Gipsy Moth

Instruction Manual

Congratulations on your purchase of the Flying Legends DH 60G Gipsy Moth!

Designed by the world renowned English designer David Boddington, this superb ¼ scale replica of the famous De Havilland Gipsy Moth has been developed to match the superb O.S. IL-300 four cylinder engine, with the mounting holes in the front former having been pre-drilled to suit. Alternatively, the model is also suitable for large single cylinder four stroke engines, and an optional mounting box is available for the O.S. FS.200 engine. Covered in fabric, and with many scale details, the Gipsy Moth also emulates the full sized aircraft in having folding wings, which after flying only requires four bolts to be removed before the wings fold back into their storage/transport positions.

The scale sprung undercarriage enables gentle landings and smooth and steady taxiing, whilst the optional scale exhaust system for the IL-300 adds that finishing touch. Very easy to fly and fairly aerobatic, the inclusion of the scale slats on the upper wing panels eliminates any possibility of tip stalling, making approaches and landings simple. Ideally suited to calmer flying conditions, the Gipsy Moth looks at its best performing slow low passes and gentle wingovers, enjoying the sight of this classic aircraft in the air, the sun glinting off the silver wings.

Flying Legends DH 60G Gipsy Moth Specification

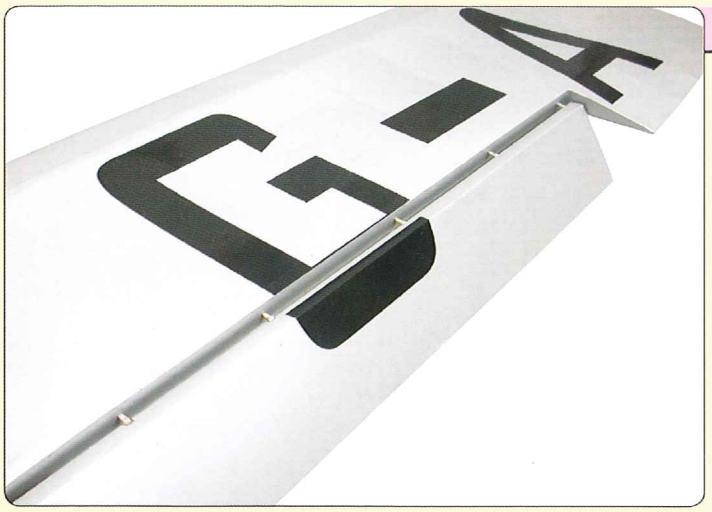
Wingspan:	**90" (2286mm)**
Length:	**75" (1905mm)**
Weight:	**18.5 - 22lbs (8.5 - 10Kgs)**
Engine:	**2.00 - 3.00.in 4 stroke required**

ARTF
ALMOST READY TO FLY

FLYING LEGENDS
241 Green Street,
Enfield,
Middlesex,
EN3 7SJ,
United Kingdom.

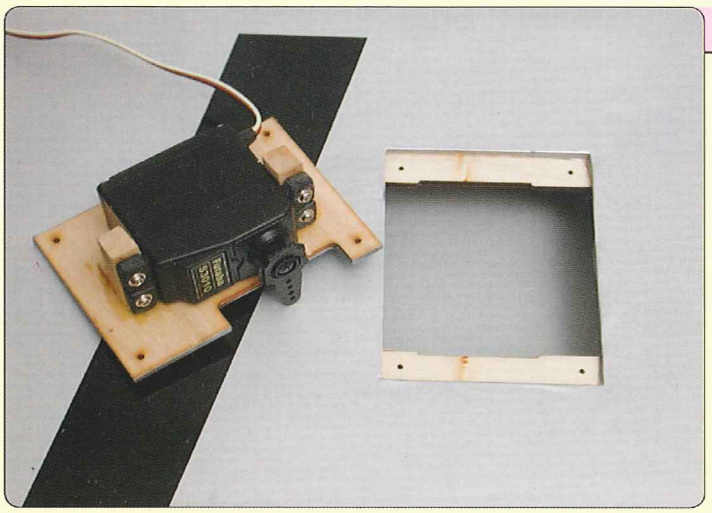
Part Number:
A-FL001

Ripmax



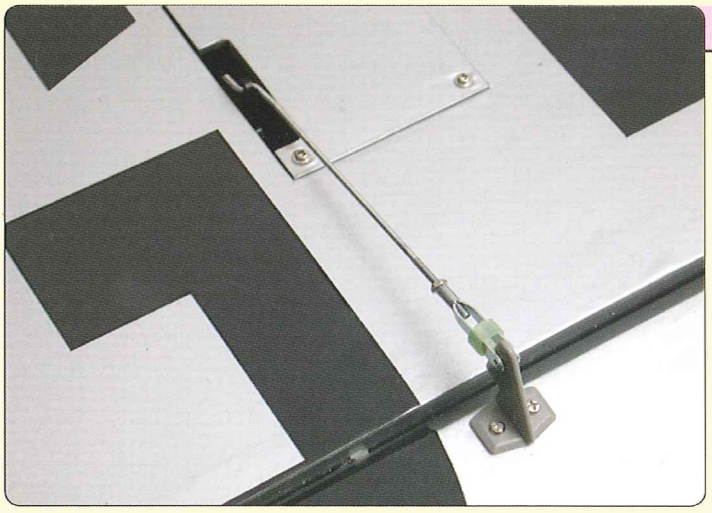
Step 1

Epoxy the supplied pin hinges into the ailerons, having first protected the hinge point with either a drop of oil or grease, to avoid the epoxy getting into the hinge point and jamming it. When the glue has cured check that the hinges still operate freely, before fitting the aileron to the wing panel, again using epoxy on the hinges.



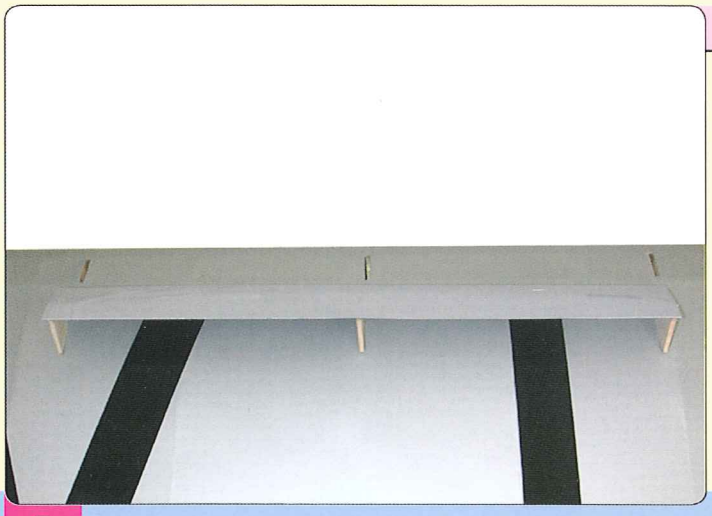
Step 2

Mount the aileron servos to the mounts on the wing servo hatch covers, and then fit extension leads to the servos – note that the extension leads have to be long enough to allow for the wings to be folded, which requires longer extensions than when the wings are in flying position, yet still reach the receiver position, so please check this before fitting.



Step 3

Fit the aileron pushrods – note that these use a "Z" bend at the forward end, and clevis and locknut at the rear. Do ensure that a keeper cut from silicon fuel tubing is fitted over the clevis for security.

