



# BRCMAC

## March 2016 Newsletter

### **Chairman's Chat**

Hello. Firstly just like to introduce myself for those who do not know. My name is James Anderson and I have recently taken over from Ian Ferrari as the new Chairman. I hope that with the aid of the Committee we can continue to provide a pleasant, friendly, warm and happy Club for you to continue to enjoy.

As you may have heard there was recently a sheep infestation down at the strip. This occurred on several occasions over the winter months. However with the aid of volunteers from our club we have succeeded in putting up new fencing which will hopefully prevent any further infringements. We also had the rather unpleasant job over removing their droppings from the strip. Although this is not 100% finished, I think after a full morning of bending down and shovelling, a grand job has been done I would like to thank all those that helped.

I am sure you are all aware about the passing of a couple of members over the winter months. I would very much like to say that they will be greatly missed and offer all of our deepest sympathies to their families.

Moving on from this some of you may have listened to the radio broadcast I did at the start of the year on BBC Bristol explaining about the Club. We have also received several applications for new members recently which is very good news. If you feel you would be able to help teach or maybe become an instructor then please feel free to let one of us know. If you have any ideas on ways in which we could encourage new members to join it would be very much appreciated.

Hopefully, now the weather appears to be improving, I hope I will have the opportunity to see you all down the flying field in the very near future. With the clocks changing soon as well I am looking forward to enjoying long relaxing evenings watching you all fly.

**James Anderson**

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### **Battery Safety**

Following discussion on the subject of battery safety at the AGM, members are reminded that they are responsible for their own battery safety and should follow the BMFA guidance. This can be found on the BMFA website menu, select 'Downloads', from sub menu select 'BMFA Handbooks and Guidance', the 'Li-po battery safety booklet' is displayed as a PDF with other documents for download. Alternatively, click on this link:

<https://www.bmfa.org/DesktopModules/Bring2mind/DMX/Download.aspx?PortalId=0&EntryId=293>

**Ian Ferrari**

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## ***Organised Airshow Visits?***

We were wondering whether there might be any interest in groups of members getting together to attend selected airshow events throughout the year, either model or full size. In order to assess which events and viable numbers, please contact Mike Chinnick and let him know what you might be interested in.

***Peter Bennett***

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## ***The joys of RC flying! Or this Pooh was nothing like the cuddly bear!***

No doubt you heard that in the past we had a slight problem with sheep in our field, however the local farmer has always been helpful and the tenant has sent someone down to return them and close off some gaps in the hedge.

But not this time, as we appear to have had a flock grazing in the field behind the evening pits, since most of the barbed wire fences are made to keep cattle out, they tend to be useless with sheep as the woolly jumpers just walk under the wire, as is evident by the strands of wool on the fences.

Matt Edwards has just joined our club, having flown about eight years ago in New Zealand, we were going to the strip to go through the layout and get a few flights in. We drove up the lane to the first 'S' bend by the stables and Hey Ho! we bump into a large flock of sheep, (not literally). Weaving our way through the herd it split up, half in front of the car and half behind, just to prove how stupid they can be, at least one of them chased this bright red metal monster up the lane so that it could get to the front herd and then get chased again.

We eventually left them behind and walked over to the pits and set up my plane, just about to buddy up and I looked across the morning bridge and there they were, 80+ sheep wandering around our field, even though we had closed our gate. I have to say Matt was very efficient and with me protecting our equipment, Matt gently rounded them up and herded them back in to the field, it transpires that this was normal for his flying club in New Zealand.

Out on the moors sheep tend to drop small pellets of poo, not this lot, they dropped ruddy great dollops and they must have been in our field for a considerable time as the strip, pits, compound, in fact the whole place was covered in SH1, and some had upset tummies; guess you have got the picture.

We did fly and amazingly I missed every dollop on take-off and landing, cannot say the same about my boots, so you have been warned.

Our club now had a massive clear up campaign to arrange with a working party to resolve this problem.

