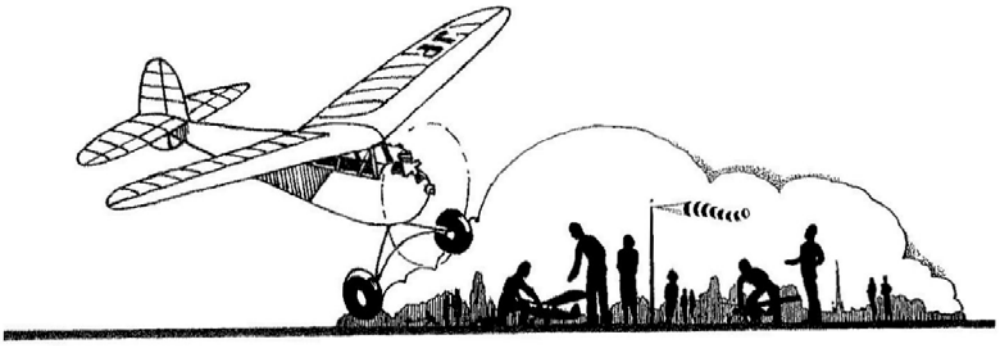


Sticks and Tissue No 141 – August 2018

If you can contribute any articles, wish to make your point of view known etc please send to or phone 01202 625825 JamesIParry@talktalk.net The content does not follow any logical order or set out, it's "as I put it in and receive".

Thanks to Mark Venter back issues are available for download from http://sticksandtissue.yolasite.com/

Writings and opinions expressed are the opinion of the writer but not necessarily the compiler/publisher of Sticks and Tissue.

Photo sent by Ronald showing his Junior 60 over Belgium countryside

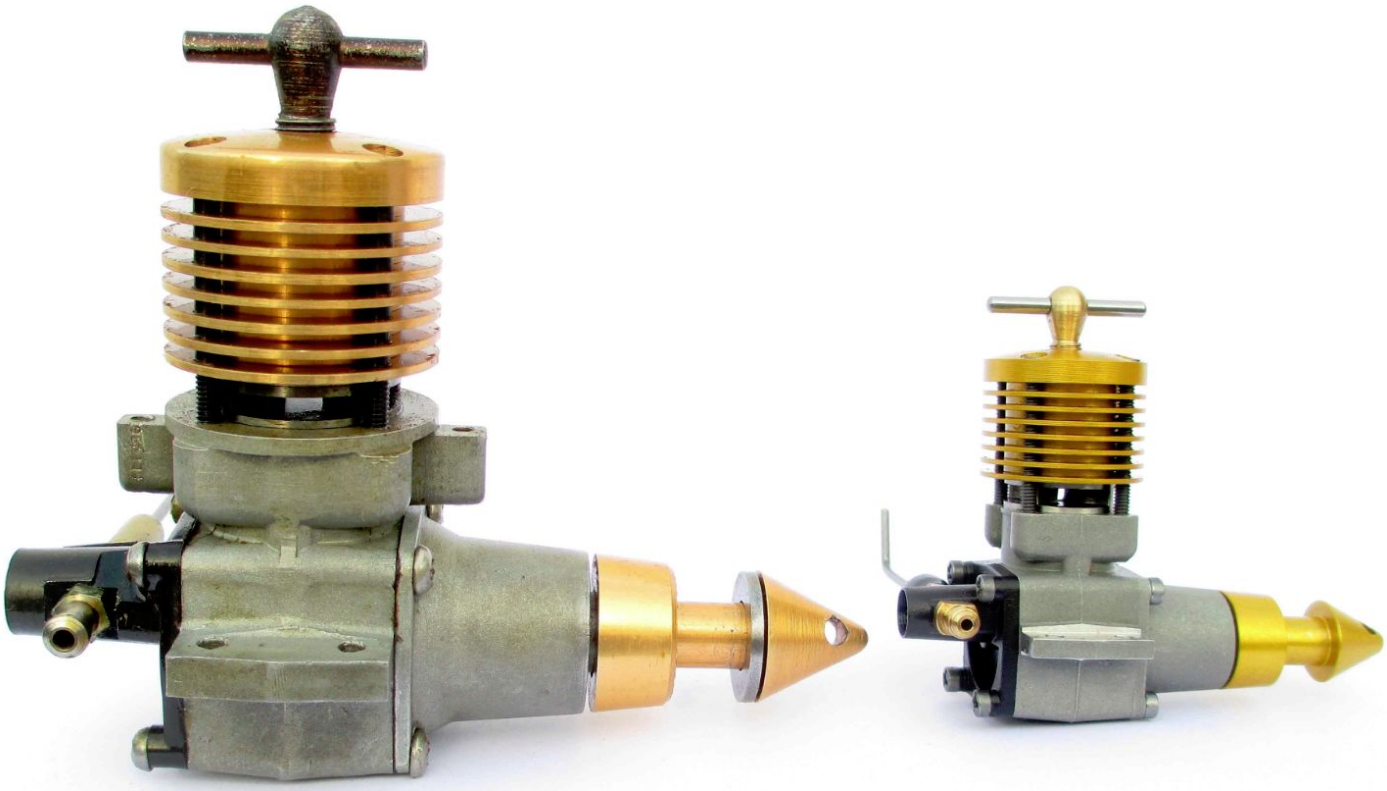
From Bill Wells

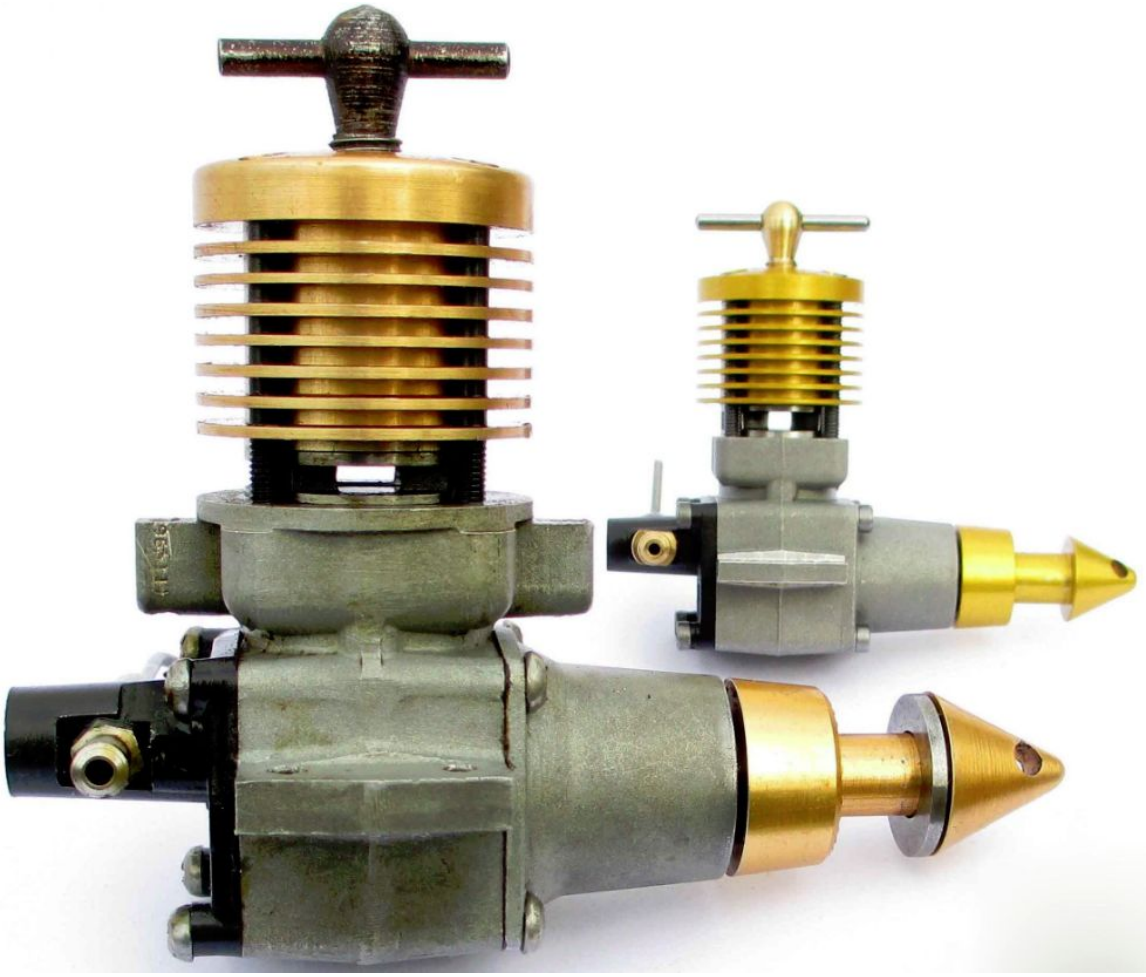
Mini ETA .35cc

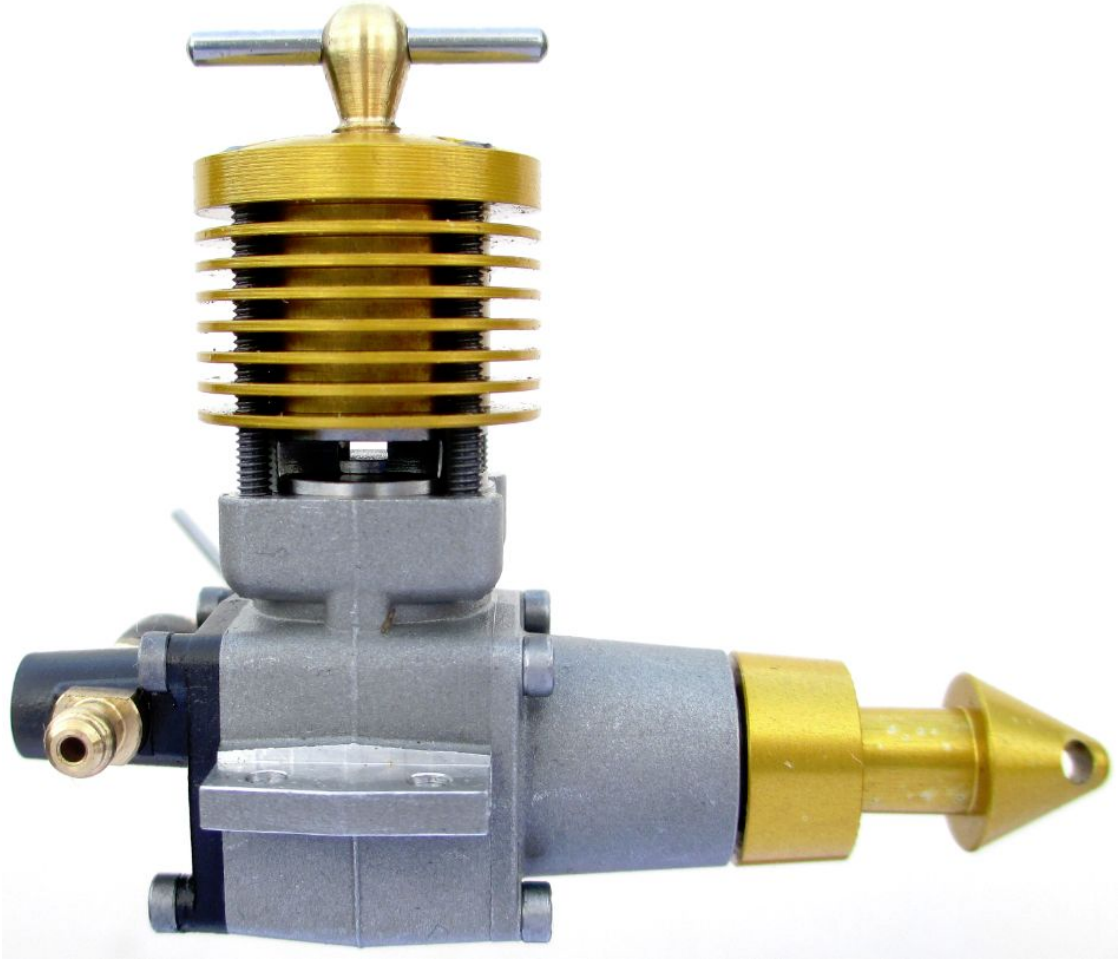
For a number of years now there has been a trend to produce what at I can only describe as ‘Novelty Engines’. They are copies of engines from the past but not true replicas because they are miniaturised. The advent of CNC machinery has enabled these engines to be produced in significant numbers and they do appeal to enthusiasts especially in free flight or light weight radio control models. Some of the early engines were reported as a waste of space either very difficult or impossible to start. Up to now I have in the main resisted the temptation but when Paul Goodall of BMP produced one from a box of engines I just knew I couldn’t walk away without it.