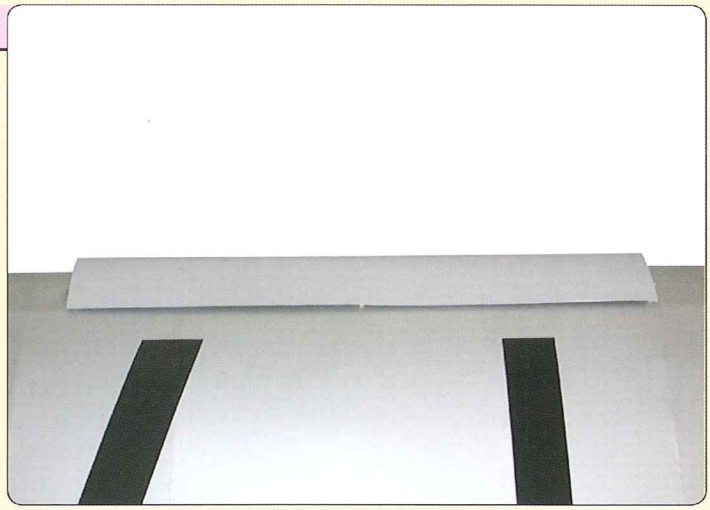


Step 4

Offer up the wing slats to the outer section of the top of the upper wing panels, where you will find small sub ribs at the leading edge which will match the ply supports on the slats, these supports are designed to fit between two sub ribs. When these sub ribs have been located, use a sharp knife to remove the covering between the ribs, and check the fit of the slats onto the wing panels.

Step 5

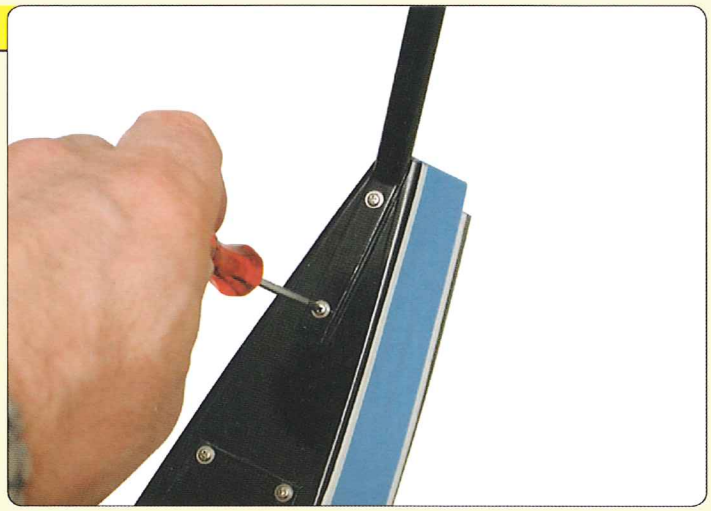
Carefully epoxy the slats into place, making sure that the rear of the slat is level with the wing surface, and with an even gap. The exact depth of the gap between the rear of the slat and the wing surface is not critical, but it should be around 3-4mm.



Step 6

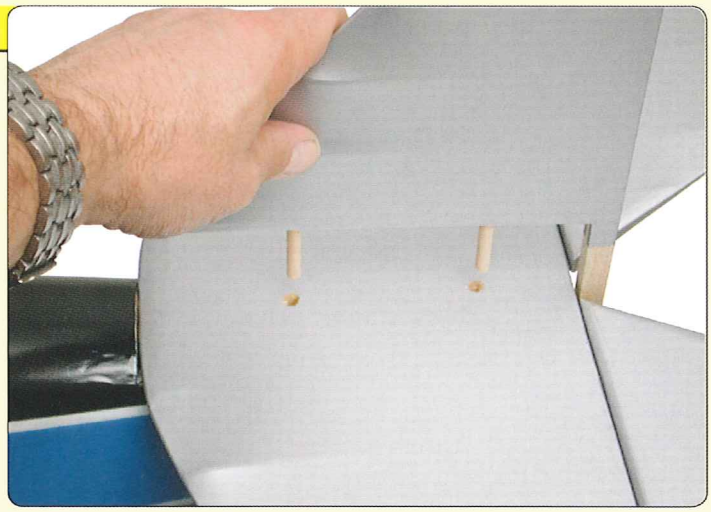
Section: TAIL

Drill for the mounting screws and then fit the tail skid to the fuselage using the supplied self-tapping screws.



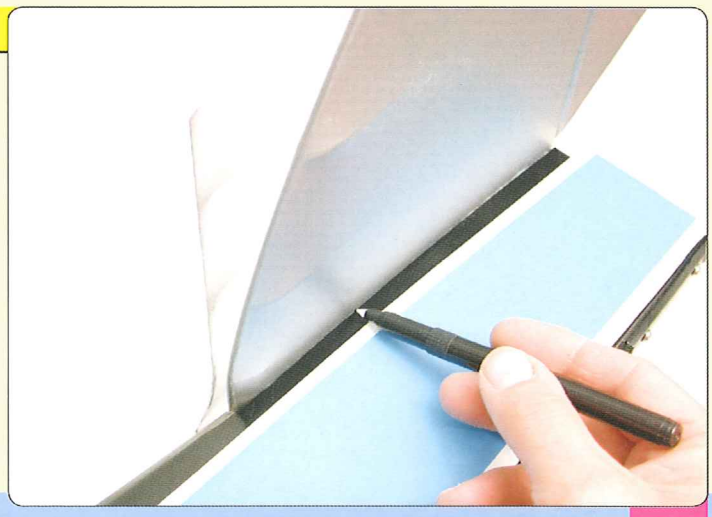
Step 7

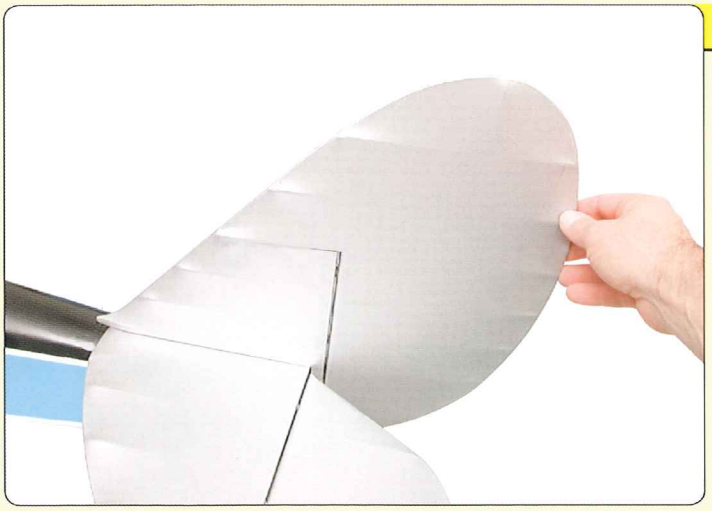
Cut away the covering on both sides of the tailplane for the fin post dowels, then position the tailplane onto the fuselage and fit the fin, ensuring the fin post dowels slide into the matching holes in the fuselage, as this will accurately align the tailplane.



Step 8

Carefully mark the underside of the tailplane where it fits onto the fuselage, and the topside where the fin fits onto the tailplane, then remove the tailplane and carefully cut away the covering between the lines you have made. Ensure that you cut only through the covering, and not into the structure of the tailplane itself, which would dramatically reduce the strength of the tailplane.



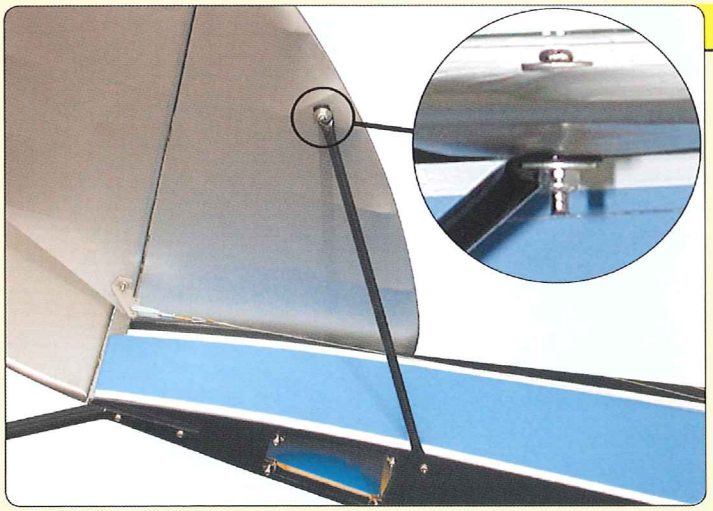


Step 9

Using 1 Hour epoxy, glue the tailplane and fin into place, ensuring that they are mounted level, and are correctly aligned – it may be worth temporarily fitting the wings at this stage to make sure that the tail is level to the wings.