***Ian Ferrari***

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## ***The Pooh Saga continues!***

As usual your Chairman James Anderson gets the brunt of the poo complaints (no pun intended) and arranged with your committee to get two additional problems resolved; since the previous week a good

turnout was arranged by Murray Barnes to get broken fences and fence posts repaired, (our Stalwart Steve Bridges bringing all the necessary kit), the fences were repaired in a couple of hours. However James discussed the access method that the sheep used and the resolution was to nail sheep resistant wire mesh along the full length of our front fence, plus two sections behind the evening pits. We also found that the far gate to this field had its Severn Trent padlock removed and the chain discarded, (really suspicious), we fixed that and it can now be looped over the gatepost, obviously this is not totally secure.

The second job was to clear as much of the poo as possible.

Quite a good response except that Steve likes to be on site before most of us wake up, they cracked on getting the mesh fitted, whilst James and I were allocated poo collecting,(it was your own fault James you had the 4 wheel drive, trailer and a great poo shovel, see the photo).

We were later (much later), joined by Peter Bennett and an over enthusiastic Simon Chillcott who, armed with gloves, decided the best method was to pick up the poo and throw it in the trailer (again see the photos). Really, some people! I am just glad I made the tea later.



You can see the amount of sheep dollop that we collected, mainly to clear the strip, at a guess around one third of a tonne, which took us over 4

hours of back breaking work. I hope all the members appreciate the effort that has been put in by your committee to keep the sheep out and to keep you guys flying.



### ***Ian Ferrari***

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#### ***Wanders will never cease!***

Well after 15 years (!! ) Ian Cook has splashed out and got a new model - a rather nice Space Walker. In addition, he has converted to 'the dark side' and gone electric. The question now is will his Astro Hog finally be pensioned off?



### ***Peter Bennett***

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## Homeless man

A man was walking down the street when he was accosted by a particularly dirty and shabby-looking homeless man who asked him for a couple of pounds for a meal. The man took out his wallet, extracted a tenner and asked, "If I give you this money, will you buy some beer with it instead of a meal?" "No, I had to stop drinking years ago," the homeless man replied. "Will you spend this on model aircraft instead of food?" the man asked. "Are you mad!" replied the homeless man. "I haven't built models in over 20 years!" "Well," said the man, "I'm not going to give you money. Instead, I'm going to take you home for a shower and a terrific dinner cooked by my wife." The homeless man was astounded. "Won't your wife be furious with you for doing that? The man replied, "That's okay. It's important for her to see what happens to a man after giving up drinking and flying!"

**Gerry York**

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## A DIY Telemetry Project

After years of being a loyal Futaba user, a while back I switched to FrSky equipment. I was attracted by the FrSky philosophy of low cost capable hardware, combined with open source transmitter software which has functionality equivalent to other manufacturer's top end models. The OpenTx software used by their Taranis transmitter has been developed by other RC flyers and also comes with companion software to run on your computer. You can use the companion or the transmitter to set up models. OpenTx embodies a very different approach for setting up a model from a Futaba radio, but now that I'm used to it, I would never go back. It does everything you can think of!

I had thought I would make some changes to the transmitter software, tailoring or extending it to my liking. However, it turns out that the OpenTx software is so good that as yet I haven't found any changes I would need! The only thing I have done is keep the transmitter up to date with the latest release.

One feature new to me is telemetry. Out of the box, the system provides received signal strength at the model, and the model's receiver battery voltage, back to the transmitter. A range of other sensors are also available to plug in to the receiver. My interest was to get data back from the engine controller of my Wren turbine to enable me to work out fuel used. One of the problems with the jet engine is its huge fuel consumption. Even with a 1.5L tank, it gets through that in less than five minutes at full power. Normal flying could give longer flights, but I usually end up playing safe and landing with half a tank of fuel left. I know from experience, it doesn't glide well. Getting the fuel pump voltage back over telemetry would let me do some maths, integrating over time with some constants thrown in to give a good idea of the fuel used. I can assume linear fuel consumption with pump power and then calibrate it with an engine run to get the constant to apply.