Described as a Mini ETA 0.35cc it is a copy of an ETA 15 Mk II but has Gold Anodising instead of Blue. This alone appealed to me as I have an ETA 15 Mk III Elite with Gold Anodising. The external features of the Elite differs from the MkII in having front and rear attachment points and a ring for a silencer, all integral to the crankcase. The pictures show the difference in size of the two engines. The Elite weighs in at 6.6 and the Mini ETA 1.65 ounces.

As there is a Comprehensive Test Report by Maris Dislers in the December 2017 issue of Aeromodeller there isn’t much else I can say that might help a user of this little gem. However if you find it difficult to administer a LIGHT exhaust prime, just enough to wet the top of the piston and no more then a useful tip is to mount the engine on it’s side. This way surplus fuel will run through and out of the lower exhaust port. I used a straight fuel and got 9,300 using a 6x4 nylon prop. Lastly there are cheaper .35cc engines probably sourced from the same manufacturer but they are not miniature copies of an engine from the past!








ETA
036

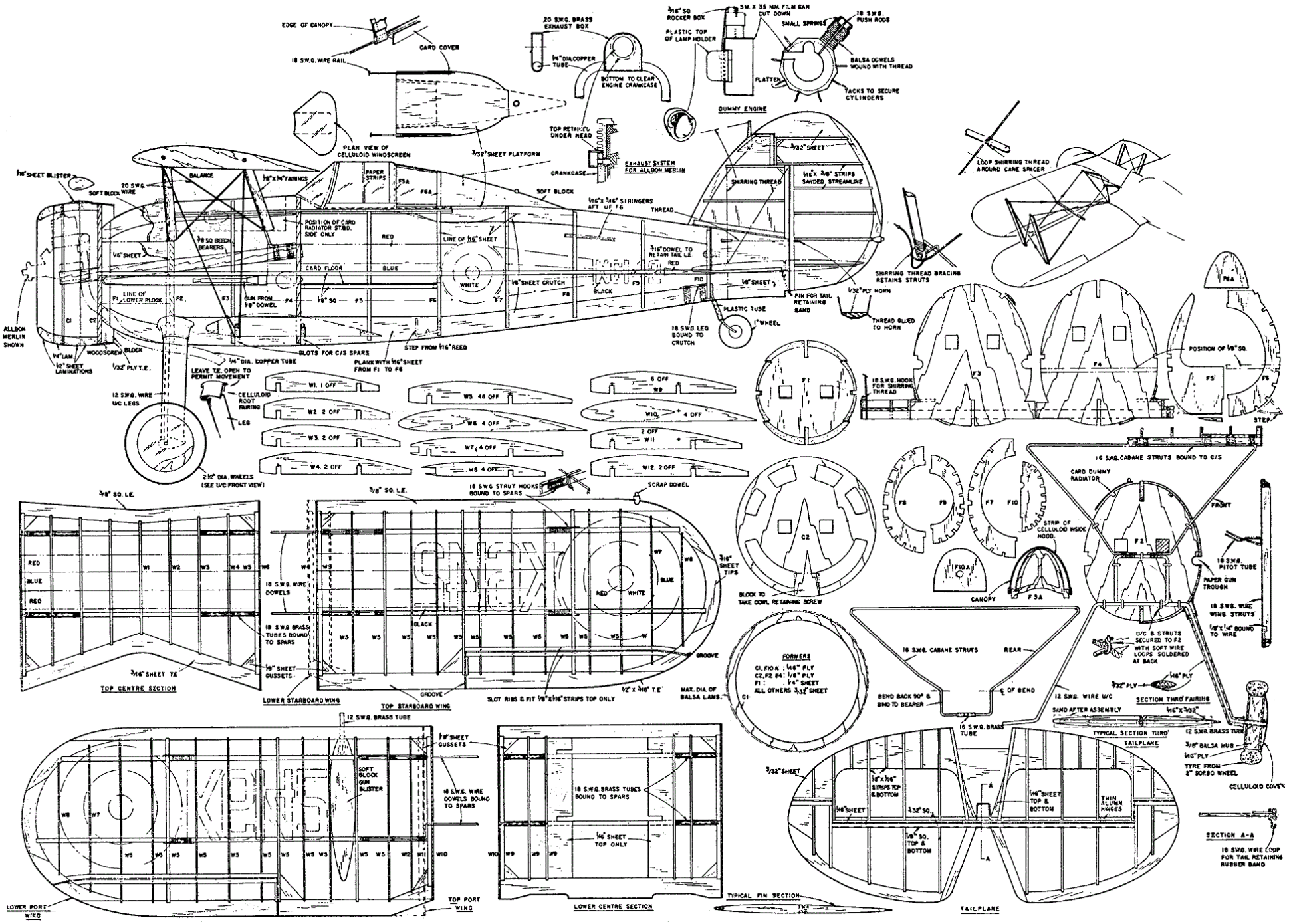
From Den of Den's Models

Look what arrived in the last parcel from Rudolf Heisbok….its the micro Easy….. a small rubber powered version of the Easy RC model that was featured in a previous S & T….as yet, it's just a prototype… so I don't know when it will be available.

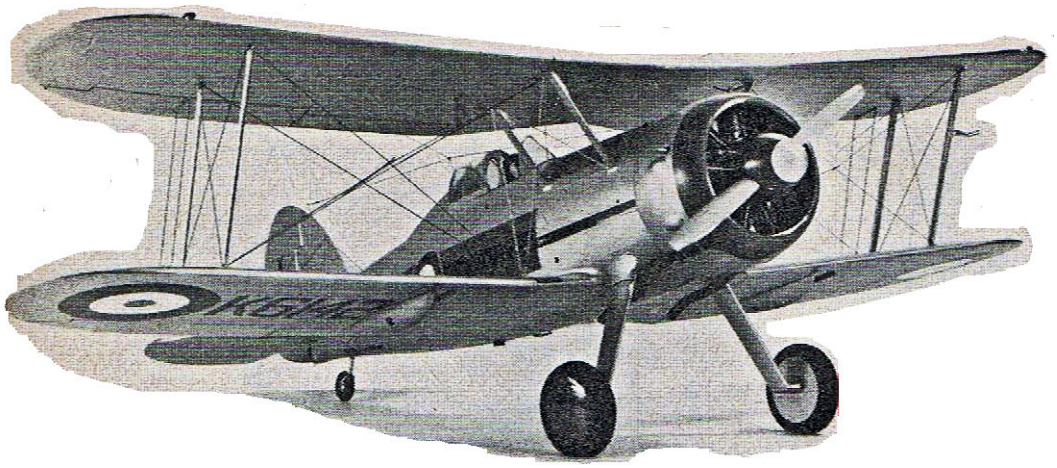
I've asked Rudolf if the micro Easy could be combined with his micro Shark in one box…..as it's a good companion to

the little glider

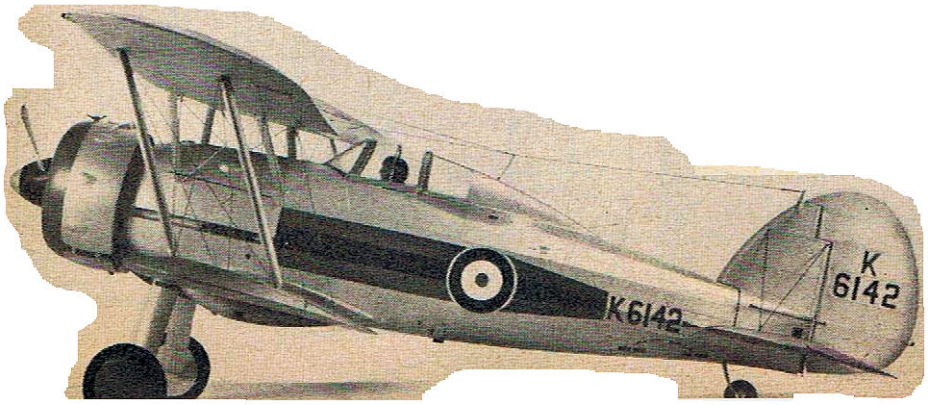
If Rudolf agrees it could be a great basis for some fun competition with a combined score from rubber and glider….and I'm sure the combined kit will be great value….they both are great fliers in calm conditions…..I'm getting about 20 sec from the Easy…..the mini Shark is a challenge….hand launches are superb…..but I have yet to find the best way to get it up to a reasonable height…..the high aspect ratio does not like catapult….well a rubber band….but recent experiments using shirring elastic and Kevlar thread as a micro hi – start are showing promise….BTW the micro Shark is already available from my site for £5 plus p & p


EDGE OF CANOPY
CARD COVER
18 S.W.G. WIRE RAIL
PLAN VIEW OF CELLULOID WINDSCREEN
3/32" SHEET PLATFORM
20 S.W.G. BRASS EXHAUST BOX
1/4" DIA COPPER TUBE
BOTTOM TO CLEAR ENGINE CRANKCASE
TOP RETAINER UNDER HEAD
CRANKCASE
EXHAUST SYSTEM FOR ALLBON MERLIN
3/16" SQ ROCKER BOX
PLASTIC TOP OF LAMP HOLDER
5 M. X 35 MM. FILM CAN CUT DOWN
SMALL SPRINGS
18 S.W.G. PUSH RODS
BALSA OGWELS WOUND WITH THREAD
PLATTEN
TACKS TO SECURE CYLINDERS
DUMMY ENGINE
3/32" SHEET
SHIRRING THREAD
1/16" x 3/8" STRIPS SANDED STREAMLINE
LOOP SHIRRING THREAD AROUND CANE SPACER
1/16" SHEET BLISTER
SOFT BLOCK
20 S.W.G. WIRE
BALANCE
1/8" x 1/4" FAIRINGS
PAPER STRIPS
F3A
F6A
SOFT BLOCK
1/16" x 3/16" STIRINGERS AFT OF F6
THREAD
POSITION OF CARD RADIATOR STBD. SIDE ONLY
1/8 SQ BEECH BEARERS
RED
LINE OF 1/16" SHEET
3/16" DOWEL TO RETAIN TAIL L.E.
1/16" SHEET
CARD FLOOR
BLUE
WHITE
1/8" SHEET CRUTCH
BLACK
F10
1/8" SHEET
SHIRRING THREAD BRACING RETAINS STRUTS
1/32" PLY HORN
PIN FOR TAIL RETAINING BAND
THREAD GLUED TO HORN
LINE OF LOWER BLOCK
F1
F2
F3
GUN FROM 1/8" DOWEL
F4
1/8" SQ
F5
F6
F7
F8
F9
PLASTIC TUBE
1" WHEEL
18 S.W.G. LEG BOUND TO CRUTCH
ALLBON MERLIN SHOWN
C1
C2
1/4" LAM
1/2" SHEET LAMINATIONS
WOODSCREW
BLOCK
1/32" PLY T.E.
1/4" DIA. COPPER TUBE
SLOTS FOR C/S SPARS
STEP FROM 1/16" REED
PLANK WITH 1/16" SHEET FROM F1 TO F6
LEAVE T.E. OPEN TO PERMIT MOVEMENT
CELLULOID ROOT FAIRING
LEG
12 S.W.G. WIRE U/C LEGS
2 1/2" DIA. WHEELS (SEE U/C FRONT VIEW)
W1. 1 OFF
W2. 2 OFF
W3. 2 OFF
W4. 2 OFF
W3. 48 OFF
W6. 4 OFF
W7. 4 OFF
W8. 4 OFF
6 OFF W9
W10. 4 OFF
2 OFF W11
W12. 2 OFF
F1
18 S.W.G. HOOK FOR SHIRRING THREAD
F3
F4
F5
F6
POSITION OF 1/8" SQ.
STEP
16 S.W.G. CABANE STRUTS BOUND TO C/S
CARD DUMMY RADIATOR
FRONT
3/8" SQ. L.E.
18 S.W.G. STRUT HOOKS BOUND TO SPARS
SCRAP DOWEL
C2
F8
F9
F7
F10
STRIP OF CELLULOID INSIDE HOOD.
F2
18 S.W.G. PITOT TUBE
PAPER GUN TROUGH
18 S.W.G. WIRE WING STRUTS
1/8" x 1/4" BOUND TO WIRE
RED
BLUE
RED
W1
W2
W3
W4
W5
W6
18 S.W.G. WIRE DOWELS
18 S.W.G. BRASS TUBES BOUND TO SPARS
1/8" SHEET GUSSETS
3/16" SHEET T.E.
TOP CENTRE SECTION
LOWER STARBOARD WING
W7
W8
3/16" SHEET TIPS
BLUE
RED
WHITE
BLACK
GROOVE
GROOVE
SLOT RIBS & FIT 1/8" x 1/16" STRIPS TOP ONLY
1/2" x 3/16" T.E.
TOP STARBOARD WING
BLOCK TO TAKE COWL RETAINING SCREW
F10A
CANOPY
F3A
FORMERS
C1, F10A : 1/16" PLY
C2, F2, F4 : 1/8" PLY
F1 : 1/4" SHEET
ALL OTHERS 3/32" SHEET
MAX. DIA. OF BALSA LANS.
16 S.W.G. CABANE STRUTS
REAR
BEND BACK 90° & BIND TO BEARER
℄ OF BEND
12 S.W.G. WIRE U/C
16 S.W.G. BRASS TUBE
U/C & STRUTS SECURED TO F2 WITH SOFT WIRE LOOPS SOLDERED AT BACK
1/16" PLY
3/32" PLY
SECTION THRO' FAIRING
SAND AFTER ASSEMBLY
1/16" x 3/32"
TYPICAL SECTION THRO'
12 S.W.G. BRASS TUBE
3/8" BALSA HUB
1/16" PLY
TYRE FROM 2" SOESO WHEEL
CELLULOID COVER
12 S.W.G. BRASS TUBE
1/8" SHEET GUSSETS
SOFT BLOCK GUN BLISTER
W8
W7
W5
W2
W11
W10
18 S.W.G. WIRE DOWELS BOUND TO SPARS
LOWER PORT WING
TOP PORT WING
18 S.W.G. BRASS TUBES BOUND TO SPARS
1/16" SHEET TOP ONLY
W10
W9
LOWER CENTRE SECTION
TYPICAL FIN SECTION
3/32" SHEET
1/8" x 1/16" STRIPS TOP & BOTTOM
1/16" SHEET
3/32" SQ.
1/8" SQ. TOP & BOTTOM
1/16" SHEET TOP & BOTTOM
THIN ALUMN. HINGES
A
A
TAILPLANE
TAILPLANE
SECTION A-A
18 S.W.G. WIRE LOOP FOR TAIL RETAINING RUBBER BAND