Step 10

Mount the inner end of the tailplane struts to the fuselage – note that the struts are different left to right, so ensure you have the correct strut when installing.



Step 11

Locate the pre-drilled holes in the mounting blocks in the outer leading edges of the tailplane, and cut away the covering, then fit the outer end of the strut to the tailplane, using M3 bolt and nut, with washers to spread the loads onto the mounting blocks. Do not overtighten the bolts as this will crush the mounting blocks.

Step 12

Section: FUSELAGE

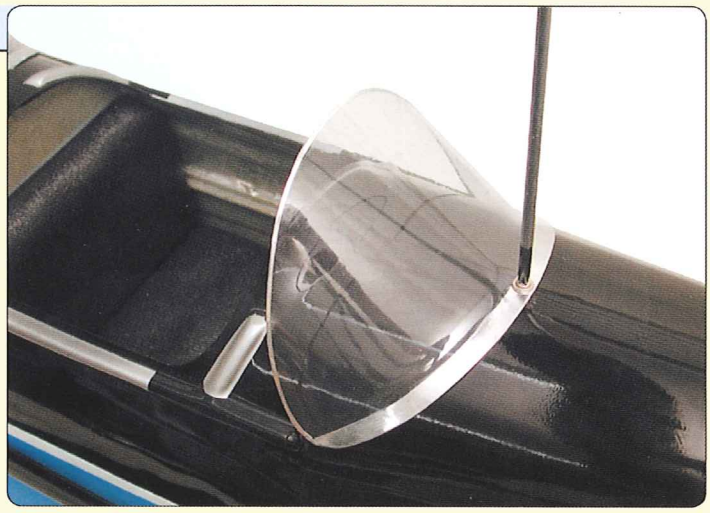
Cut away the covering over the open areas at the bottom of the forward part of the fuselage, leaving a 10mm wide free edge, then use a heat iron to iron down the excess, to ensure that the edges do not lift later.

Step 13

Glue the moulded pilots seats into place in both cockpits.

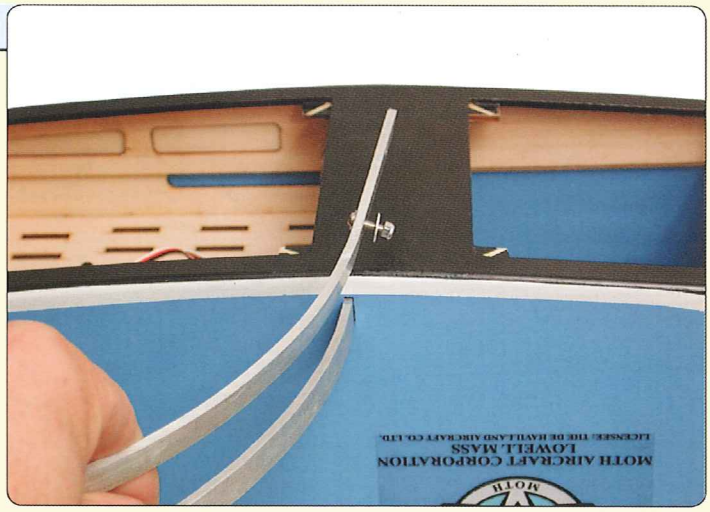
Step 14

Check fit and then mount the two windshields. We used a single screw in the centre of the mounting flange, and a small smear of canopy glue around the bottom of the flange to secure the windshield.



Step 15

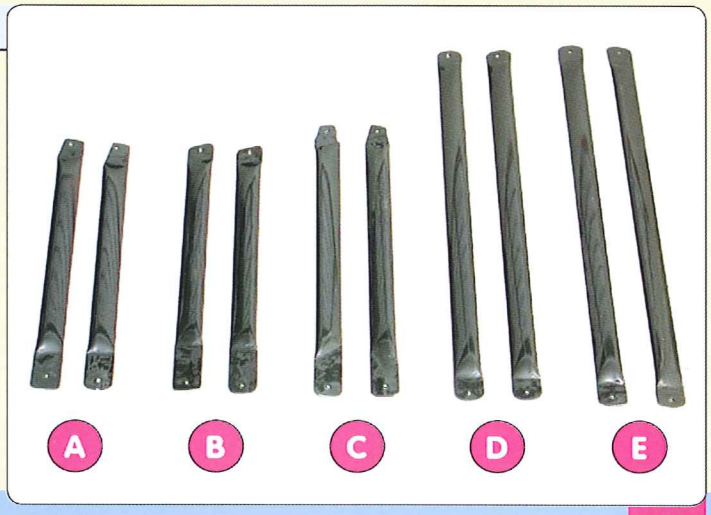
Bolt the curved lower aluminium wing spars to the fuselage.

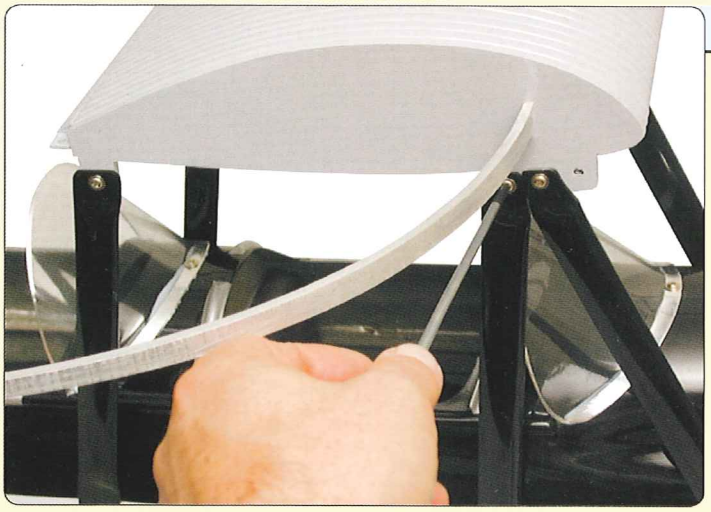


Step 16

Identify the various wing and fuselage struts from the picture, and then offer the fuselage struts up to the fuselage and check fit against the pre-installed spike nuts in the fuselage.

A: **Front Vertical**
B: **Rear Vertical**
C: **Front Angled**
D: **Wing Front**
E: **Wing Rear**



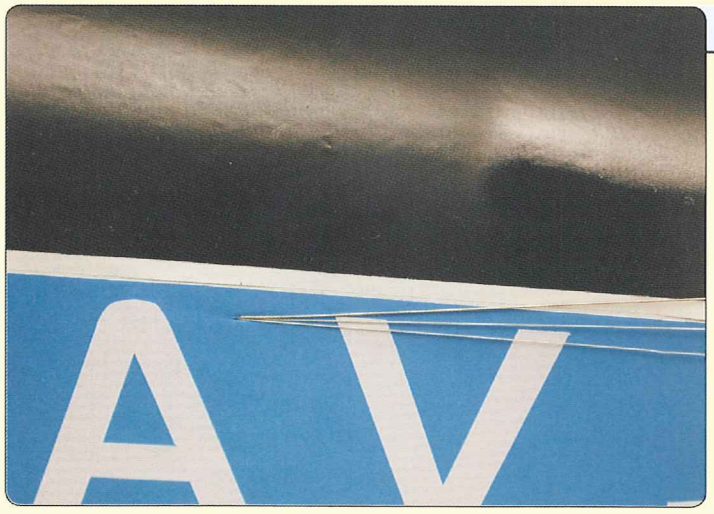


Step 17

Fit the struts to the fuselage and then fit the upper wing centre section to the struts. Ensure that all screws are fully tightened, and use a threadlock on all bolts except those that screw into locknuts.

