, Futaba transmitters with the original round buddy box connector should never be used with a 2.4 GHz transmitter (fitted with a square connector). While this may seem to work on the ground, operation is erratic. This is stated in the manuals together with cross-reference tables for the (expensive) leads required to link their transmitter types; damage is likely if the incorrect lead is used due to the differing battery voltages.

Spektrum and Futaba manuals state that the slave transmitter should not be switched on and its power will be supplied from the master transmitter via the interconnecting lead. Where a 35 MHz transmitter is used as the slave, the module or crystal should be removed to inhibit transmission which, otherwise, could draw excessive currents through the lead.

If both are switched on, there are several potential problems. There is a wide range of battery voltages in each brand and one would try to charge the other battery with the additional potential for overheating circuitry causing failure or erratic operation. There would be ambiguity as to which was master and which slave and this could swap in use! It would seem that no indication would be apparent if both were erroneously switched on until, perhaps, erratic operation resulted during use.

Scene at the Field

May 2015

Mark Conlin's new Sebart Avanti S on a high speed pass.

One of the Black Horse models being flown by Jason.

Scene at the Field

John Anderson's ME109 about to touch down.

Jim Sheldon's Sebart Wind S.

Scene at the Field

The Xcalibur lifts off flown by Dave Swarbrick

The model flew really well

Back in the Day

May 2015

Article by John Prothero

So with S-BUS and X-BUS, 2.4 Gigahertz, digital trims, 50 model memory, telemetry, touch screens, voice confirmation etc., We must remember where it all started with single channel "Bang Bang" rubber driven escapements, one pulse for left two quick pulses for right and remember to count your imputes as the rubber driven escapement ran down! These were the "good old days" but nostalgia isn't what it used to be!

Here is an advert from the 1960s. At the bottom is the single channel outfit for us mere mortals, but just below is mention of the TERAPLEX Proportional gear a snip at £180.00! A new Mini cost £400!

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R.C.S. 8 Chl. Tx

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ACCESSORY OUTFIT. Consists of compound escapement, wiring harness, battery box, switch, allows immediate operation £4

MOTOR CONTROL ACCESSORY OUTFIT. Plugs into above for reliable motor speed change £3

R.C.S. Mk. I GUIDANCE SYSTEM £14. R.C.S. Mk. I ACCESSORY OUTFIT £2.10.0

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CSI

Article and pictures by John Higgins

No, not another episode of some ghastly American crime programme; this CSI stands for **Crash** Scene Investigation.

As every modeller knows, having a crash is the second worst thing that can happen and is guaranteed to spoil any modeller's day. The worst thing that can happen is having a crash ***and*** not knowing what caused it (I'm assuming that it wasn't you, yourself, who was the cause!). In this scenario you will begin to suspect everything, and every time you use the same equipment there will always be that nagging doubt at the back of your head gnawing away at your self-confidence and peace of mind. Was the crash caused by the battery/switch/extension leads/transmitter/receiver? The list goes on and on. I've been in this unhappy predicament for the last two weeks.

My Sebart Sukhoi 140E destroyed itself a couple of weeks ago. From straight and level flight the model decided, of its own volition, to terminate itself. I was merely a spectator holding a box that was, all too apparently, not communicating with the model. The model did not go into failsafe but seemed to go to motor stop when I throttled back just before impact. As is often the case, when the wreckage – and this was real wreckage – was retrieved everything was working just as it should, apart from a couple of damaged servos. When I got the wreckage home, and had let a day or so elapse to allow the sadness to dissipate (I really liked this model), I set about trying to find the cause. At first I suspected that a servo arm on one of the ailerons had slipped on its splines. The arm was secure but the servo had broken gears, as had one of the elevator servos. Could this account for the model's demise? I've never known servo gears to fail in flight so it seemed most likely that this damage resulted from the crash. I ordered replacement servo gears and changed my focus. The radio gear was range checked and all the connecting leads given a good waggle. The radio battery – in this case a 2200 mAhr, 3S lipo - was discharge checked and found to be okay, even though the internal resistance was a bit on the high side. I ordered a new battery, just to be totally safe. The complete radio system was then left running for a couple of hours with frequent stirring of the sticks. This test was passed with flying colours.