Gloster Gladiator free flight for .75 cc by Doug McHard from Aero Modeller December 1958

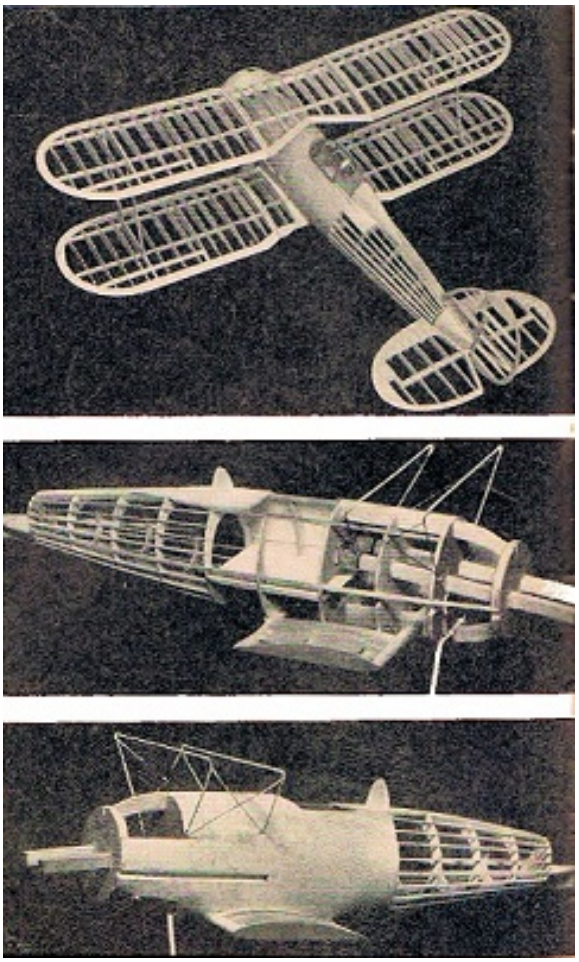


Doug McHard's Gladiator which made its debut at this year's Nationals has been the object of many a scale fan's request over the last six months.
In its pristine silver colour scheme with 72 Squadron markings it has attracted a 'neat deal of attention wherever flown, and its characteristic flight with the muffled exhaust note coming through genuine scale pipes have made it both look and sound the part of the last of the famous Biplane fighters.
Here is a subject for the ardent scale enthusiast who wants perfection or the man who has made a model or two and would like to try his hand at scale. It is a docile model, and one which will achieve great popularity in years to come.
All constructional details are given on the plan and provided they are carefully followed no difficulty should be encountered. The sheeted front part of the fuselage can be covered in wide sheets of 1/16-in. medium balsa as there is very little double curvature present, moisten the outer surface of the wood to facilitate bending.
Joins between sheets should be arranged to come over the keels and 1/8-in. sq. stringers. A slow-drying adhesive of the Le Pages PVA type will be found to be of great assistance during this operation. Araldite was used on the original model for all hardwood jointing such as undercarriage ply fairings and motor bearer fixing, strength is enormously increased and the extra time required for drying is worthwhile.
A sliding cockpit cover is, of course, optional, but adds considerably to the final appearance. The cockpit may be completely equipped and a dummy pilot included (from soft balsa) as desired. Details will be found included in the 3-view drawing in our "Famous Biplanes" feature.
The exhaust system is also optional, but if used is very effective and also helps to keep the model clean by leading surplus oil cut of the motor cowling. Covering on the original model was heavyweight Modelspan, although in view of the light weight of the finished job, silk will be used when recovering becomes necessary. Silk covering will increase the "hole resistance" considerably, but if used pay particular attention to the wing and tail structures which should have very hard spars and leading and trailing edges throughout.

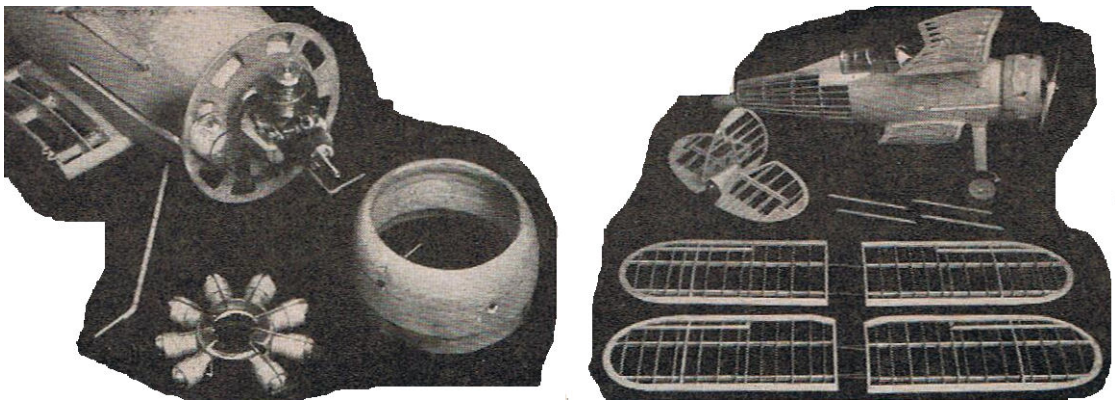


The 2 ½ -in. thin-tyred wheels presented a problem which was surmounted by using the tyre from a 2-in. "Roadway" wheel with the internal ridge cut away, stretched over the larger hub and fixed with "Evostick" to prevent splitting.
Before flying, check incidence angles and engine thrustline carefully and set elevator to neutral. The fuselage should be horizontal when the assembled model is supported under the upper wing centre section at the point indicated on plan. Slight nose-heaviness is permissible, but NOT tail-heaviness !! A flat straight

glide should result from a gentle level launch. Trim out with elevator. When satisfied, cement and pin the movable surface before power flying. The model should fly left-handed circles under power and glide to the right.



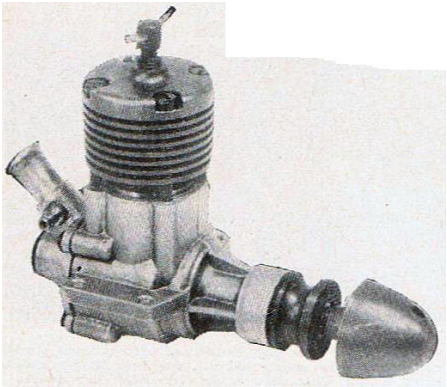
Structural photos show completed airframe before covering to reveal scale rib spacing and authentic control surface false spars. Centre view shows the fuselage before adding starboard sheeting. Note cockpit floor and tail platform. Lower photo, shows the fuselage only needing end and tail blocks to make it complete.



Cowl and dummy motor are removed from the nose to show the tank position and fretted former C2. At right the framework is completed ready for covering.

From Ronald in Belgium

Just a few photos epitomizing my summer: the Junior 60 lazily on reconaissance over the neighbouring fields. Sheer happiness! The other planes also get a regular outing, I am still enjoying your magazine very much indeed.



Rhythm 2.46 twin ball race diesel produced in the Ukraine for U.S.S.R. modellers From Aero Modeller July 1963

Superficially this 2.5 c.c. U.S.S.R. diesel resembles a mixture of 'Frog' and 'ED.' layout with a rather hand-made look, apart from the anodising on the cylinder jacket, driver and spinner nut. It has, however, obviously been produced as a 'racing' diesel by Krasnorouski of Kiev, featuring a twin ballrace crankshaft bearing and relatively advanced timing, although allied to drum valve induction. Performance in this latter respect was disappointing on test, largely due to handling difficulties. Starting and adjustment characteristics are, quite frankly, poor—due partly to the very poor suction, plus an over-stiff contra piston and a spraybar/needle valve combination which seemed incapable of supplying an optimum mixture. Possibly these are faults of the individual engine tested, for much of the maker's claimed performance potential appeared to be there in the design, but instead of their figure of .32 B.H.P. at 15,000 our test results were much more modest. The more we ran it, too, the more we came to dislike Its characteristics, which on the larger propeller sizes called for setting up the tank at exactly the right level to keep engine suction with just the right amount of 'gravity' assistance.

Moderate performance - Performance was more or less the same on all the standard British commercial fuels tried. The recommended fuel mixture in the instruction leaflet specified six ingredients, which we could only identify as basically a 30/40 ether/paraffin mixture plus 4 per cent. nitrate additives, leaving two 17 per cent, constituents 'unknown' types of lubricating oil. Perhaps they could have made all the difference! Basically, however, any good diesel should run on straight ether/paraffin/oil mixture, with a little nitrate to promote smoothness. This one did not object to a normal fuel so much as having to struggle to induct enough mixture va a consistent needle valve setting.

Two ball-races - Constructional layout is orthodox. The crankcase unit is a gravity die casting of quite substantial wall thickness machined internally for the two ballrace housings and also to provide clearance for the con rod big end. Actual crankcase volume is quite small. The .275 in. (7 mm.) diameter hardened steel crankshaft steps down to .236 in. (6 mm.) diameter immediately behind the front ballrace which is of lightweight type and accommodates the propeller driver on a split brass collet before being threaded for the remainder of its front end length. It is finished by grinding between centres. The shaft diameter is relatively small for a modern diesel of this size, but there is, of course, no port cut out or central hole.

Drum 'valve Induction

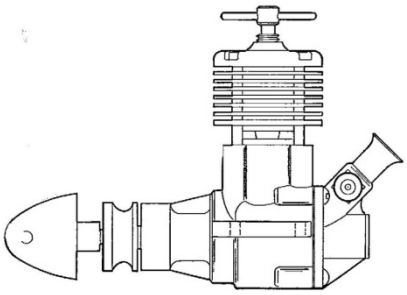
Induction is by a drum valve of virtually the same form as that introduced by George Fletcher on the Frog '349', again of hardened steel 9.5 min. diameter and running in a plain bore bearing surface in the rear crankcase housing. This housing also has the angled intake tube cast integral with it. Bearing length for the drum valve is bored and reamed right through, the open end subsequently being sealed with a rather crude rubber moulding—a much more straightforward method than having to finish a blind bore.

The cylinder liner is of hardened steel and conventional 'British' pattern with a wall thickness slightly in excess of 1/16 in. It seats in the crankcase on a ring section, through which are cut the circumferential exhaust ports. Transfer ports are drilled upwards at an angle through the walls from the outside and the tops of the transfer passages emerging in the pillars between the exhaust ports finishing square and almost completely overlapping the exhaust opening. The ports are, in fact, further machined after drilling to produce a square section on the inside walls. The piston is machined from cast iron and is of substantial section and weight. Finish is fair but the fit in the liner is good, and possibly obtained by lapping.

The gudgeon pin is press fitted whilst the connecting rod is machined from dural, and rather roughly at that. The parts that matter, though, the big and little end bearings, are reasonably finished, but not as good a fit as they could have been. The cylinder jacket is a conventional straightforward turning, fitting over the top of the liner and with the whole assembly secured by four screws through into the crankcase unit. The contra piston appears to be of cast iron and, as mentioned previously, too tightly fitted for easy adjustment. This is not helped by the fact that the tommy bar is rather flimsy and thin—painful to the fingers when attempting to adjust a tight "contra".