Figure 1 FrSky Taranis

After I had come up with this idea, I subsequently found that Xicoy, the manufacturer of the turbine controller supplied by Wren, offer their own Telemetry adapter. Brilliant! This plugs into the engine controller instead of the hand held display unit and also into the receiver. Unfortunately, Xicoy only support a few radios and not FrSky. I emailed Xicoy to ask about support and they responded to say they wouldn't be adding FrSky as there was no market for it. This is clearly incorrect, as there was at least a market of one, namely me. However, they were not

persuaded, so I decided to make my own. My further request for a description of the data interface was met with silence, which was a shame, but not really surprising.

## Phase 1 – reading the data from engine controller

How hard can it be? I persuaded a friendly hardware engineer from work to connect his fancy oscilloscope to the port on the engine controller. It didn't take him long to characterise the interface. There are three wires, ground, plus five volts and signal. The signal is bi-directional serial data at 4800 baud, 8 data bits and no parity. A 50 byte message is transmitted from the controller to the hand held display at about 6 Hz. This must contain all the info displayable in the screens of the hand held unit, such as rpm, temperature, and crucially, fuel pump power. Between these messages, a smaller message from the hand held display is sent back to the engine controller. I assume this contains the state of the various buttons on the unit used to change engine parameters, but this is of no further interest. The fancy scope he used was capable of capturing the 50 byte messages, so I obtained a few of these to analyse later. Since the engine was not running, most parameters would be zero, but the temperature showed 21 degrees, so I should be able to find that in the message.

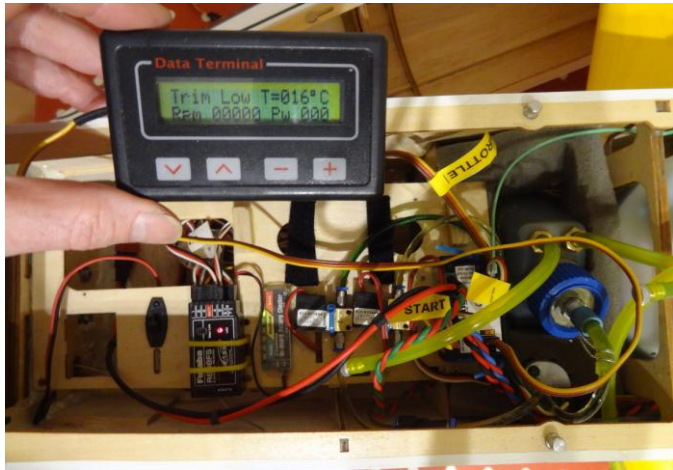


Figure 2 Hand held display connected to Xicoy FADEC

Sadly the messages just looked like garbage data. I couldn't recognise any values, plus all the data changed with each frame. As the values should have been constant, I assumed the message was encrypted and temporarily gave up at this point. However, my interest was rekindled some months later when I read on the internet that some guys over the pond had made their own Xicoy telemetry modules for a JETI radio. I got in touch and they kindly emailed me what they had found. The message isn't in fact encrypted, just lightly scrambled, to protect it from prying eyes. A one byte frame count is kept, incrementing by one each frame. This count is added to every byte in the message. Finding this and deducting it from each of the 50 bytes reveals the clear message. (It's a good job they didn't have me at Bletchley Park. I should have spotted that straight away!) My USA buddies also pointed out where the various interesting bits of data were in the message. They had had access to the interface of an older Xicoy engine controller and used that as a starting point.

To proceed with development, I needed a tiny low power compute device capable of handling two serial connections, as the telemetry interface into the receiver is also a serial bus interface, but more on that later. Up until recently, home build electronics projects for modellers invariably used PIC devices, programmable interface controllers. There was a bewildering array of these to select from. They also invariably needed extra components and circuit design skills to make anything useful. Added to that, they required a special programming board. Needless to say, I don't think many modellers used them. Thankfully times have changed. There are now many small self-contained devices available that are simply programmed by connection to your computer with a USB cable.