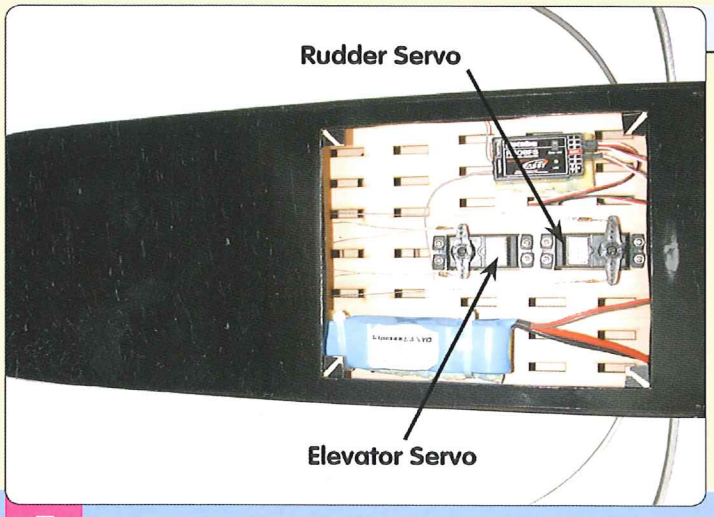
Step 19

Locate the exit for the closed loop cables, and cut a short slot through the covering, then check that the cables pass freely through the slot and into the fuselage.



Step 20

Pass the rudder and elevator cables through the slot and into the fuselage and pull through to the servo tray.

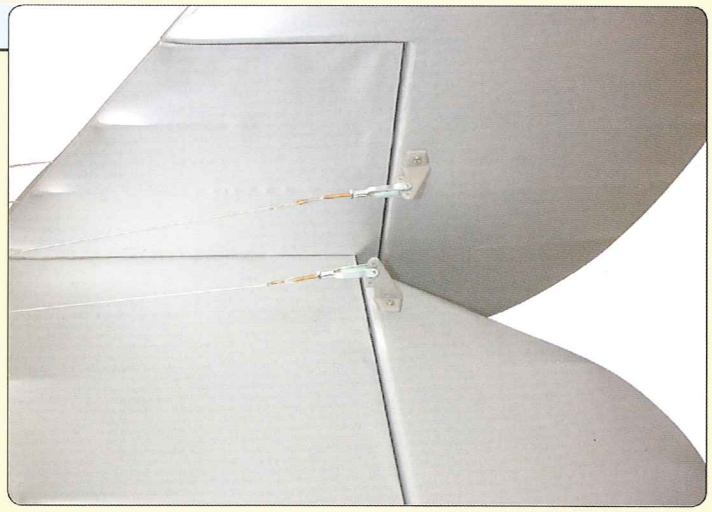


Step 18

Install the rudder and elevator servo into the fuselage, followed by the receiver and battery pack. Connect the closed loop cables to the clevis adapters/clevises for the appropriate servos – be very careful with the elevator cables, as the correct cable from each side of the fuselage must be connected to each of the clevis adapters/clevises to ensure that the elevators operate in the correct direction. The closed loop wire should be passed through one of the supplied small brass tubes, then through the hole in the clevis adapter, and back through the tube, then the tube carefully crimped, securing the wire without cutting through. For additional security thin cyanoacrylate glue should be run into the tube and allowed to cure.

Step 21

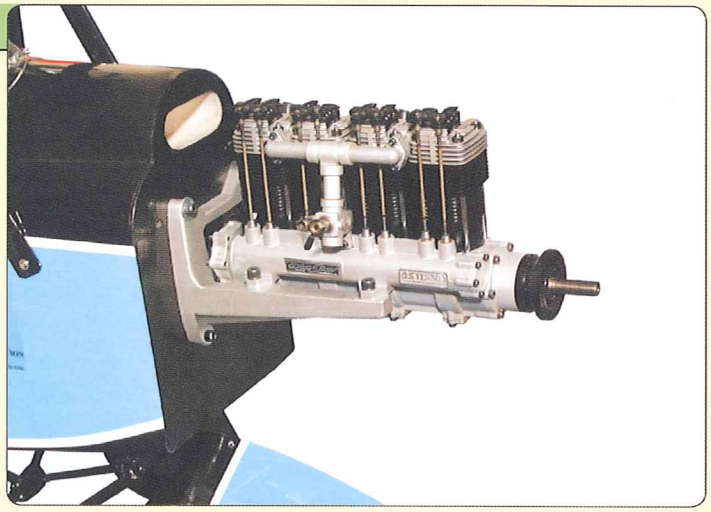
Fit the closed loop cables to the clevis adapters/clevises for the rudder/elevators, then attached the clevises to the control horns and adjust the adapters as required to centralise the control surfaces with the radio system switched on and the trims in the central position.



Step 22

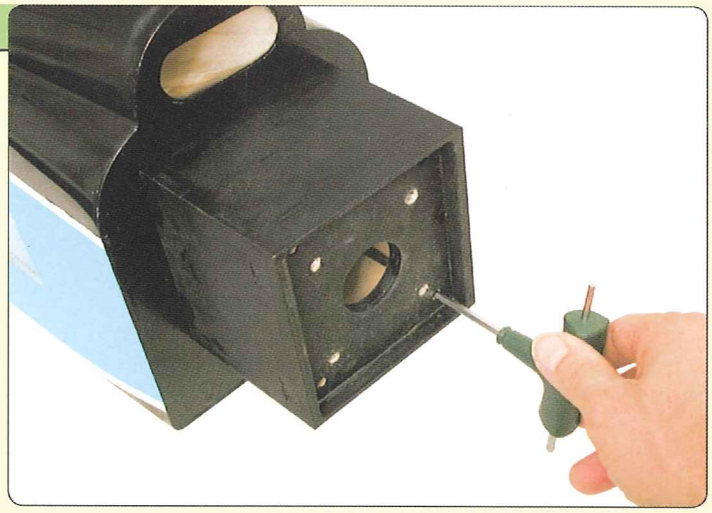
Section: ENGINE

If using the O.S. IL-300 inline four stroke engine screw the supplied O.S. aluminium engine mount to the pre-fitted spike nuts in the front former, ensuring threadlock is used on the mounting screws, and in turn mount the engine to its mount. Drill the front former for the throttle linkage.



Step 23

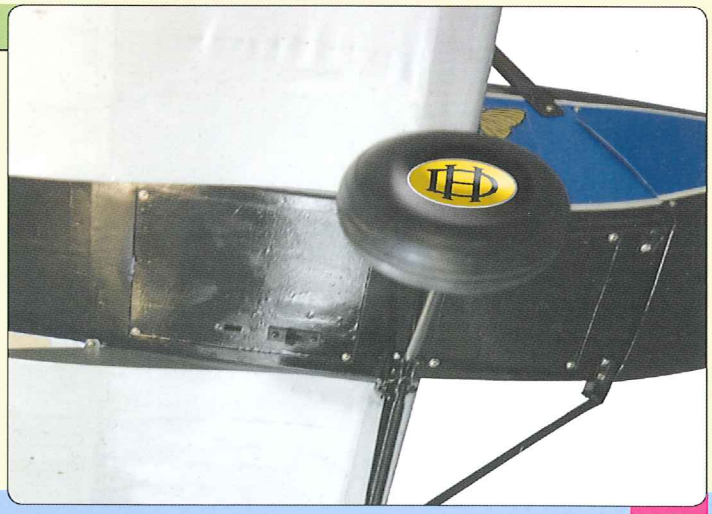
If using the alternative of an O.S. FS-200 engine, you will require the optional mounting box. This is simply screwed into place onto the same mounting nuts as would have been used for the IL-300 mount, then in turn the nylon engine mounts are attached to the mounting box. Offer the engine up to nylon engine mounts and temporarily fit the cowl to correctly position the engine on the mounts. When happy, drill for the engine mounting screws and then screw the engine into place, then drill for the throttle linkage.