Gasket seals are used under the liner 'ring' seating on the crankcase unit, between the crankcase and back

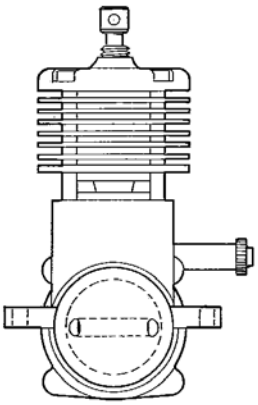
cover unit and in front of the rear ballrace. A hard resin-paper thermoset plastic washer is used between the front bearing housing and the propeller driver, presumably to act both as a spacer and an oil seal. The spraybar is of brass with a steel needle soldered into a split brass thimble, with locking action provided by friction. The spraybar locks against rotation by locating in a 'flat' in the intake tube o/d.



Machining

This engine appears to have been made with rather limited machine tool equipment and although the workmanship is generally good it is not up to the standard that one comes to expect for a 'racing' engine. Although not necessarily affecting performance as such, many machined parts on the castings show considerable evidence of excessive chatter, although all the ground finishes are good. The choice of drum valve induction is also surprising on a 'racing' diesel. Whilst this provides unlimited scope for induction timing without weakening of shaft the actual port opening is comparatively modest (although larger than could be accommodated on the size of crankshaft used). And theoretical advantages of drum induction are often more than offset by the increase in friction and consequent power loss in driving the drum.

Basically, in fact, we found nothing at all to enthuse over in this engine other than the internal 'squaring' of the transfer ports and plenty to criticise.



Specification

Displacement: 2.46 Cu. cent. (.15 cu. in.)
Bore: .552 in. (14 min.)
Stroke: .630 in. (16mm.)
Bare weight: 6 1/2 ozs.
Max. power: .25 B.H.P. at 14,400 r.p.m.
Max. torque: 21.5 ozs.-ins. at 9,800 r.p.m.
Power rating: .1 B.H.P. per C.C.
Powerlweight ratio: .038 B.H.P. per oz.

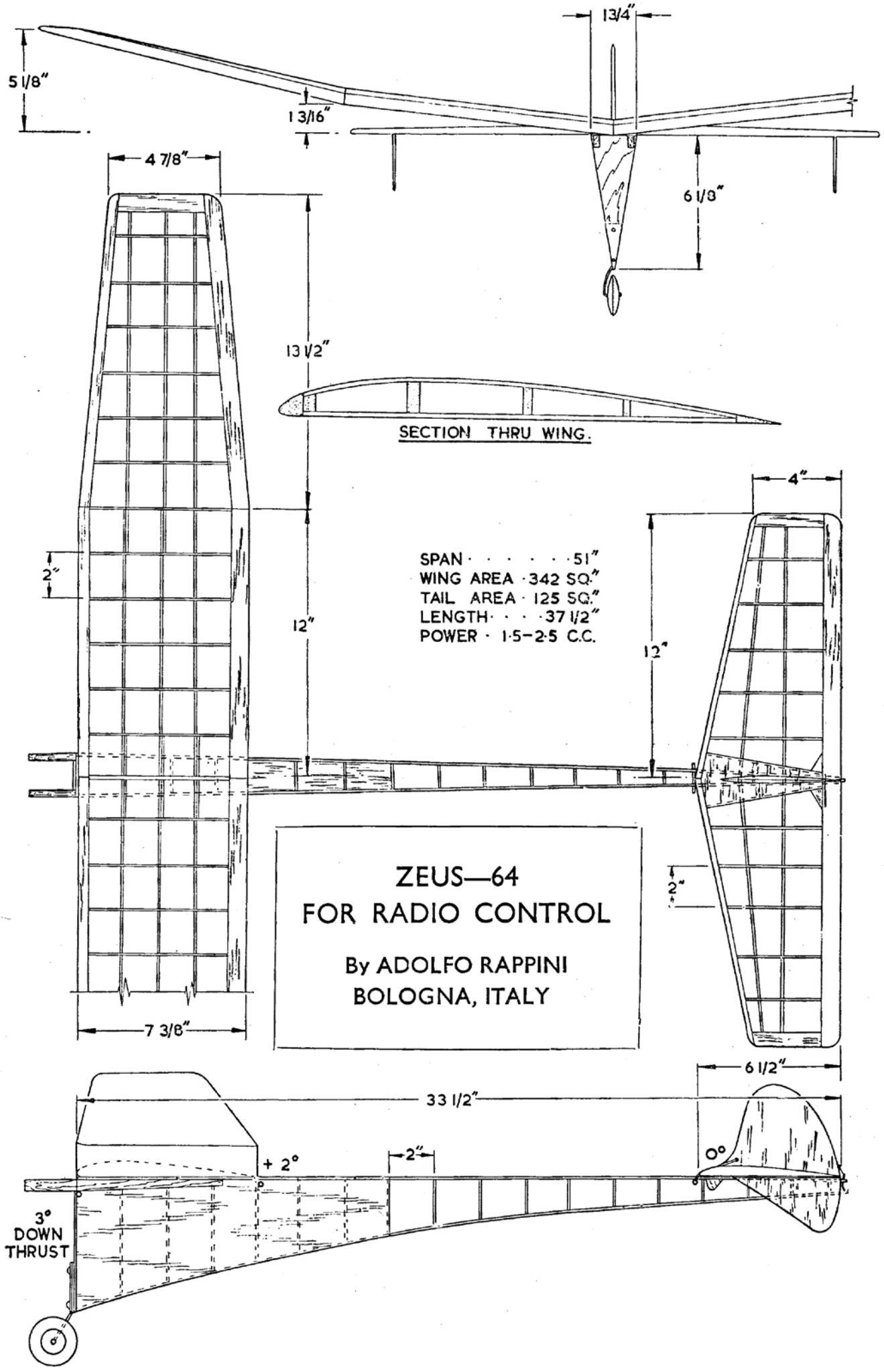
Construction:

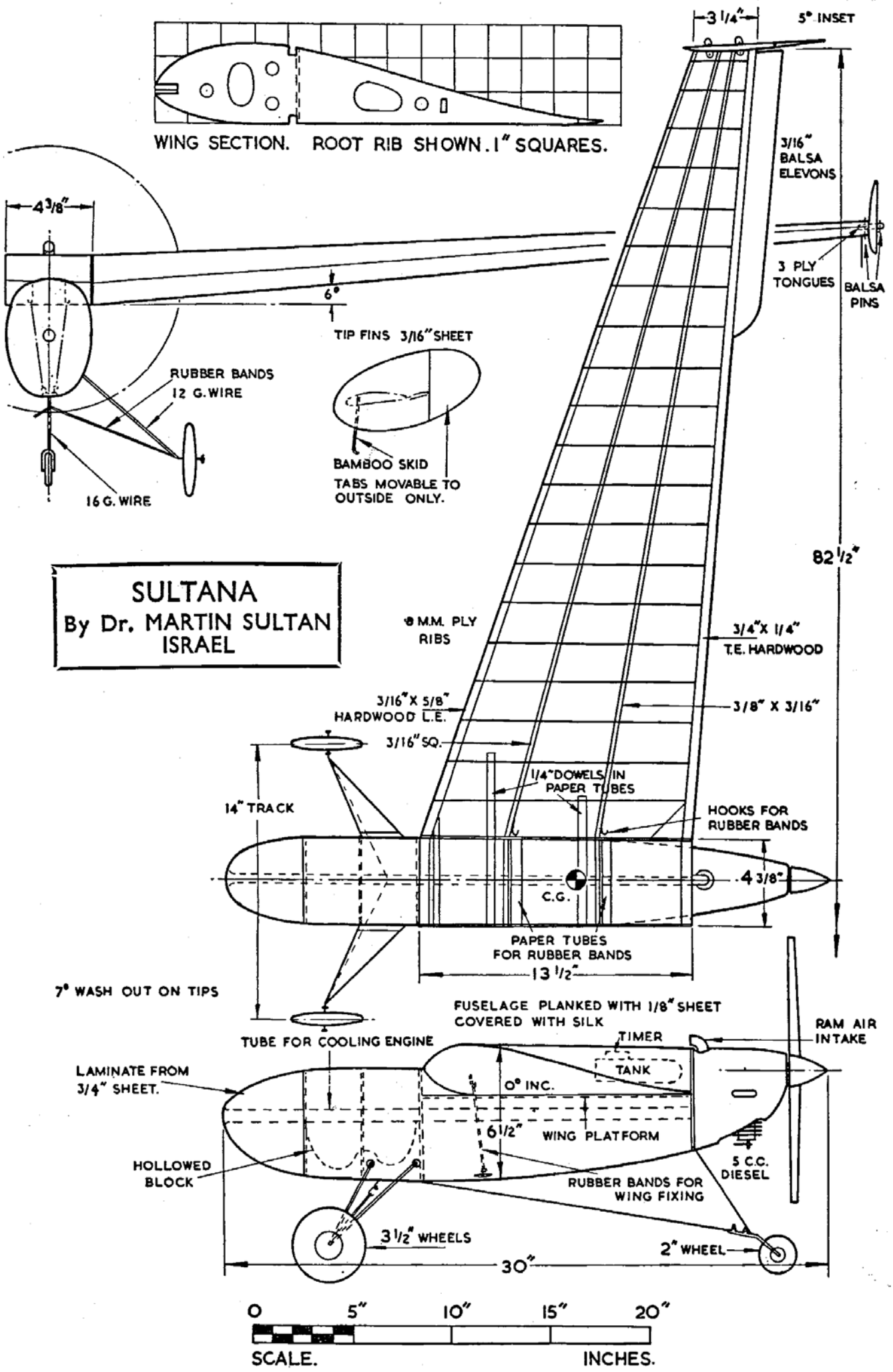
Crankcase unit: light alloy gravity die casting, machined faces and machined internally for ball race housings, transfer port clearances and connecting rod clearance. Cylinder liner: hardened steel .6985 in. o/d (top and bottom, above and below exhaust ring). Piston: cast iron: shallow conical frustum top. Gudgeon pm: silver steel approx. .165 in. diameter. Connecting rod: machined from dural
Crankshaft: hardened steel (solid) Drum valve: hardened steel, .3735 in. o/d drum.
Main bearings; Standard 7 mm. ball race (rear); lightweight 6 mm. ball race (front). Cylinder jacket: turned dural Anodised purple.
Propeller driver; turned dural, anodised purple: brass split collett. Spinner nut: turned dural, anodised purple. Crankcase back cover (integral drum valve housing and intake tube): light alloy gravity die casting. Spraybar: brass.

Propeller r.p.m. figures

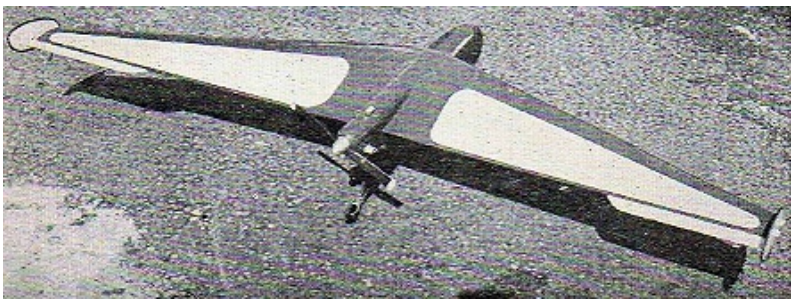
	Dia x pitch	
Frog	9x6	10,500
	8 x4	12,900
KK	9x4	11,600
	8x4	13,000
TopFlite	9x4	11,000
	8x6	11,100
	8x4	13,600

The following two plans are taken from Aeromodeller Annual 1952 loaned to me by Terry Burnal

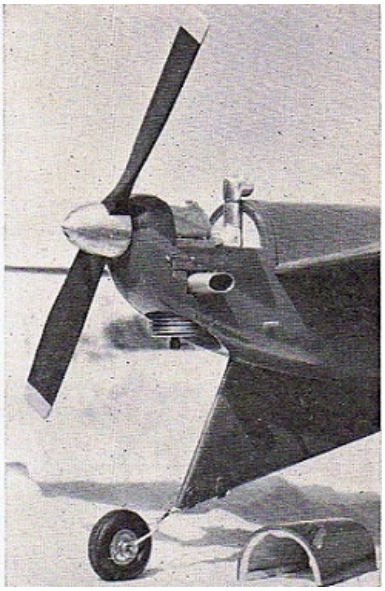

13/4"
5 1/8"
1 3/16"
4 7/8"
6 1/8"
13 1/2"
SECTION THRU WING.
4"
2"
12"
12"
SPAN · · · · · · · 51"
WING AREA · 342 SQ."
TAIL AREA · 125 SQ."
LENGTH · · · · 37 1/2"
POWER · 1·5–2·5 C.C.
ZEUS—64
FOR RADIO CONTROL
By ADOLFO RAPPINI
BOLOGNA, ITALY
2"
7 3/8"
6 1/2"
33 1/2"
+ 2°
2"
0°
3°
DOWN
THRUST


WING SECTION. ROOT RIB SHOWN. 1" SQUARES.
3 1/4"
5° INSET
3/16" BALSA ELEVONS
3 PLY TONGUES
BALSA PINS
4 3/8"
6°
TIP FINS 3/16" SHEET
RUBBER BANDS 12 G. WIRE
BAMBOO SKID
TABS MOVABLE TO OUTSIDE ONLY.
16 G. WIRE
82 1/2"
SULTANA
By Dr. MARTIN SULTAN
ISRAEL
8 M.M. PLY RIBS
3/4" X 1/4" T.E. HARDWOOD
3/16" X 5/8" HARDWOOD L.E.
3/8" X 3/16"
3/16" SQ.
1/4" DOWELS IN PAPER TUBES
14" TRACK
HOOKS FOR RUBBER BANDS
4 3/8"
C.G.
PAPER TUBES FOR RUBBER BANDS
13 1/2"
7° WASH OUT ON TIPS
FUSELAGE PLANKED WITH 1/8" SHEET COVERED WITH SILK
TUBE FOR COOLING ENGINE
TIMER
RAM AIR INTAKE
TANK
LAMINATE FROM 3/4" SHEET.
0° INC.
6 1/2"
WING PLATFORM
5 C.C. DIESEL
HOLLOWED BLOCK
RUBBER BANDS FOR WING FIXING
3 1/2" WHEELS
2" WHEEL
30"
0
5"
10"
15"
20"
SCALE.
INCHES.