Figure 3 Teensy USB Microcontroller

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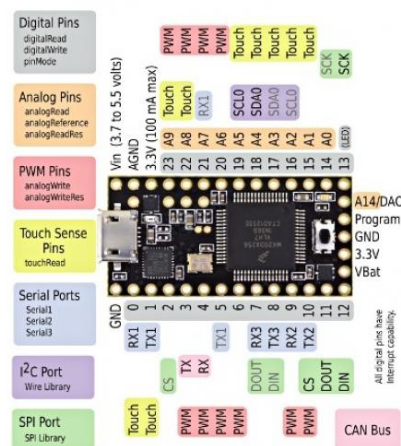


Figure 4 Teensy Interface Pin Outs

Many of you will have heard of the “Raspberry Pi”, which is a credit card size computer, but much too powerful for what’s needed here. I chose a “Teensy”, which isn’t much bigger than a postage stamp, and is built around an ARM Cortex M4 signal processor. It provides three serial interfaces, plus, and interesting for RC modellers, ten pulse width modulated (PWM) signal pins, as used by receivers and servos. (So, although I won’t use it this time, it would be a simple matter to write a program for this board to read and write PWM signals, for instance a sequencer. I’m already thinking of new applications!)

The Teensy is programmed in the C++ high-level language. As I am familiar with this, it was only a few hours work writing and testing the code to read and interpret the Xicoy data. It amounts to several pages so I won’t reproduce it here. If anyone wants to have a look I can email it to you.

So, this is as far as I have got so far. The next phase is to calculate fuel used and write it to the telemetry data port on the receiver. This should be straight forward as the details of how to do this are published by the manufacturer. I’ve also obtained a tiny OLED display, which I will put in the cockpit to display fuel usage and engine parameters.

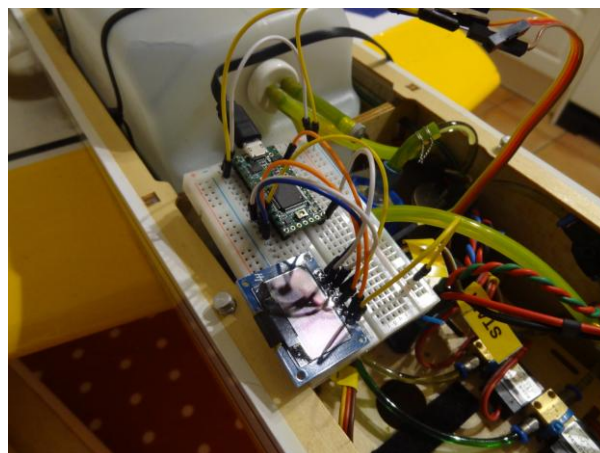


Figure 5 Teensy micro controller and OLED display connected on a breadboard

Related WebSites

Frsky Taranis [http://www.frsky-rc.com/product/pro.php?pro\\_id=113](http://www.frsky-rc.com/product/pro.php?pro_id=113)

Frsky Horus [http://www.frsky-rc.com/product/pro.php?pro\\_id=144](http://www.frsky-rc.com/product/pro.php?pro_id=144)

OpenTx <http://www.open-tx.org/>

Teensy <https://www.pjrc.com/teensy/index.html>

ARM M4 Cortex <http://www.arm.com/products/processors/cortex-m/cortex-m4-processor.php>

**Mike Heley**

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### **Martin Fardell's latest**



Two pictures of my new DH 75A Hawk Moth. 108" span, 10 cell Lipo. 14 lb weight. Flies nice and slowly.

**Martin Fardell**

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## ***Aero modeller Pilgrims Progress!***

Do you remember the Veron Sabre (f86) kit, priced 30/6d? Or the pocket money priced KK range at 3/6d? How many club members purchased their first Junior 60 for all of 48/3d? If so you probably started modelling at about the same time. I'm sure we all had the same dream, "one day I'll build a really big one", at least that was the thought for those who had not discovered motorbikes (or girls).

Being a bit of a late developer, it took me rather longer than the average LMA member to get above the 20kg limit, in fact it took about 25 years.

At the time, I was working for Britannia Airways, taking pink people out to Palma and bringing browner, or occasionally very red ones, back again. Modelling had taken a back seat as overseas hotels rather looked down on inhabitants leaving wood shavings in the bedrooms, and dope fumes really got up their noses, as it were.