My larger electric models have their radio powered by a 3S lipo running, via a 15 amp, switched-mode regulator, to provide a constant 6 volts to the radio equipment. The regulator has an on/off switch which merely instructs the regulator to supply power to

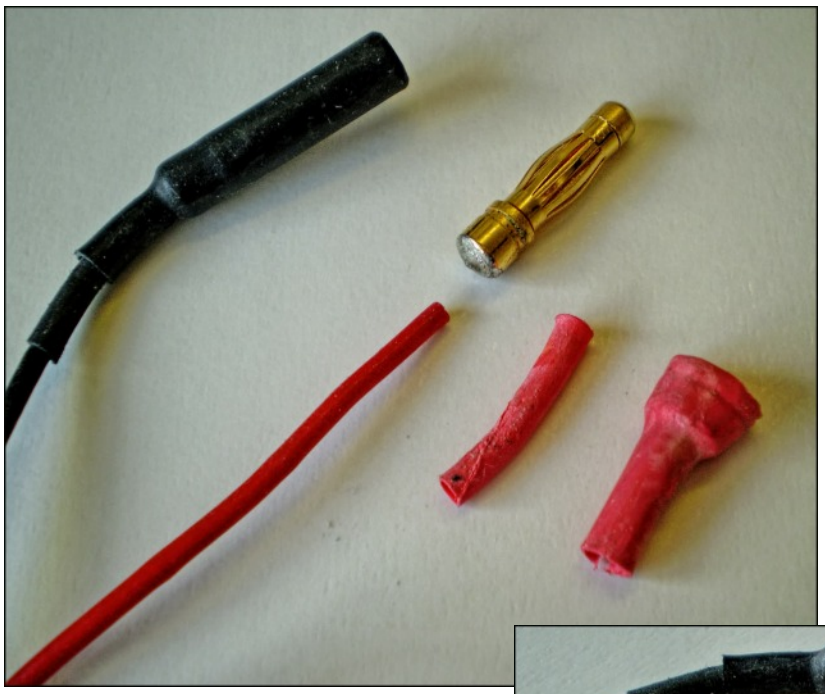
the radio; the switch itself does not carry the current that is supplied to the radio. If a failure were to occur in the switch, or in the unit itself, the system failsafes to “on”: a safe system. I’ve used these devices for years and have had no issues with them.

I was now faced with a dilemma; I wanted to use the equipment in a new model (by this time I had already taken delivery of the new model!) but I couldn’t trust it. The search for a cause had to continue. More bench-testing of the radio ensued. Just as I was about to admit defeat I spotted something. The regulator has four LEDs, two green and two red, which indicate the battery state. If all four are lit this indicates a freshly-charged lipo. After a couple of flights the indication will drop to two reds and one green, showing that the edge has just been taken off the lipo’s fully-charged state. As I twiddled the sticks the indication momentarily dropped to one red – the “land or die” state. Ah! I thought, the battery is the problem. I immediately plugged in a new battery: four LEDs glowing brightly! I changed back to the original battery: four LEDs glowing brightly! In frustration I unplugged everything and went to make a cup of coffee. Returning to the quest, I plugged in the original battery: nothing, no LEDs at all. I changed to the new battery: nothing, no LEDs at all! Either the regulator had suffered total failure or the battery – any battery – was not now connecting.