Sultana Powered Tailless Pusher Model By Dr. Martin Sultan Flying Club of Israel



The good looking flying model is a design of Dr. Martin Sultan, who traces his aircraft experience back to before World War I days, when he was interested in ornithopters, and indeed ultimately built a fullsize machine of that class though he left the country before it could be tested.



To return to the model, the original version was powered with a 5 c.c. Bonnier diesel (similar to Micron) equipped with a four-blader propeller. The final version illustrated has a 5.8 c.c. Super Tigre, with a normal two-blader of 14-in. diameter and 6-in. pitch.

To ensure absolute accuracy the wings are built in jigs. All bearing members of both wings and body are of spruce. Bulkheads and centre-section ribs are three-ply, other ribs of 3/16th-in, balsa. Exhausts have been lengthened with tubing, while motor is fully cowled with a removable cowling.

Work on designing the model took nearly a year, and its actual completion a further year, as the designer is a busy dentist, with only Saturdays available for model making.

Colour scheme is red and white. All up weight approximately 54 lb.

North Cotswolds meeting 11 / 12 August 2018

The long awaited event which given half way reasonable weather is a most enjoyable way to spend a weekend. The weather this year was not too good, Saturday morning until about 13.30 was reasonable in that the wind was such that flying was possible but not many seemed to want to have a go. I flew my Novice and a variety of other models were to be seen, of particular interest was a single channel Madcap which great to see. By the afternoon the wind became choppy and we left however the flying theme was maintained by visiting the local Falconry Collection which a sit happens was well worth going to see, the flying remarkable and the hour long session very informative, if you are ever in the Cotswolds give Cotswolds Falconry Centre, Moreton in Marsh a go.

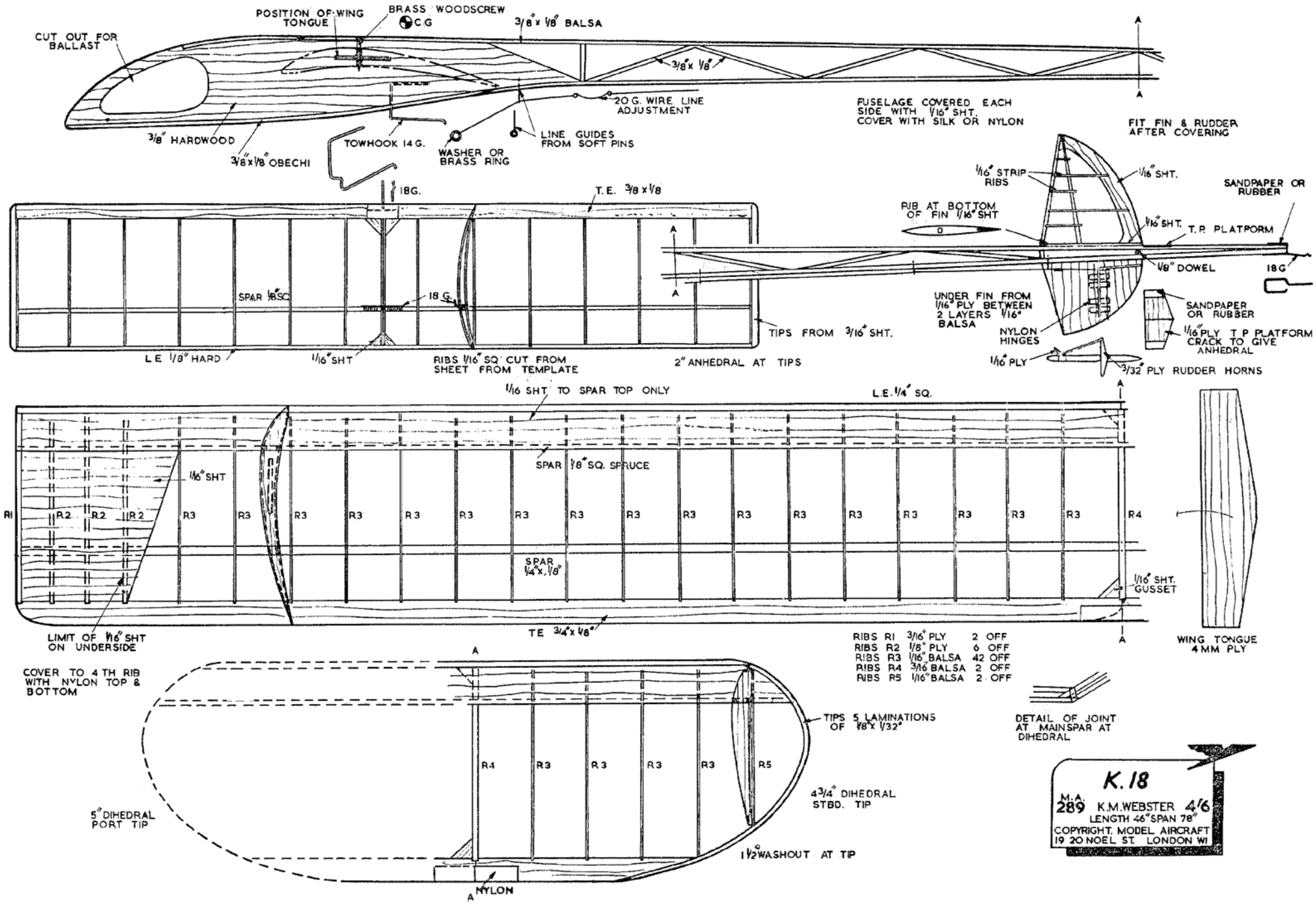
Now for the few photos.

Line up of items for sale

The Flying Flea had an excellent flight or two in the wind

The single channel Madcap

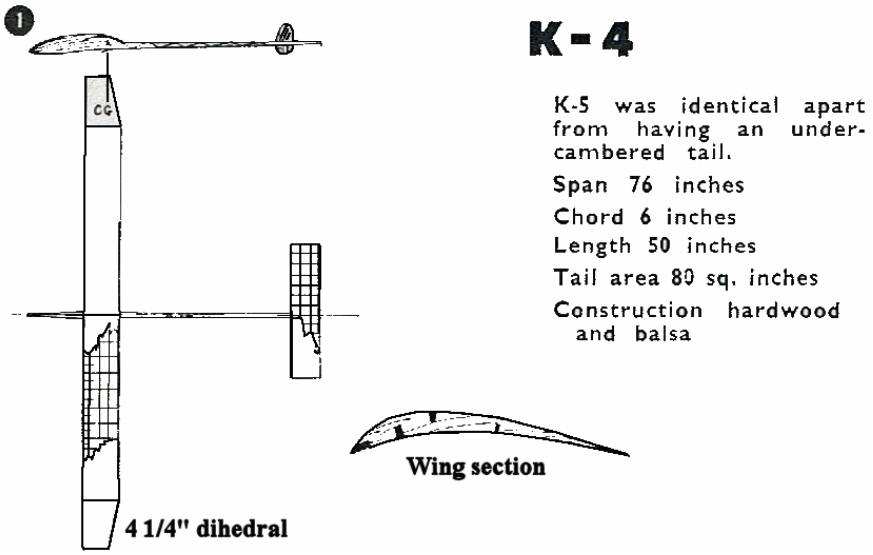
Next year is North Cotswolds 70th anniversary event. Fingers crossed for the good weather.


POSITION OF WING TONGUE
BRASS WOODSCREW
C.G
3/8" x 1/8" BALSA
CUT OUT FOR BALLAST
3/8" x 1/8"
20 G. WIRE LINE ADJUSTMENT
FUSELAGE COVERED EACH SIDE WITH 1/16" SHT. COVER WITH SILK OR NYLON
FIT FIN & RUDDER AFTER COVERING
3/8" HARDWOOD
3/8" x 1/8" OBECHI
TOWHOOK 14 G.
WASHER OR BRASS RING
LINE GUIDES FROM SOFT PINS
1/16" STRIP RIBS
1/16" SHT.
SANDPAPER OR RUBBER
18G.
T.E. 3/8 x 1/8
RIB AT BOTTOM OF FIN 1/16" SHT
1/16" SHT.
T.P. PLATFORM
1/8" DOWEL
18G
SPAR 1/8" SQ
18 G.
UNDER FIN FROM 1/16" PLY BETWEEN 2 LAYERS 1/16" BALSA
SANDPAPER OR RUBBER
1/16" PLY T P PLATFORM CRACK TO GIVE ANHEDRAL
NYLON HINGES
TIPS FROM 3/16" SHT.
L E 1/8" HARD
1/16" SHT
RIBS 1/16" SQ CUT FROM SHEET FROM TEMPLATE
2" ANHEDRAL AT TIPS
1/16" PLY
3/32" PLY RUDDER HORNS
1/16 SHT TO SPAR TOP ONLY
L.E. 1/4" SQ.
SPAR 1/8" SQ. SPRUCE
1/16" SHT
R1
R2
R3
R4
SPAR 1/4" x 1/8"
1/16" SHT. GUSSET
LIMIT OF 1/16" SHT ON UNDERSIDE
TE 3/4" x 1/8"
WING TONGUE 4 MM PLY
RIBS R1 3/16" PLY 2 OFF
RIBS R2 1/8" PLY 6 OFF
RIBS R3 1/16" BALSA 42 OFF
RIBS R4 3/16 BALSA 2 OFF
RIBS R5 1/16" BALSA 2 OFF
COVER TO 4 TH RIB WITH NYLON TOP & BOTTOM
TIPS 5 LAMINATIONS OF 1/8" x 1/32"
DETAIL OF JOINT AT MAINSPAR AT DIHEDRAL
R5
4 3/4" DIHEDRAL STBD. TIP
5" DIHEDRAL PORT TIP
1 1/2° WASHOUT AT TIP
NYLON
K.18
M.A. 289
K.M.WEBSTER 4/6
LENGTH 46" SPAN 78"
COPYRIGHT. MODEL AIRCRAFT
19 20 NOEL ST. LONDON W1

K18 By K M Webster from Model Aircraft August 1958 Evolution of an A/2

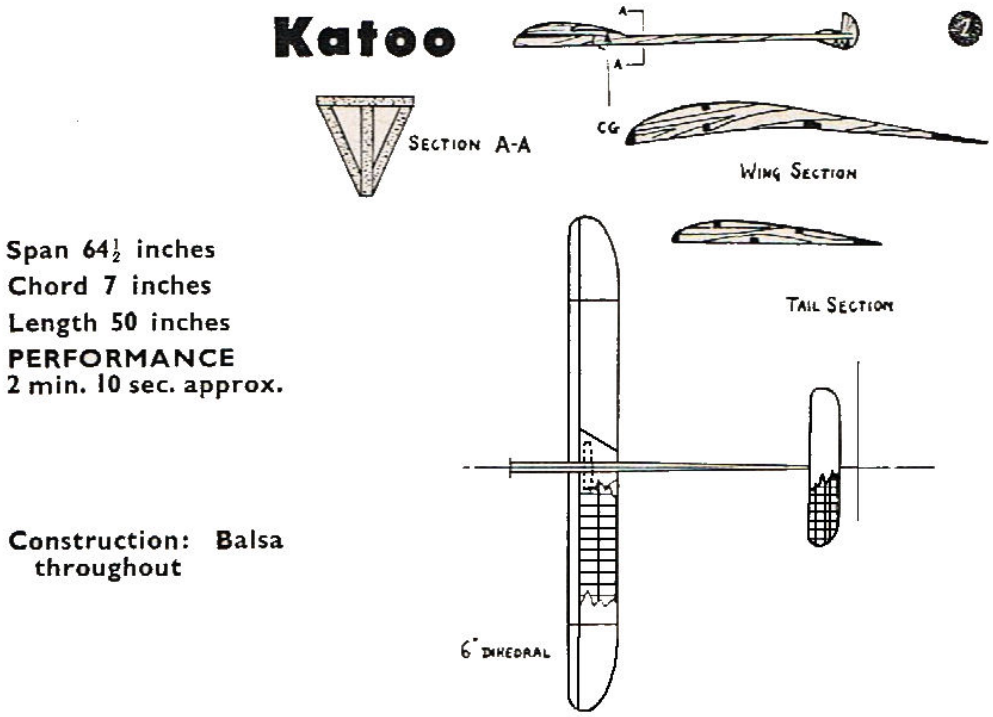
This account of four years' work on an A/2 is not intended to be an authoritative article on Sailplane Design, but simply the result of my experience. No doubt many of the following statements will bring forth groans of anguish and perhaps even sympathetic comments from many quarters, but at least it will show a diversity of ideas, which can only be to the good.—K.W.