I was asked to help a fellow pilot. Who was building a Rutan LongEze, all foam and fibreglass, very modern. That was interesting, but I felt the need to go "traditional" and decided to build an "Isaacs' Fury" The original plan was to start from scratch, but as time available was limited, I and my partner in crime, actually the village doctor who was a keen Private Pilot, decided to take up the offer of an underway project which the builder had decided was too difficult for him. You can see how far he got in the first photo. Getting this collection of bits from Surrey to Cheshire was interesting, requiring lots of language and the borrowing of a somewhat elderly horsebox.



Anyway once back in my garage, off we went, not building, but stripping down. The initial assembly was very suspect, the rudder, which had been signed off, was twisted and had to be stripped and rebuilt and the odd ply shapes glued to the fuselage, were identified a metal fittings to locate the centre section, so you can imagine, confidence in the original builder was somewhat lacking. We eventually rebuilt from the tailskid upwards so our idea of saving time and building in about a year, became three years in all, and that included spending two New Year eves in a cloud of dust, sanding down ribs and leading edges.

It really was like building a model, I used X-Acto spoke shaves and planes to carve the L.E. and the rear decking aft of the cockpit was  $\frac{1}{4}$  square from the local model shop!

As the temperature dropped, the Boss took pity on me and the wings were covered in the living room, with us passing a 15 inch needle back and forward as we secured the linen to the ribs. Doping the wings caused a bit of a flurry as the dope fumes passed up through the floor above the garage into the bedroom occupied by my daughter, (enter cross-eyed child saying, "feel a bit odd")..End of doping session for that evening!

But eventually it all came together, if in rather chilly weather, pouring cold four-star petrol in a temperature of -5 ° C was bracing.



I must admit. It did look rather good; 18ft span 530 Lbs all up weight of semi scale Fury

First flight was interesting; we had tested the airspeed indicator by holding it out of the Dr's car and comparing speeds. We knew the rest of the instruments worked, and we had a reasonable idea of the stalling speed. What we did not know was the position error on the ASI, (that is the error you get because of the location of the pitot tube); I got a very definitive value as I closed the throttle on round out and arrived back on Cheshire soil with a thump more suited to a 737 than a light biplane. About a 5 knot error; I landed on the stall, but it all stayed together; let's hear it for "Araldite"!

Great fun, no grumpy passengers, but no coffee, no radio, no ATC telling one what you couldn't do. It's now 30 years since G-BLMU was built but sadly, she no longer exists; an accident at Barton Aerodrome wrote her off, though luckily the pilot survived.

Occasionally I look at the models in my possession and think-----perhaps one day? Maybe?



***Dunlandin***

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### ***'A' Test Success***

Congratulations go to Terry Burgess who passed his 'A' test on Saturday 12<sup>th</sup> March. Here he is receiving his certificate from Examiner Martin Fardell standing behind his 1.2Kg electric Trainstar model. Well done Terry.

***Peter Bennett***



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### ***Historic Bi-plane Rigging Drawings***

The back page contains another in the series of contemporary WW1 rigging drawings, from the collection compiled by Air Mechanic 1st Class Campbell - a magnificent Maurice Farman Shorthorn powered by an 80HP Renault engine. This one is a little different in that it was drafted in August 1917 from notes made by 2/LT Compton, No. 3 School of Military Aeronautics, Technical Notes Sheet 3.

***Peter Bennett***

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### ***Future News letters***

To make future Newsletters interesting your articles or stories (visits to shows or exhibitions, model builds, flying experiences, modelling techniques etc.), for sales and anything not necessarily model aircraft related, will be most welcome and should be forwarded to [secretary@brcmac.org.uk](mailto:secretary@brcmac.org.uk) for inclusion as appropriate.

That's all for now. Happy flying.