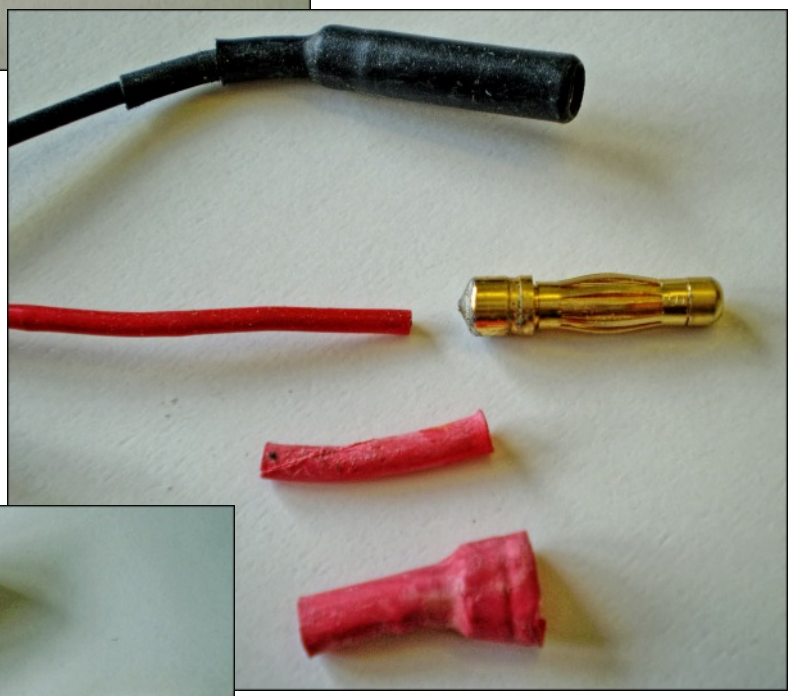
I got out my trusty meter and checked the continuity from the regulator’s negative connector (4 mm bullet) to the circuit board. No problem there. Sound as a bell. I did the same with the red lead. No continuity. I suspected a break in the wire, but where? I stuck three fine pins through the wire at intervals and checked the continuity back to the connector. The fault lay at the junction of wire and connector. The connectors are soldered and supported with two graded layers of heat-shrink for several cms past the joint. When the heat-shrink was carefully cut away the wire was seen to be broken and only held to the connector by the heat-shrink. How long it had been like that God only knows. All I know is that if the power supply link is broken for a split second and then instantly restored, quite a few seconds have to elapse before the system re-establishes the radio link. Your model can’t go to failsafe if it has no power supply, and those few seconds of ensuing chaos give your model more than enough time to find the planet. Sleep well, modellers all, and don’t have nightmares…

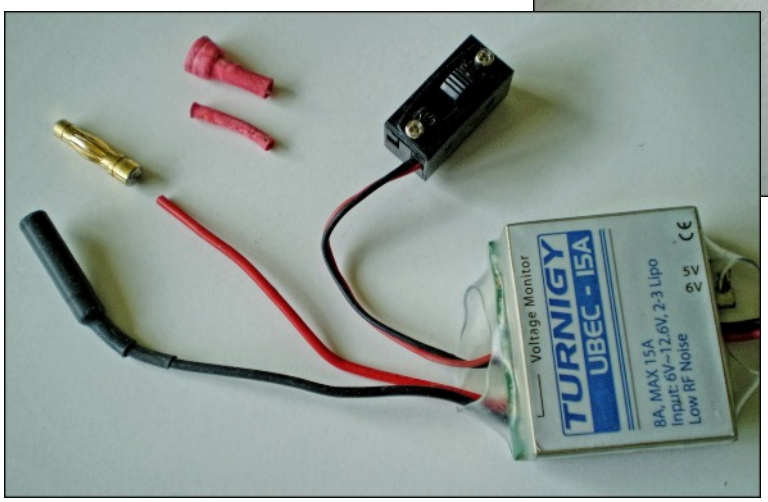
John Higgins

CSI Pictures



These are the pictures John supplied causing his very expensive model to demolish itself into mother earth.





Training Evenings at the Field

May 2015

These evenings are held till 9pm throughout the summer months - bring you models down and brush up on your flying skills. An instructor is always on hand to teach and advise.

Shows for 2015

LMA

Strathaven Model Show	26th - 28th June
Cosford Model Show	18th - 19th July
Elvington Model Show	8th - 9th August

Other Shows

Weston Park International Model Airshow	19th - 21st June

Cleveleys Classic Car Show Sunday 7th June

Sunday 7th June The Blackpool and Fylde RCMS are putting on another static model aircraft display. To all members participating, please be there by **8am** to set up. The stewards will direct your car to the display/parking area.

IF ANY OF YOU HAVE INFO OF ANY OTHER MODEL SHOWS WHICH I HAVEN'T LISTED ABOVE, PLEASE LET ME KNOW AND I'll PUT THEM IN.

May 2015

In Conclusion

It may have been a quiet month in one way due mainly to very variable weather but for those few days when it behaved, I, and many of you had some really enjoyable flying. I spent a very happy time down at the field yesterday with my camera. I can't get over just how much better this one performs. To say that I'm pleased is an understatement.

Thanks to all of you who have contributed - thanks to John Prothero who keeps digging out old RC info. Thanks to John Higgins, Brian Holdsworth, and of course Will Sparrow for your excellent articles. I have put one of those fat balls in the hedge which hopefully our tame sparrow will find.

The shows are starting at last - Cleveleys Classic car Show, then Weston Park etc. See you at the the Cleveleys Classic Car Show. In the meantime, happy and safe flying. I leave you with a picture of this WOT4 XL powered by a Saito petrol four stroke - sounded superb.