Step 24

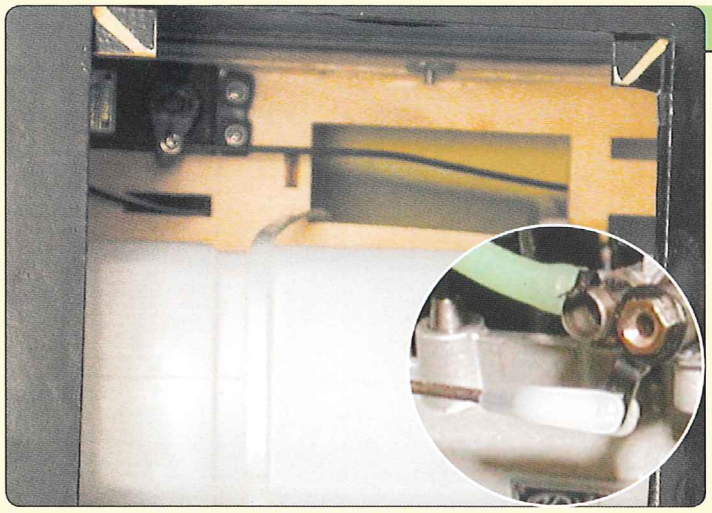
Fit the scale sprung undercarriage to the fuselage – do not forget to threadlock the mounting screws.

Fit the wheels and wheel covers.



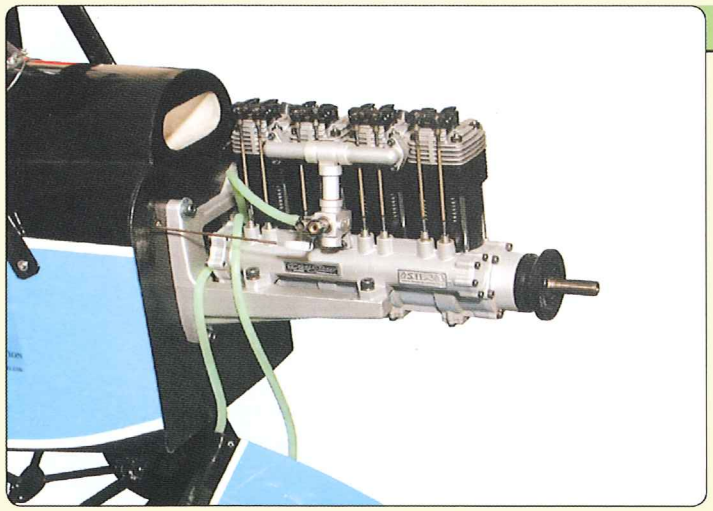
Step 25

Assemble the tank, with the pipework as shown. Check for leaks before fitting the tank to the model using tie wraps.



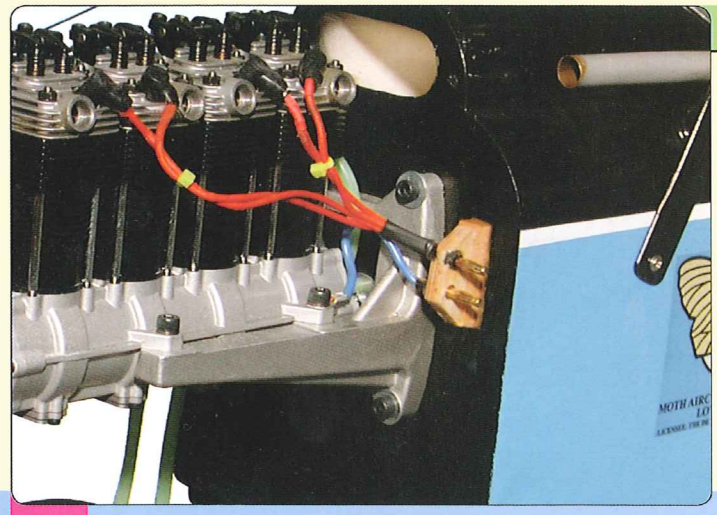
Step 26

Fit the throttle servo and carefully bend the throttle push rod so that it fits through the hole in servo/tank mounting plate and through the hole/s you drilled in the front former's. The threaded end of the pushrod should be positioned at the engine end and a plastic clevis should be screwed onto it. Connect the other end to the throttle servo arm with the servo adapter supplied.



Step 27

Connect the feed line from the fuel tank to the engine and connect the clevis on the throttle pushrod to the throttle arm on the engine.

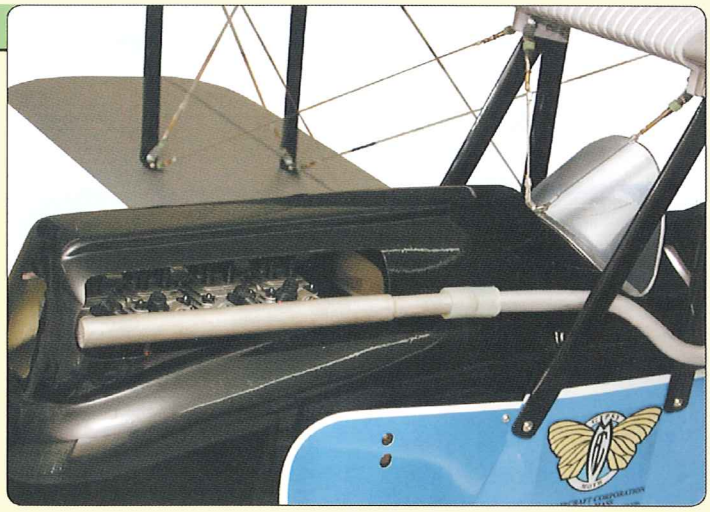


Step 28

The IL-300 is supplied with remote glow wiring, we wired the leads into a pair of 4mm connectors so that a single external 2v gell cell could be used when starting the engine. This only required two small holes to be drilled in the side of the cowling to allow the leads to be connected.

Step 29

The optional scale exhaust system for the IL-300 is shown fitted to the model. Note that this system is not suitable for other engines.



Step 30

As the Gipsy Moth is designed for both single and multi cylinder engines the heavier engines such as the IL-300 will require tail weight. We glued the weight to the rear hatch, so that it would remain accessible to allow the weight to be adjusted as required.

Step 31

When fitting the scale exhaust system, the supports should be screwed to hard points in the fuselage structure.