***Peter Bennett***  
**Editor**

# MAURICE FARMAN 'SHORTHORN'

[TYPE 1914]

80 HP

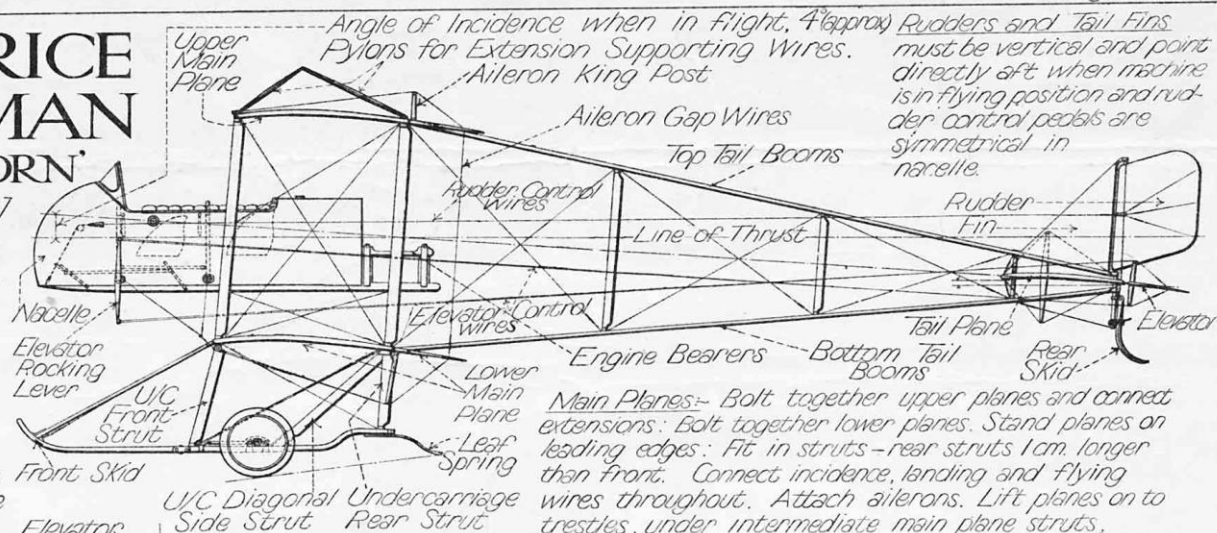
RENAULT

**Undercarriage-** Viewed from the front the sides of the undercarriage must be vertical and in direct line with the interplane struts above. To test sides stretch string from the leading edge of the top plane to the end of the main skid. The distance from the string to the leading edge of the lower plane should read 145 mms.

**Tail Plane-Incidence-** Adjust the height of the front spar above the rear (testing as in main planes) until it reads 45 mms. This is the maximum incidence to be given and will possibly require readjustment.

**Main Planes-Incidence-** Put machine in flying position by supporting booms until lower longerons of nacelle are level. Hold straight edge level with one end under rear spar. Then the distance from the straight edge to under side of front spar (leading edge) should be adjusted until it reads :-  
 47 mms. under Right Outer Strut  
 50 mms. under Right Inner Strut  
 55 mms. throughout Centre Section  
 60 mms. under Left Inner Strut  
 63 mms. under Left Outer Strut  
 Right Wing Wash-out 8 mms.  
 Left Wing Wash-in 8 mms.

(The above measurements have been found suitable for Egypt)