The present line of development began in 1954, with the aim of producing the ideal A/2 for contest work.
I came to the conclusion that for a model to be able to keep up a good contest average, it must possess good
line stability during a fast tow and also be able to hold its own against slackening off and increases of wind speed, i.e. gusts, whilst on the glide.
The first model in the series, designed with this end in view, featured slim pod and boom fuselage, medium aspect-ratio wing and thin, highly cambered section. The resulting model was very "Continental" in appearance and brought forth considerable adverse comment, especially from the "Gad Sir! it just isn't English" types, when first seen.
Three days later, in the calm evening air on Halton Airfield, the critics were eating their words—on that evening the model averaged 2 min. 51 sec. on 11flights. The model, together with performance details, is shown in Fig. 1.



After a time I began to notice instability in conditions of wind, this being in the form of bad stall recovery.
I came to the conclusion that this was caused by too little longitudinal dihedral or, to put it another way, the angular difference between wing and tail was not sufficient to bring about an adequate stabilising force. This angle is not a fixed quantity but depends on certain factors, such as wing section and tailplane efficiency. It was this latter point which set me thinking. The c.g. was at 65 per cent, chord and with a 6o percent. Clark Y tailplane section, this gave an angle of wing incidence of 2 1/2 per cent. I did not want to bring the c.g. any further forward, nor did I want to change the tailplane area; I felt there was some other way out. I hit on the idea of an under-cambered tailplane and this I knew would allow me to increase wing incidence to about 4 deg., ascertained by experimenting with A/1 size jobs with sheet tail surfaces.
Many modellers I have met will not agree with me on this point, and say that high lift sections for tailplanes do not have any effect on the trim of the model. A high lift tailplane is much more efficient than one of thin Clark Y or flat section, and so allows less area to be used.
Some time later I teamed up with A. Farrar who, at that time, was flying a typical English A/2 with a thick section. He was very critical of my type of design but agreed that it had some good points which, if taken further, could provide the ideal contest model. Consequently we set about designing a model utilising the good points of both models and the result is shown in Fig. 2.
It was a slim fuselage model with rather thin wings and medium-long moment arm. I think it can safely be

said that one or the other of us gained a first, second or third in every event we entered in 1955. This design also brought forth much criticism and I shall always remember the remarks of the A/2 enthusiasts from Loughborough college: “They might perform well but what happens when it’s windy?”



As we had designed the model for windy conditions this remark was, to say the least, discouraging. However, the model seemed to stay in one piece. Its only drawback was the fuselage which, on top of being somewhat difficult to build, had the bad habit of bending and stayiisg bent (!) thus tending to upset the trim.

The present model is based on this joint effort (known as the Katoo) and has merely been simplified and had the fin placed in front of the tail (it’s safer there), also I have gone hack to under-cambered tails which I gave up for a time, mainly for ease of construction. There is much work yet to be done on the A/2 and it is far from the truth to say that the design of the model sailplane has reached its limit. Much work has yet to be carried out on wing sections and turbulators, and for anyone who is prepared to experiment there is plenty of scope. I have yet to see, or hear, of the three minute A/2, but I have no doubt that this experience is near at hand and may come upon us any time now. Although I am quite sure that if and when, it does, the F.A.I. will pounce, with drastic effect!

At the moment I am experimenting with anhedral tailplanes and their effect on stability; what the outcome of these tests will be I cannot yet say as I have not had time to draw conclusions.

Structural design is also an excellent field for experiment, as most A/2s seen on our flying fields are much too complicated and too darned expensive: when an A/2 starts to cost over £1 something is amiss.

And here I must add a note for those W.W.I enthusiasts, who regard the modern contest model as an eyesore, and don’t seem to mind telling everyone.

The A/2 sailplane has to fulfil a purpose and in fulfilling that purpose must he good looking. It is designed for the most graceful of all aeronautical movements and therefore must in itself be of graceful design. Please remember that a Sopwith Pup was built to “ fight” and the fact that it turned out to be a cute little bundle of wood and wire was purely by chance.

Now let us take a look at the latest model in the series and see what we have (see Fig. 3). A sinspie A/2; no scientific layout. The fuselage, whilst having ample side area for towline stability, is cut down to the minimum, where area is not needed, at the top and bottom. It is in effect a profile (there is no such thing as a “lifting fuselage “) and is simply 1/8 x 1/8 in. hard balsa covered with A3/32in. sheet.

The wing is of normal construction and is fixed to the fuselage by means of a 4 mm. ply tongue (best birch). Aerofoil is medium-thin own-design based on the Benedek range. The tailplane uses the same section but in this case it is thinned to 80 per cent. Main points about the performance of this model are good stall recovery and an overhead launch every time.

Finally, a few remarks on trimming and flying procedure. The kind of trim used on an A/2 depends to a great deal on the particular modeller; I myself prefer about 100 ft. circles, and a slow undulating glide which is just off the stall. This trim is obtained by using about 50 ft. of towline and using packing under the tailplane then the model has a slight stall a small amount of extra rudder is given to damp out any prolonged

stalling tendencies. A model trimmed beyond this point is not a good proposition, except in very windy weather, when the turn may need to be increased slightly.

Some time ago I used a tuner-operated d/t on a model very similar to the K-4. This set-up worked by means of a wire retainer pin in the rear of the fuselage; this was connected to the timer and passed through a loop of C/L wire fixed to the tailplane trailing edge. On one flight the timer went haywire and did not pull the pin right out of the loop. The tailplane not only became tilted in flight—it also had a decrease in incidence, thereby giving an up elevator effect and increasing the turn.

The resulting flight was quite interesting and afterwards I began to trim the model for a very tight turn. To counteract this turn it was necessary to place 1/8 in. of packing at the trailing edge of the tail. The model flew with about 45 deg. of bank, and as the turn radius was in the region of 20 ft., it was nearly thermal happy. Then using this kind of trim it is also noted that elevation trim is not critical as the model just refuses to stall, but please don't try it the other way—that turn is much too steep to go playing around with trying to make it fly in a groove. If it's thermals you're after, this is the trim, but remember, it's hard on wing tips.

I have also used the so-called wandering trim and found it useless for our kind of weather. This is the trim which needs a very slim toothpick-type model to use successfully and even then, only in toothpick" weather. The idea seems to be that the model is trimmed for straight flight and after leaving the towline heads straight for the nearest thermal. On entering the thermal it goes into a turn. As I have said, I have had no such experience—the model just seems to fly straight through any lift which happens to be about. Here again, there may be great scope for anyone wishing to experiment and look into the matter.

Always remember when flying an A/2, that a good model can't win on its own. It needs a good modeller behind it; someone who can tell at a glance where the thermals are and who really knows how to use a towline to the best advantage.

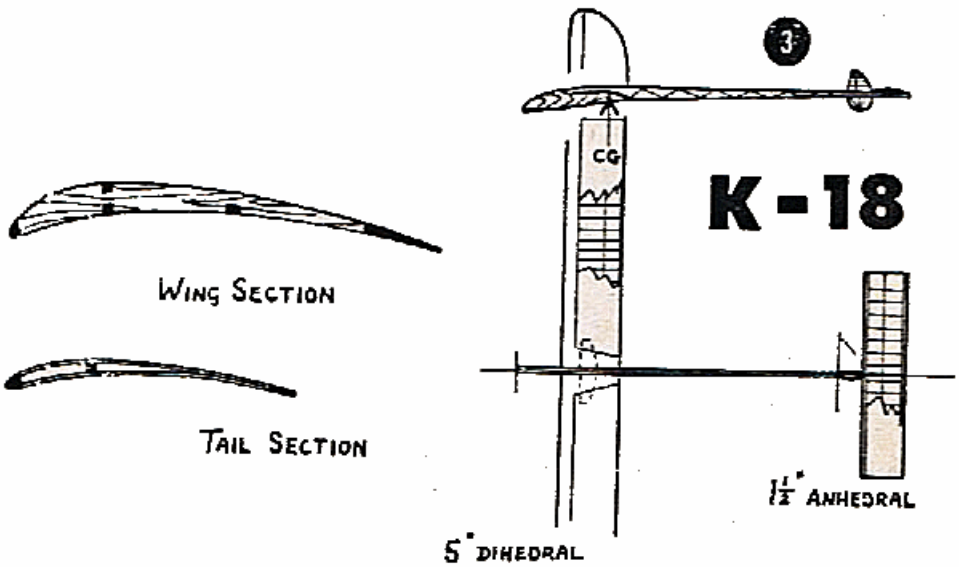
All I am waiting for now is someone to tell me how wrong I am. So come on, you critics, if you have anything we can learn, let's hear from you.

DETAILS OF FIRST FLIGHTS. ALL IN SAME WEEK

Conditions	Flight Times, from 50m. Line					
Dead calm, smokehaze at about 50 ft.	2 : 1	2 : 23	2 : 38	2 : 36	2 : 37	2 : 39
Calm, clear, evidence of slight movement	2 : 21	3 : 8	3 : 12	2 : 18	1 : 12	—
10 m.p.h. wind, clear ...	2 : 12	1 : 45	1 : 58	2 : 23	2 : 3	—
Slight drift coming dead calm with damp air ...	11 Flights: Lowest 2 : 40; Highest 3 : 10.					

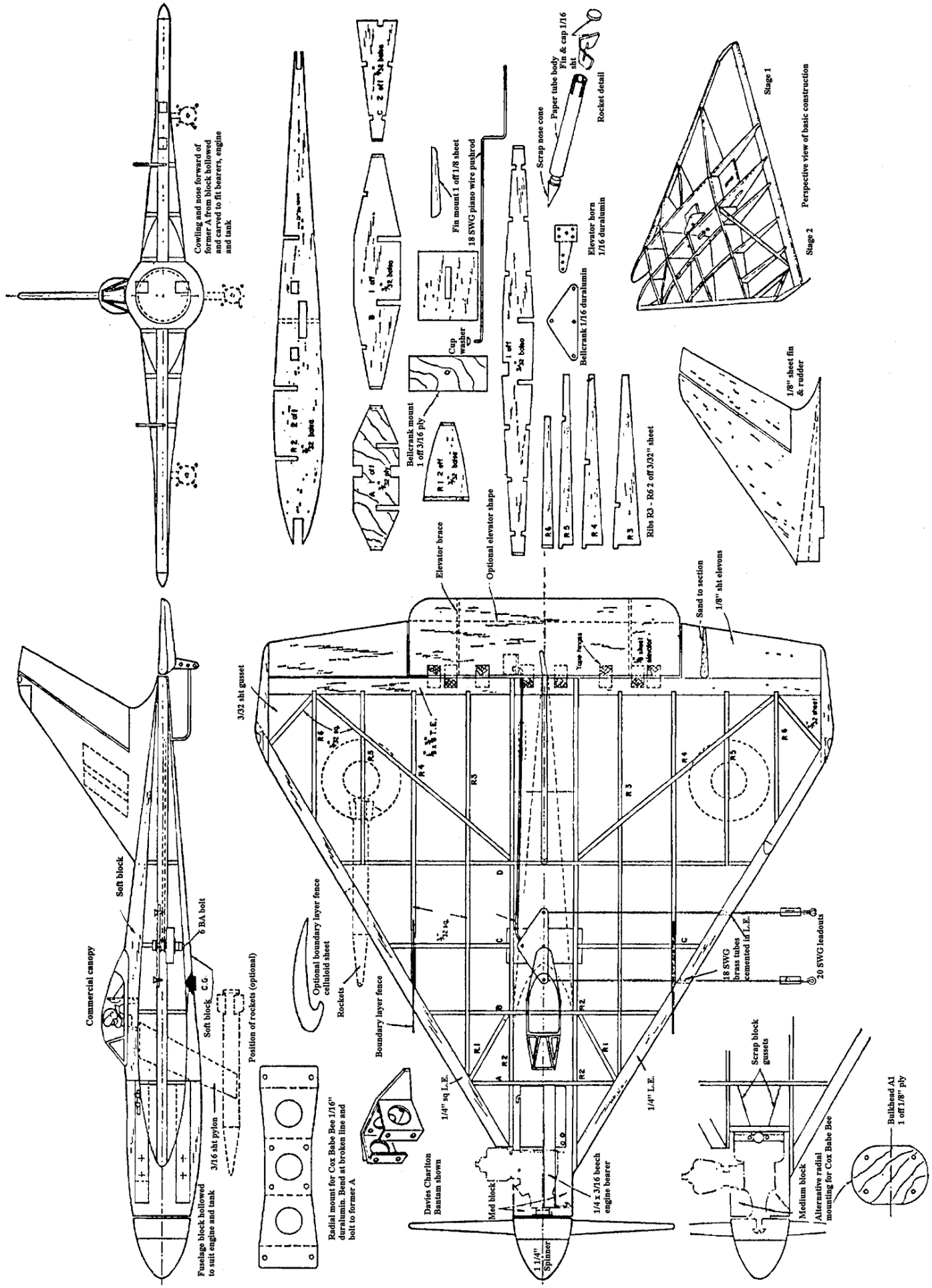
Span 76 in.
Chord 6 in.
Tail area 80 sq. in.
Length 42 in.
PERFORMANCE
2 min. 0 sec. approx.