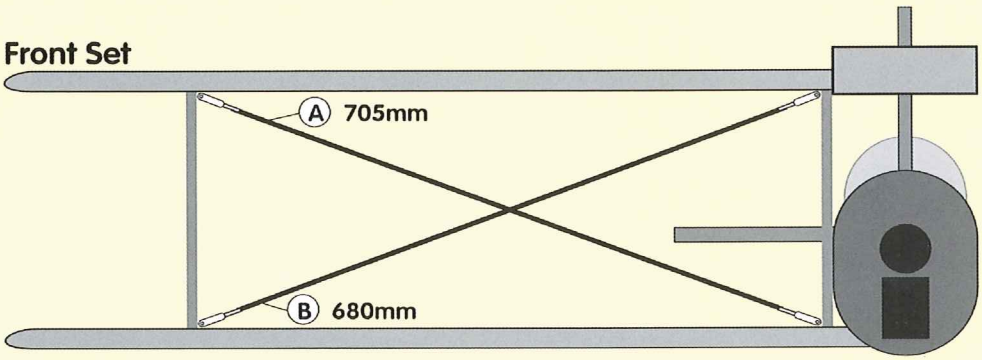
Rigging wires are an essential part of the structural strength of the Gipsy Moth, and it is vital that they are correctly fitted if the model is to fly safely and withstand the various flying and landing loads. All the rigging wires have been produced to the required lengths at the factory, but due to the natural nature of the wooden airframe the lengths for each particular model are likely to vary slightly, which is why there is an amount of adjustment possible at each end of the wires. Fit the struts and rigging wires as shown on the drawing and in the photos, then carry out the following checks.

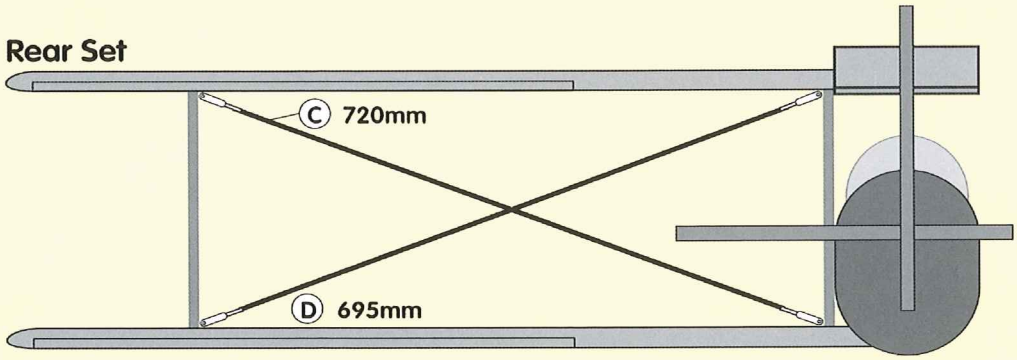
1. Dihedral is the same on each wing panel. If any noticeable difference is found then the rigging wires can be adjusted to equalise the dihedral between the panels – take great care not to induce warps whilst doing this.

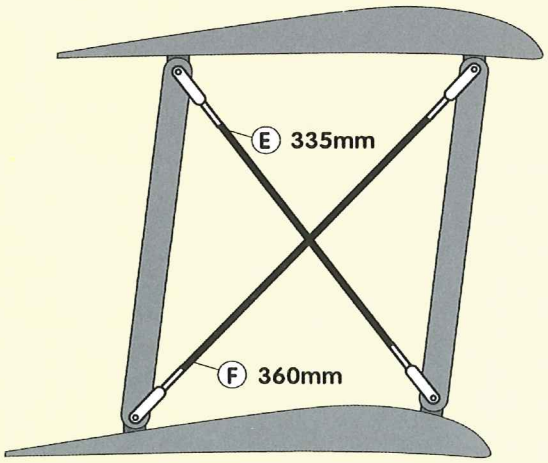
2. Wing panel/s are warped. In this case adjust the wing wires to correct the warps.

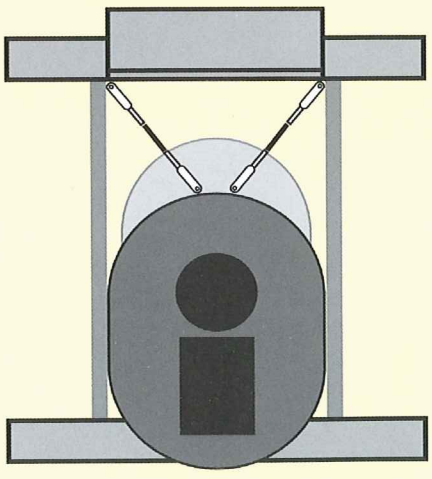
3. When looking down on the wing panels from above, the upper and lower panels are in line with each other, i.e. one panel is not swept back or forward when compared to the other.

Rigging a scale biplane when first built can be a time consuming business, as each adjustment to correct one problem can affect another area. For example, the wing has the correct dihedral but is warped, so the rigging wires are adjusted to remove the warp but this then also affects the dihedral. You will find that you have to go around the rigging several times making ever finer adjustments until the rigging is perfect. Once satisfied, do ensure that the locknuts are securely tightened against the metal clevises at the end of the rigging wires to ensure they never come lose which could require you to carry out a re-rigging. Take great care not to overtighten any of the rigging wires, as this may damage the structure of the model, and do ensure that all clevises have been fitted with short sections of silicon fuel tubing to make sure they can never open in flight, which could be disastrous.







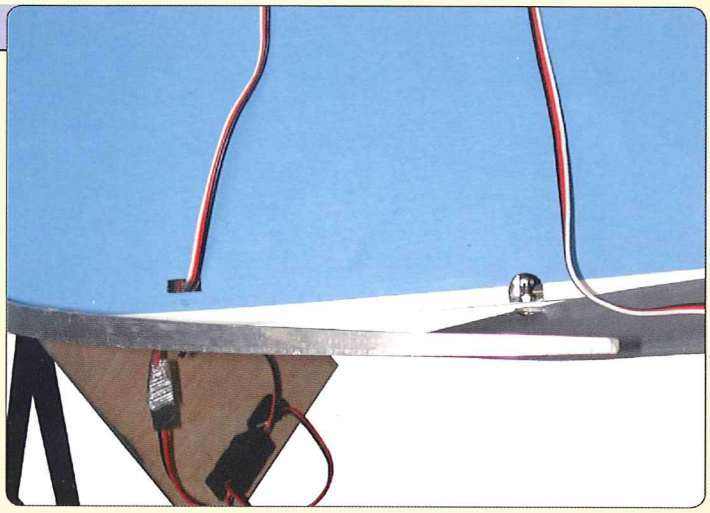


Step 32 Section: AIRFRAME RIGGING

The radio switch and charging socket can be mounted on the rear hatch as shown, or could be mounted internally if required, possibly in the cockpit area.

Step 33

The lower wing panel is attached to the fuselage using a single M3 screw and locknut through the mounting flange at the rear of the wing, note the aileron extension lead emerging from the wing root and into the fuselage side.

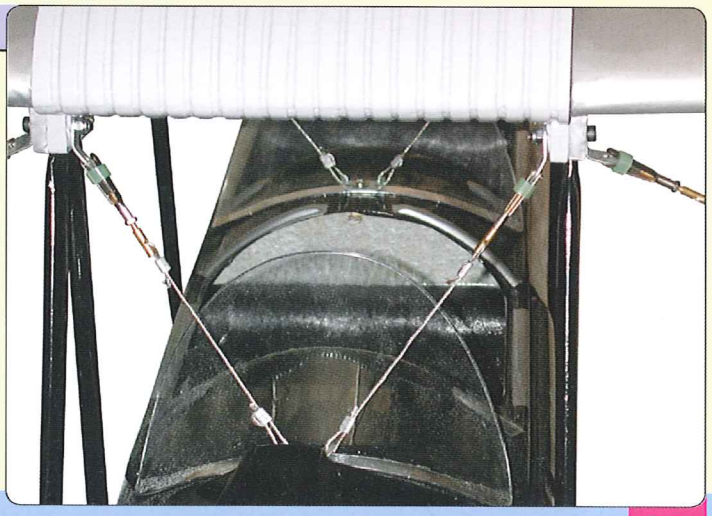


Step 34

View illustrating the rigging at the lower wing root – note that the diagonal cable down to the forward bolt position supports the wing as it folds, and thus should be left attached to the wing at all times.