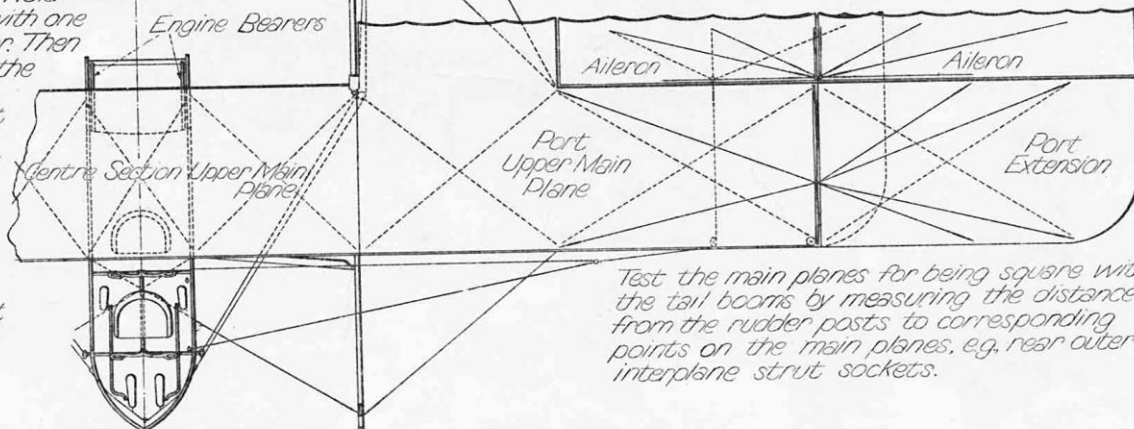


**Main Planes:-** Bolt together upper planes and connect extensions: Bolt together lower planes. Stand planes on leading edges: Fit in struts-rear struts 1cm. longer than front. Connect incidence, landing and flying wires throughout. Attach ailerons. Lift planes on to trestles, under intermediate main plane struts, making chord of lower plane horizontal. Stretch string between the tops of outer lower strut sockets across the span, front and rear. Adjust landing and flying wires until string cuts top of all intermediate sockets except those for the struts which support the nacelle: the string must cut these 5mm. below the top. Opposite diagonals in outer bays must be equal: trammel. Chord of lower plane to be square with line between leading edge of upper and lower planes: test with big square (or by plumb line if chord of lower plane is horizontal).

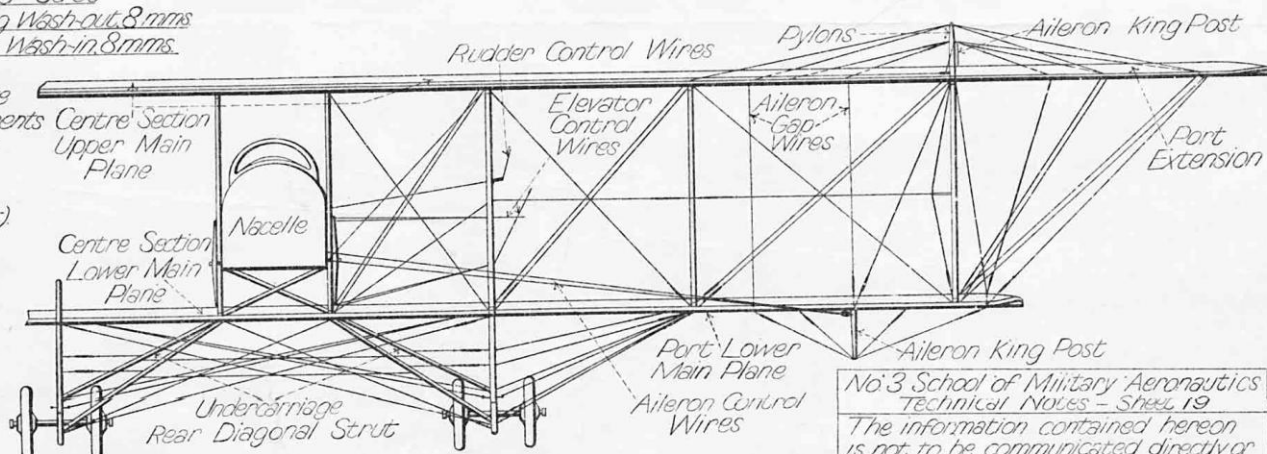
**Tail Booms and Empennage:-** Build up completely before attaching to main planes, making opposite diagonals in middle bay of sides equal. Bolt to fittings on rear spars of centre section planes. Booms to be parallel and square with main planes. Opposite diagonals of side bays of booms to be equal. Distance from each rudder post to corresponding points on main planes; e.g. rear outer interplane strut sockets, to be equal. Side struts to be vertical. Front and rear spars of tail plane to be straight.

**Ailerons** to be set with a droop of 25 mms. with the control handles symmetrical.

**Elevators** to be set with a droop of 15 mms. with the control lever vertical.



Test the main planes for being square with the tail booms by measuring the distance from the rudder posts to corresponding points on the main planes, e.g. rear outer interplane strut sockets.



No 3 School of Military Aeronautics  
 Technical Notes - Sheet 19  
 The information contained hereon is not to be communicated directly or otherwise to any person not holding an official position in H.M. Service.

Notes by 2/Lt. Crompton  
 Sheet prepared by I/AM Tealby