CONSTRUCTION
Balsa Fuselage, tail, wing-ribs, wing sheeting, wing L.E. & T.E. Hardwood spars and fuselage nose.

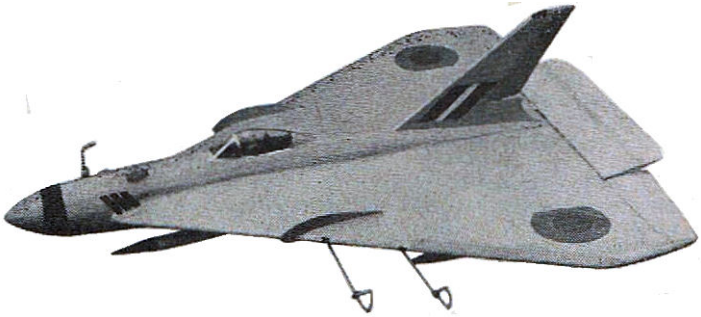


From Jörgen

Hi James a couple of Pictures on a sunny day my yellow and black Marjorette single channel and my friend Christer Erla in Swiss markings and test running of my two Webra Piccolos great Runners.


Cowling and nose forward of former A from block hollowed and carved to fit bearers, engine and tank
Fin mount 1 off 1/8 sheet
18 SWG piano wire pushrod
Cup washer
Bellcrank mount 1 off 3/16 ply
Scrap nose cone
Paper tube body
Fin & cap 1/16 sht
Rocket detail
Elevator horn 1/16 duralumin
Bellcrank 1/16 duralumin
Ribs R3 - R6 2 off 3/32" sheet
Stage 1
Stage 2
Perspective view of basic construction
1/8" sheet fin & rudder
Elevator brace
Optional elevator shape
Sand to section
1/8" sht elevons
3/32 sht gusset
Soft block
6 BA bolt
Commercial canopy
Soft block C.G
3/16 sht pylon
Fuselage block hollowed to suit engine and tank
Position of rockets (optional)
Optional boundary layer fence celluloid sheet
Rockets
Boundary layer fence
1/4" sq L.E.
1/4" L.E.
18 SWG brass tubes cemented in L.E.
20 SWG leadouts
Radial mount for Cox Babe Bee 1/16" duralumin. Bend at broken line and bolt to former A
Davies Charlton Bantam shown
Med block
1/4 x 3/16 beech engine bearer
1 1/4" Spinner
Scrap block gussets
Medium block
Alternative radial mounting for Cox Babe Bee
Bulkhead A1 1 off 1/8" ply

Firestrike A small delta sports control line design to suit .5-.8 c.c. by R. C. Povey from Aero Modeller December 1968



Built to introduce a 15-year-old son to C/Lflying, this is an easily built dual purpose model, strong, safe, yet flexible enough to offer really lively fun. Designed for .51.8 cc. diesel or glow, Firestrike has been given fairly strict scale fighter lines. It is felt that unless a model looks and flies like a real aircraft it has no place in the air (some early models have agreed with the author rather unexpectedly!) . . . Build Firestrike — then fly it to pieces — it will take longer than you think! The original is still completely undamaged except for tissue patches after countless flights, four absolute beginners and many very hard landings. Before conmencing building, study the plan and instructions carefully, the delta structure is far more simple than it at first appears.

The basic step, and incidentally the one on which success depends is the assembly of only seven pieces, which should first be fitted without cement to check a good fit and without warp in the head-on view. Make up the control plate assembly of 3/16 in. ply or Perspex using a 6 BA. bolt as a pivot and soldering the nuts to prevent working loose in flight. Next cut brace E, Formers A & B and trailing edge. Take main ribs and insert control assembly through slot, then slot in the T.E. and former A, making sure all components are in alignment after addition of brace E and former D.

Cut and fit leading edges, elevons (fixed) and wing tips (made from scrap leading edge section), again checking alignment. Now add the remaining formers and ribs in normal manner as shown in the perspective view on the plan. Note that it is necessary to chamfer the outer edge of each former to allow for wing sweep. Elevators may now be fitted and the control system linked up. Hinges may either be cloth, or a ‘proper’ hinge of piano wire and celluloid tags. When soldering cup washers to the control rod, a thin paper tear-away washer beneath them will provide clearance to prevent binding of the linkage. The horn is recessed into the elevator, with plenty of cement around the holes, and a small piece of 1/32 sheet cemented over the base. Now cut the fin from sheet noting grain direction, sand to section, and cement in 10 deg. right rudder. Fit fin to brace E using locating tab, and checking for vertical. Cover the upper and lower centre sections with 1/32 sheet, grain running crosswise. Chamfer the edges of the sheeting to avoid a ‘hard’ edge for the tissue.

Fitting the engine.

Due to the diversity of engines and tanks a universal method of nose construction has been adopted. Bolt the engine to hardwood bearers with bearers extending forwards of engine to provide additional protection. Position tank between bearers as close to engine as possible and pack to correct height with scrap balsa, apply cement liberally. Fit airscrew and 1 1/4i in. spinner (don’t be alarmed by spinner size, it’s surprising how much of a propeller is ‘dead’ area). Now cement block or laminated 1/4 in. sheet all around engine from spinner to a point 3 in. rearward until the whole unit is a block 3 in. x 1 1/2 in deep x 1 3/8 in. wide. Cement this block into the space forward of former A, checking thrust line, and when dry trim to outline shown on plan, upper and lower fuselage is added in the shape of block to outline shown on plan to complete airframe. I find the cheap handy packs of block balsa very economical for this purpose. Cover wing panels with tissue, steam, and dope in usual manner. Small celluloid panels are cemented beneath wing at noseto prevent finger trouble!

The model is completed by hollowing the cockpit, making balsa pilot, and fitting hood, boundary layer fences and missiles, the latter cemented to small panels of 1/32 sheet. Originally the model flew with two rockets under each wing, but this has been amended to provide a point for a hand-hold under the centre section. The original is doped light grey and has R.A.F. decor as shown on the plan.

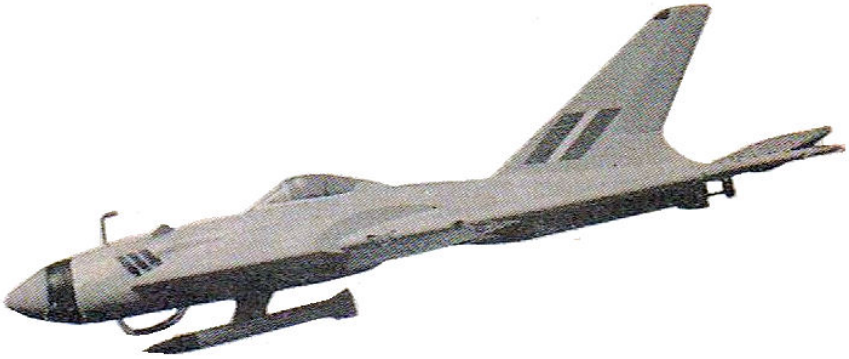
Flying and Trim Notes

Choice of elevator area and CG. gives flexibility,

a) Full power, larger elevator and rear C.G. gives a very lively sports model.

b) Full or reduced power with either elevator and forward C. G. is ideal for training, when flight can be reduced to a slow nose high ‘mush’ in safety.

Firestrike can be flown in higher winds than a non-delta layout, provided quick footwork maintains line tension, but in gusty conditions occasionally develops an alarming 'flutter' of the starboard wing when coming upwind. This is amusing, and completely safe and harmless, being caused by your momentarily taking the starboard wing out of the flight line with resultant spasmodic flutter — control of the model is in no way affected and the symptom only occurs when sensible people would have packed up and gone home!



Showscene, from Dave Bishop of DB Sound.

Family commitments stopped me from going to the annual British National Flying Championships organised by the BMFA and I had to send my apologies via the Honorary Treasurer Keith Lomax and his wife Christine for the very kind invite from the chairman of that guaranteed wonderful August weekend. I say wonderful because it's the place to go and have a catch-up chat with all of your friends and colleagues from all over the place. I was also invited to have a microphone presentation of the Fun Fly flightline run again by James Gordon and Nick Lester which had some 20 pilot's entries for the Class One and Two groups. The amount of different sets of manoeuvres that these pilots have to complete in this specialised competition is amazing and one name that stands out always is the super designer and kit producer Gavin Barden with his Evolution Company's models. James reports to me that there is a "new kid on the block" who goes by the name of Charlie Wood who was there with his father Simon who he reckons will be a star of the Showscene in future years. The Fun Fly Class one winner was Martin Bell and Class Two was Alan Stead who is a regular performer with the Avicraft Panic display team. The next and final Modelair Old Warden event for this 2018 is on September 22 – 23 which is the Festival of Flight run by Ken and Sheila Sheppard.

Our editor/compiler of Sticks & Tissue tells me that he will be sending out this September edition of our free Internet magazine this coming Sunday, September 2. Over this coming weekend from Friday August 31 we will be with our caravan at Old Warden for the whole weekend to be ready for the full size display on the Sunday, the day of publication.

All the best from Dave Bishop and if you would care to email the address is davedbsound@gmail.com It would be nice to hear from you please?

The Sevenoaks DMAC club chairman Charles Dennis with his vintage model.

A nice Russian "Flanker" SU 27. Built by Sevenoaks member Will Simpson with twin Wimoteck fans. Very fast and very real in flight.

The whole group of Sevenoaks flyers at one of the recent excellent barbeques held at the flying field. (Left to right) Will Simpson, John Leach, Mike Jackson, Tony Poore, David Addison, Clive Hastie, Les Salter, Noel Oliver, Trevor Erry, Ralph O'Connell, Tony – James and Harry Middleton, Dave and Lesley Green, Charles Dennis, Paul Hewitt and John Lawrance.

One of the finest scale model builders in the country is Peter Iliffe with another of his superb scratch built radio controlled electric models.