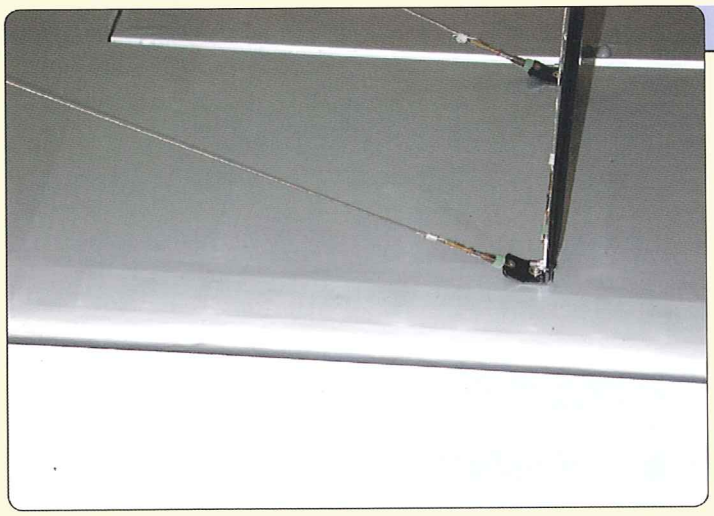
Step 35

Close up showing the fuselage centre section rigging.



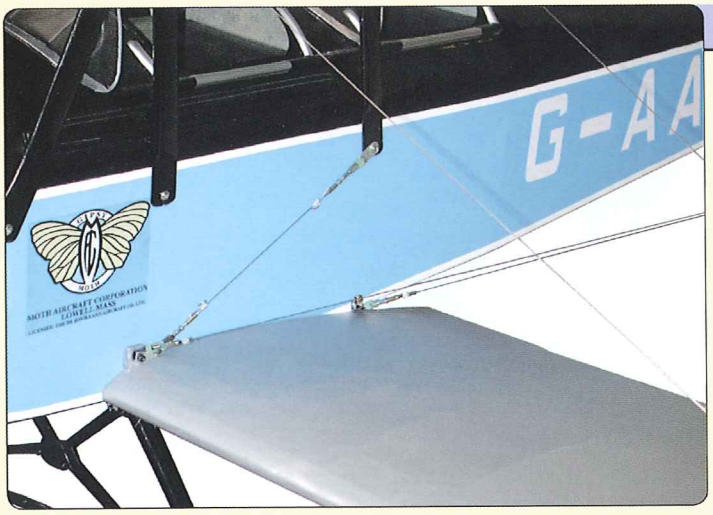
Step 36

Underside of the upper wing centre section.



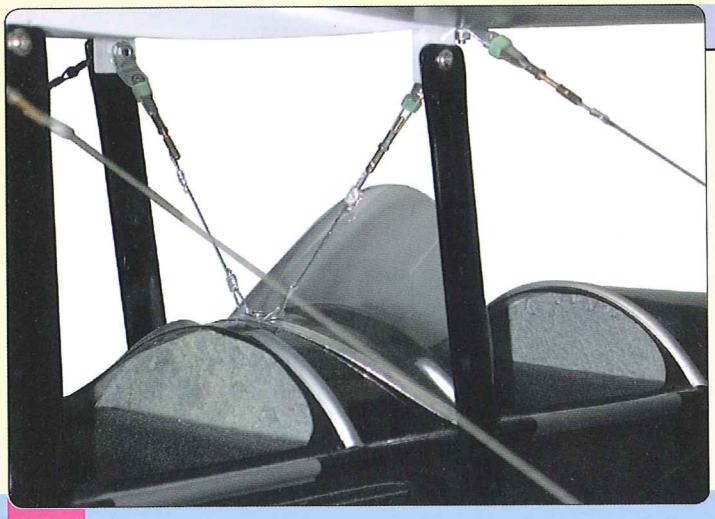
Step 37

Outer wing strut and cable connections.



Step 38

View showing both front and rear lower wing rigging connections.

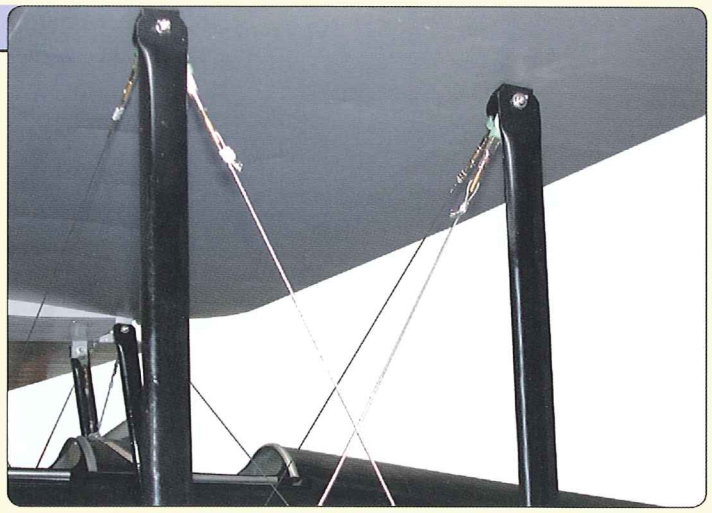


Step 39

View showing the rear upper rigging connections.

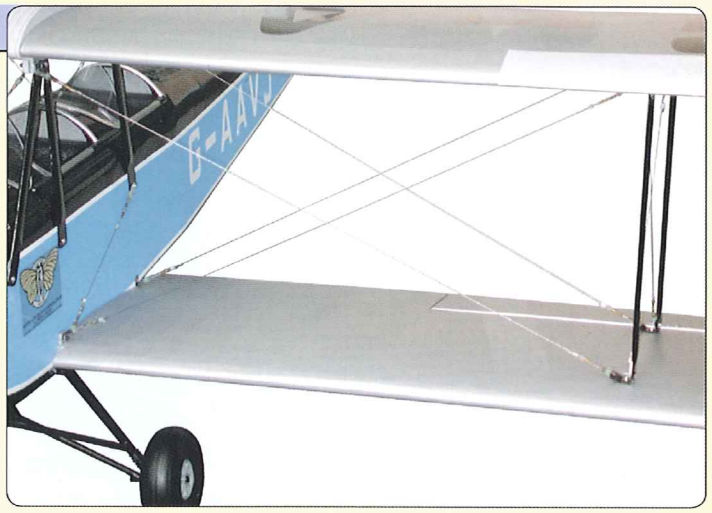
Step 40

Outer wing strut rigging.



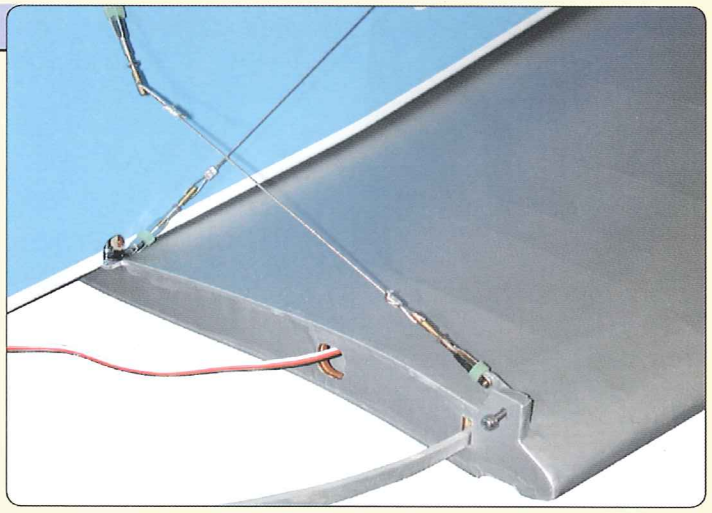
Step 41

General view of the wing rigging.



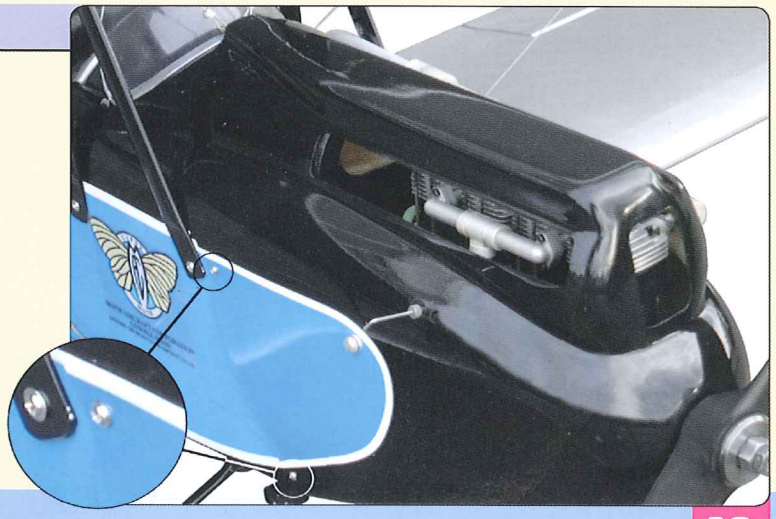
Step 42

View of the folded wing with the support rigging wire.



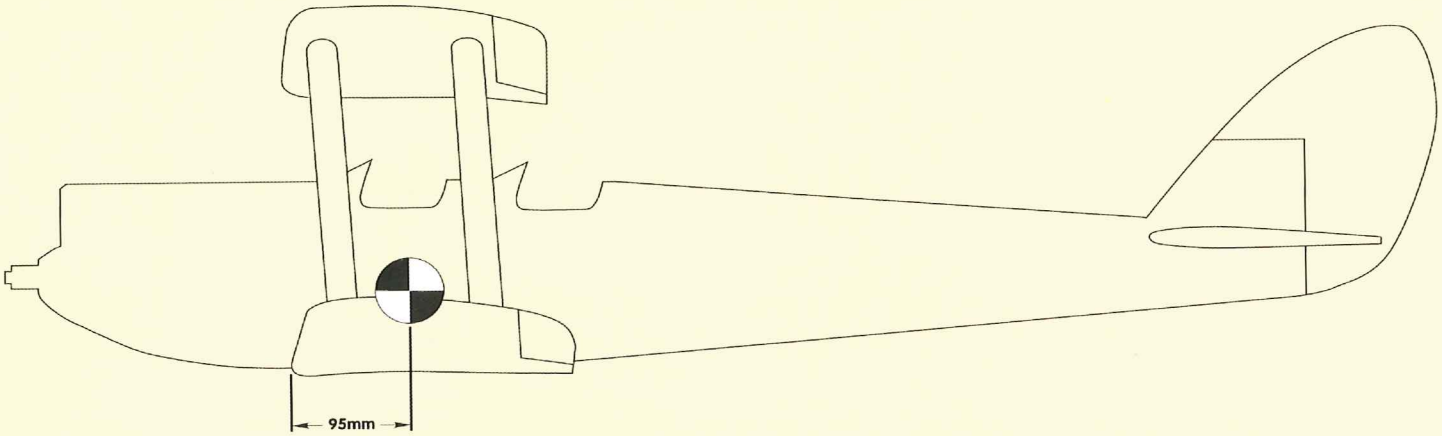
Step 43

The cowl should be attached to the fuselage with four self tapping screws. Do ensure that these screw into parts of the fuselage structure reinforced with the doublers, and run a small amount of thin cyanoacrylate glue into the holes to toughen the wood, and avoid the screws pulling out. Note that the cowl will require cooling holes cut to suit the engine being used, although the size of the exit holes can be kept quite small due to the tubular air duct built in to the fuselage between the front former and the forward cockpit.



Centre of Gravity

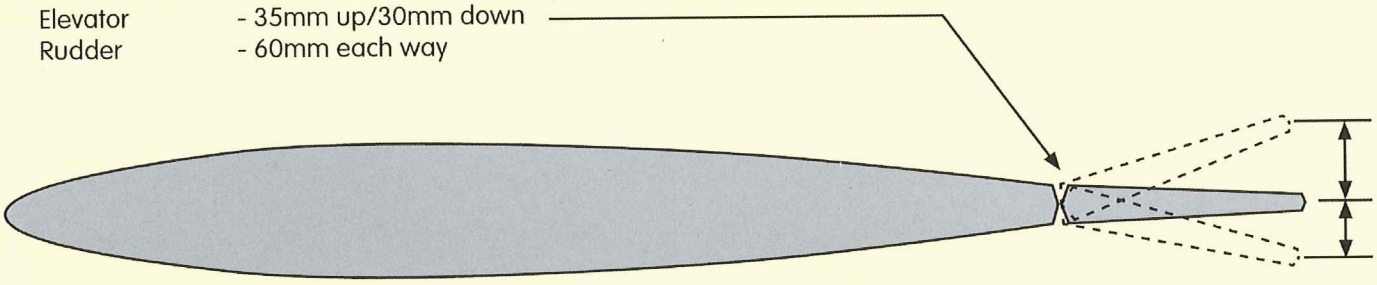
With the Gipsy Moth ready for flight, the balance point is 95mm back from the leading edge of the lower wings at the root as indicated in the diagram below.



Control Surface Movements

Check that the controls move in the correct direction and that their throws correspond to the following when measured at their widest points.

Ailerons	- 25mm up/20mm down
Elevator	- 35mm up/30mm down
Rudder	- 60mm each way



Flying the Flying Legends DH 60G Gipsy Moth

PRE-FLIGHT-INSTRUCTIONS

- Ensure that your transmitter and receiver batteries are fully charged before flying
- Carefully check your model over to ensure that all screws are tight and that all rigging and closed loop cables are tight and secure. All clevises must have short lengths of fuel tube fitted to ensure they cannot open under flight loads
- Double-check the model's Centre of Gravity position
- Check the control surfaces for both the correct throw and direction, ensuring that each surface moves freely with out any binding
- Check the receiver aerial/s is/are fully extended and secured

Before every flying session you MUST check the control range of your R/C system. Have a helper hold the model with the engine running, ensuring that they are well clear of the propeller. With the transmitter and model switched on, retract the transmitter aerial and walk away moving the elevator stick on the transmitter. Run the motor to full power and repeat the elevator movements. You should be able to walk between 50-100 metres without interference or losing control. If you lose control or the radio appears to have interference do not attempt to fly.

GENERAL FLYING TIPS

For anyone with aileron experience, the Gipsy Moth is a very easy model to fly and has excellent flying characteristics, with the slats on the upper wings eliminating tipstalls. With a low wing loading it can be flown slowly and sedately, but with full power applied it is semi aerobatic, being able to perform tight turns, loops, rolls, stall turns etc. Choose a bright, calm day for the first test flights. Allow the model to accelerate on the ground, allowing the motor to attain full power before attempting to take off. Do not 'haul' the model off with insufficient ground speed. Allow the Gipsy Moth to take-off into wind and climb to a safe height before attempting to trim the model. Become accustomed to the model's flying speed and handling characteristics before attempting more advanced manoeuvres, you will find that the rudder is very powerful, whilst the ailerons are much less so, so the rudder should be used in conjunction with the ailerons during turns, either pilot controlled, or by using coupled ailerons and rudder via transmitter mixing.

Due to the relatively high drag of the model, with its rigging wires and struts, the Gipsy Moth has a high rate of descent with the engine at idle. This does make short and accurate landings simpler, but it also means that some power should be kept on during the approach, to avoid undershooting or a hard landing. In the event of engine failure do keep the nose down to maintain airspeed until ready to touch down.

Happy and safe flying!

Gipsy Moth

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