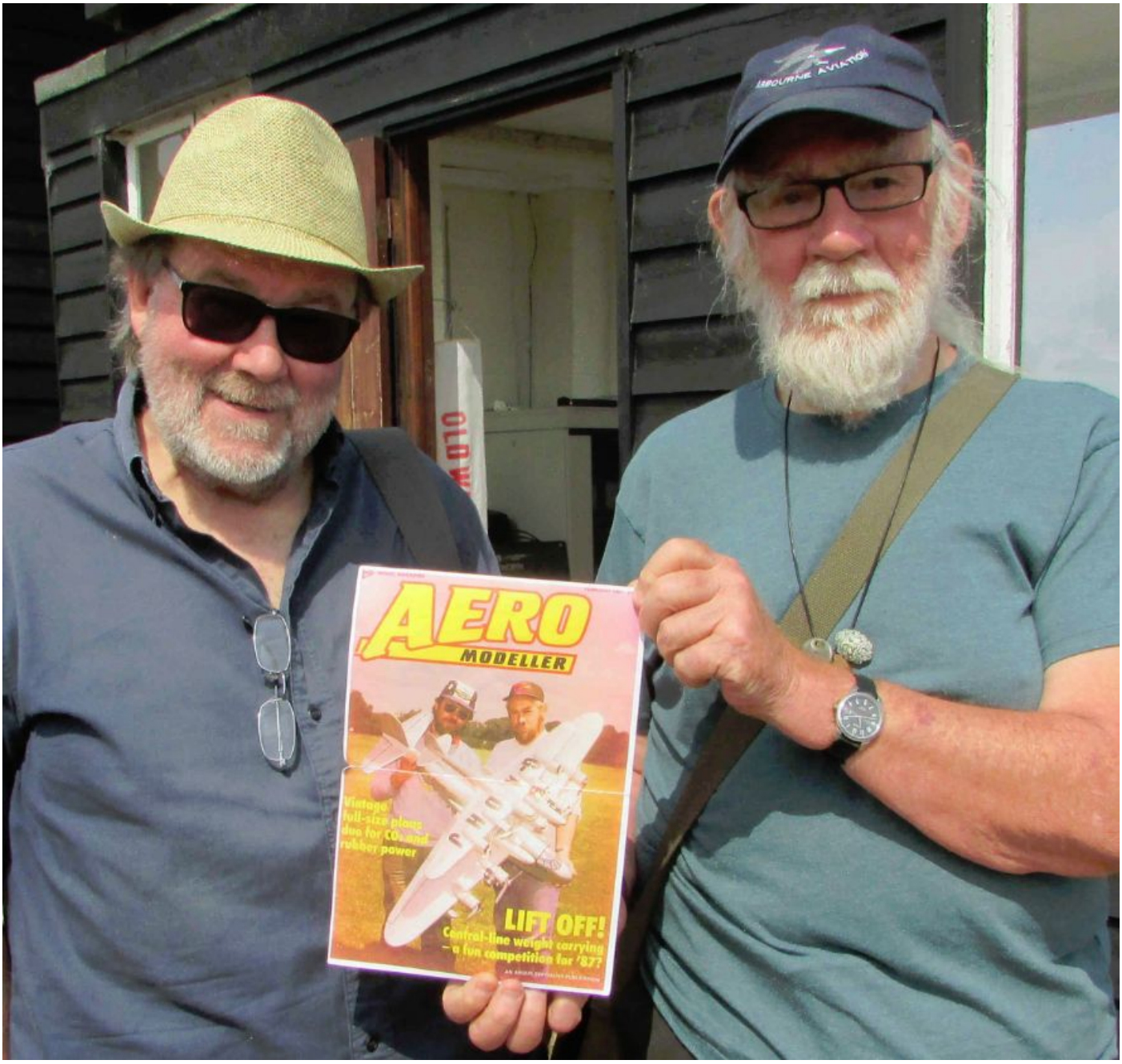
Traders are always prominent at the Tom/Jane Stephenson's Wings & Wheels annual event at North Weald airfield and here is (L-R) Tracy Richardson, Dave Watts of Southern Model Fuels and Tracy's husband Ian Richardson of the world famous Perma Grit Company.

A nicer couple you could never meet are John and Lyn Veasey always at the shows. John especially flies a superb yellow Folland Gnat jet powered with a British Wren turbine and he is famous for being the Father of show star flyer Greg Veasey.

This super and very helpful girl is part of the shows seen at the RCM&E trade stand at Weston Park. She was accompanied by the very well-known Graham Ashby now sitting in the editor's seat once again replacing his popular brother David.

This stunning (French?) jet turbine is actually stationary in the hover which was powered by a "viffing" jet motor and did some manoeuvre's that aren't even "in the book" but that's the blockbusting Weston Park show for you run for many years by Steve Bishop and Peter Whitehead.

The winning team of the "Flight Directors Choice" of the Ken Sheppard trophy are Darrin Bonfield and Steve Haughty for their consistent and brilliant duo flying of the two DH Tiger Moths throughout the two days at the last Old Warden's Modelair.



These two brothers Jym and Dave Leddy came to the last Old Warden Modelair event at the control line area and related how they first visited the place many years ago with their scratch built Short Mayo Composite control line seaplanes. The models were powered by two PAW 29's and two PAW 15's. They were featured on the front page of the February edition of the Aeromodeller monthly of which they presented a copy for the camera.

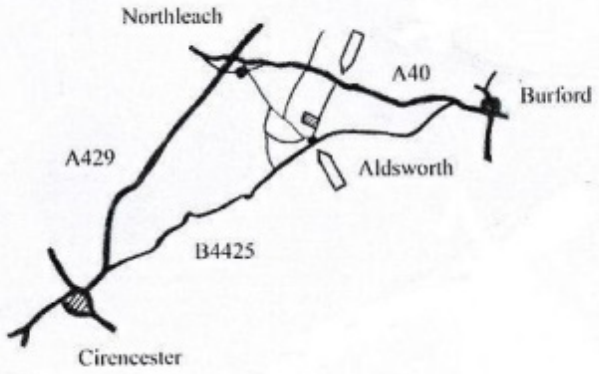
Tony Tomlin would like to thank all those who came to the last Cocklebarrow despite the event being "blown out". The support given by those attending was most appreciated.

COCKLEBARROW VINTAGE RALLIES

19TH August 2018
30th September 2018

All types of R/C up to December 1969 including electric and glider
BMFA insurance essential, [A certs. not required]
Camping on field, [no facilities]
Contact - Tony Tomlin
02086413505 / email pjt2.alt2@btinternet.com / 07767394578

Signposted from Aldsworth, Glos. on B4425 between Cirencester/Burford and off A40 between Northleach and Burford [follow SAM 35 signs]



FLITEHOOK

Indoor Free Flight Meeting
West Totton Centre, Hazel Farm Road, Totton, Southampton, SO40 8WU

Contact: Tel. 02380 861541
E-mail flitehook@talktalk.net

Café on Site

Flyers £8 Juniors & Spectators Free Flyers must be BMFA Members Sundays 10.00a.m. to 4.00p.m.

2018

9th September 2018
14th October 2018
11th November 2018
9th December 2018
30th December 2018

2019

13thJanuary 2019
10th February 2019
10th March 2019
14th April 2019

Waltham Chase Aeromodellers

INDOOR F/F MEETING

Waltham Chase Aeromodellers, in association with South Hants Indoor Flyers, are pleased to announce the continuation of the Indoor F/F Meetings held at the Main Hall at **Wickham Community Centre, Mill Lane, Wickham, Hants PO17 5AL.** These meetings will be held on the following dates:

Tuesday, 2nd. October 2018
Tuesday, 6th. November 2018
Tuesday, 4th. December 2018
Tuesday, 8th. January 2019
Tuesday, 5th. February 2019
Tuesday, 5th. March 2019
Tuesday, 2nd. April 2019
Tuesday, 7th. May 2019
Tuesday, 4th. June 2019
Tuesday, 2nd. July 2019

All meetings will run from 7.00 p.m. to 10.00 p.m. The Main Hall at Wickham Community Centre is particularly suitable for indoor free flight models of all types, with a ceiling free of obstructions. Tables and chairs will be available in the hall, the organisers are always grateful for assistance with moving furniture. A hot drinks machine is available on site.

Admission to the meetings will be £5 for fliers and £1 for spectators, whilst accompanied children will be admitted free. Junior fliers will be charged as adult spectators. Fliers will be required to show proof of insurance.

No R/C models may be flown at these events.

Flitehook, who carry a large stock of indoor models and accessories, will attend many of the meetings.

Waltham Chase Aeromodellers look forward to welcoming all indoor F/F fliers to these events.

For further details please contact:

Alan Wallington, "Wrenbeck", Bull Lane, Waltham Chase, Southampton, Hants.
(Tel. 01489 895157)

(e-mail: alan@wcaero.co.uk)

or see our web site: www.wcaero.co.uk

Small Electric Scale

Belair Kits are very pleased to have commissioned renowned scale designer, Peter Rake to produce a range of small electric scale models.
Wingspans are typically around 36 inch (1m) and all suit the economical 400 brushless motors and mini servos. All airframes are of traditional all wood construction and no mouldings are required. Each aircraft has been thorughly flight tested and are all proven fliers.

Call Belair on 01362 668658 or visit their online shop at www.belairkits.com

Here are just three of the growing collection see all the others on our website

DH82 Tiger Moth - small electric scale range

Ref: res-dh82

We are very pleased to add the DH82 Tiger Moth to our small electric scale range - a truely iconic aircraft.

Our Tiger Moth is designed to 1.23": 1ft with a wingspan of 36 inches. It suits 150 watt brushless setups with 2 cell lipoly batteries and three channel control - ESC, Rudder and elevator.

Designed exclusively for Belair Kits by Peter Rake, this model is a proven flier and quick to build. Its size means it can be left in one piece and fits in even small cars.

The parts set includes many sheets of graded balsa and plywood sheets, accurately laser cut, plus a three sheet plan and build manual.

Model Specifcations

36 inch wingspan for 150 watt brushless motors, 2 cell lipoly batteries and small electric radio - ESC, Rudder and Elevator.

Price: £70.00 Inc VAT 77.00 **USD** | 82.87 **EUR**

Albatros DV - 39" electric scale parts set

Ref: res-ald5

Our Albatros is modelled at 1.31"/1' with a wingspan of 39.3 inches. Designed by Peter Rake exclusively for Belair, the model is fully CAD designed and features laser cut parts. Construction is straightforward and features modern methods.

Includes balsa, plywood and basswood parts for fuselage sides, formers, bulkheads, wing ribs, trailing edges with rib slots cut, outlines for all flying surfaces, interplane struts, tail skid, fuselage

crutch, tail skid, plus smaller handy parts. Fuselage is built on central crutch system.

Specifcations of the Albatros DV

39.3 inch span, scale 1.31"/1' for small electric power setups of around 150W. 4 channel radio required - ESC, rudder, aileron, elevator and rudder. Full size 3 sheet plan with constructional guide included

Price: £70.00 Inc VAT
77.00 **USD** | 82.87 **EUR**

Pietenpol Air Camper - Electric scale 45"

Ref: res-piet

Parts set and plan for the original **20's American homebuilt - Pietenpol Air Camper**.

Our model is traditional all wood construction and features a multi sheet plan and accurate laser cut parts. Formers, fuselage sides, wing ribs, trailing edges, landing gear mounts, cowl parts plus many smaller parts are included. Builder will need to supply their own stripwood and covering.

Specifications

45 inch span for 400 size brushless setups. 4 channel control - ESC, rudder, elevator and ailerons. Scale 1.5":1ft

RRP: £60.00 Inc VAT
Price: £70.00 Inc VAT
77.00 **USD** | 82.87 **EUR**

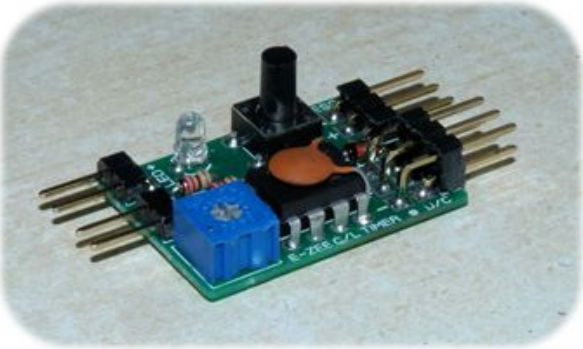
Regards,
Leon Cole
Belair Kits
Tel: +44 (0)1362 668658
www.belairkits.com
Follow us on Facebook https://www.facebook.com/pages/Belair-Kits/1448177428736984

Dens Model Supplies

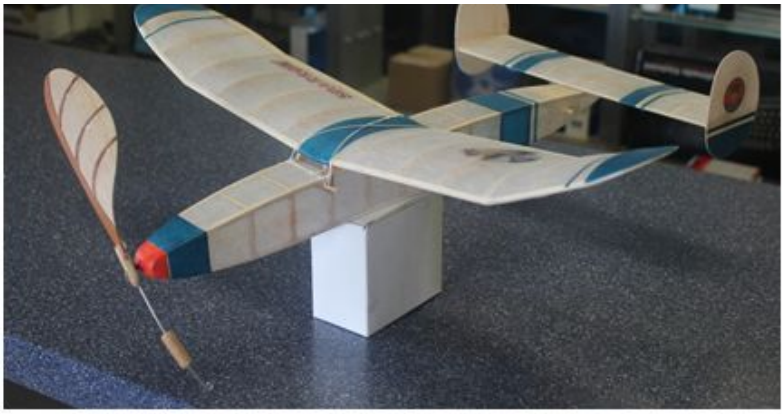
Traditional CL Kits including the ACE + Plug & Play Electric CL Starter Kit….just add glue and a battery !!

Tinplate CL tanks….Bellcranks, Lines, Handles, Cloth Hinge Tape, Leadouts etc

Cox Engines & Spares



Electronic Timers for CL & FF



Laser Cut - High Quality FF & RC Kits