

**After a period of many years, during which his Sea Vixen project lapsed, Mike Spencer resurrected the design to produce a fine flying model of this classic aeroplane.**

Since I first served at RNAS Yeovilton I had admired the Sea Vixen which was then (1968) phasing out of frontline RN service. Ever since, I have had it in the back of my mind to build a model of the type. Many years passed and other models were built and flown but it was not until I found a book by Philip Birtles in the RAE Farnborough library "Postwar Military Aircraft: "Vampire, Venom and Sea Vixen" (publisher Ian Allen) that I started to make some outline drawings initially for a small PSS project but with the eventual aim of building something larger at a later date. While reading this book I also had a close encounter with the RAE airframe which Andy Sephton had flown down from Llanbedr for continuation training with a live pilot instead of the RC system in its target role. (Now that

# PSS

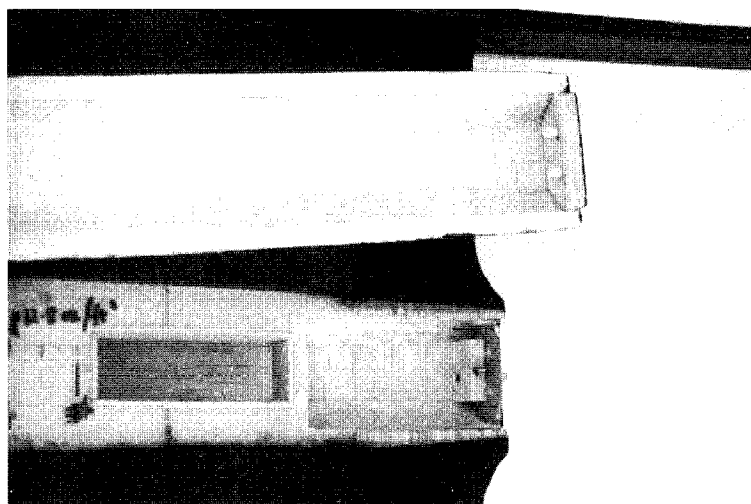
reasonable drawings at 1:72 scale in its "Warpaint" feature on the centre pages and, with another fullsize aircraft adjacent to the Fleet Air Arm museum only 3 miles away from my workshop, I no longer had any excuse to delay this project (except 2 sons, a dog, an old house and a steady stream of fullsize helicopter students!).

## DEVELOPMENT

As a first stage, I built a maquette (profile skeleton) out of 1/8" balsa sheet of about 8 inch span. This was thrown around the garden on calm evenings to confirm the rough location of the CG after calculating the aerodynamic Centre of Pressure. Although this was a very basic 'model', instant recognition and comments in the Squadron confirmed my impression of how even this simple outline conveyed the character of the real aeroplane. It seemed that I would be able to get away with quite large departures from true scale yet retain the 'essence' of Vixen. (Is it just coincidence that, as I write this, my wife has just had to bath the dog after he insisted on rolling in fox dung?!)

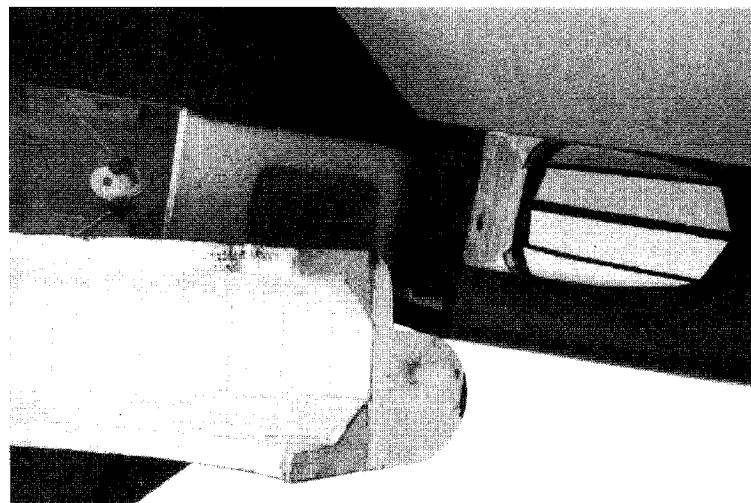
## THE MODEL

I drew up a set of outlines for a model of some 32" span which gave a root chord of just under



**Above: The centre section of the fuselage is carved from blue foam and the servo bays are hot-wired to suit. The top hatch is secured at the back by these two dowel pins.**

**Below: The front end of the fuselage access hatch is retained with a snake 'catch'. This system of retention has proved faultless so far.**



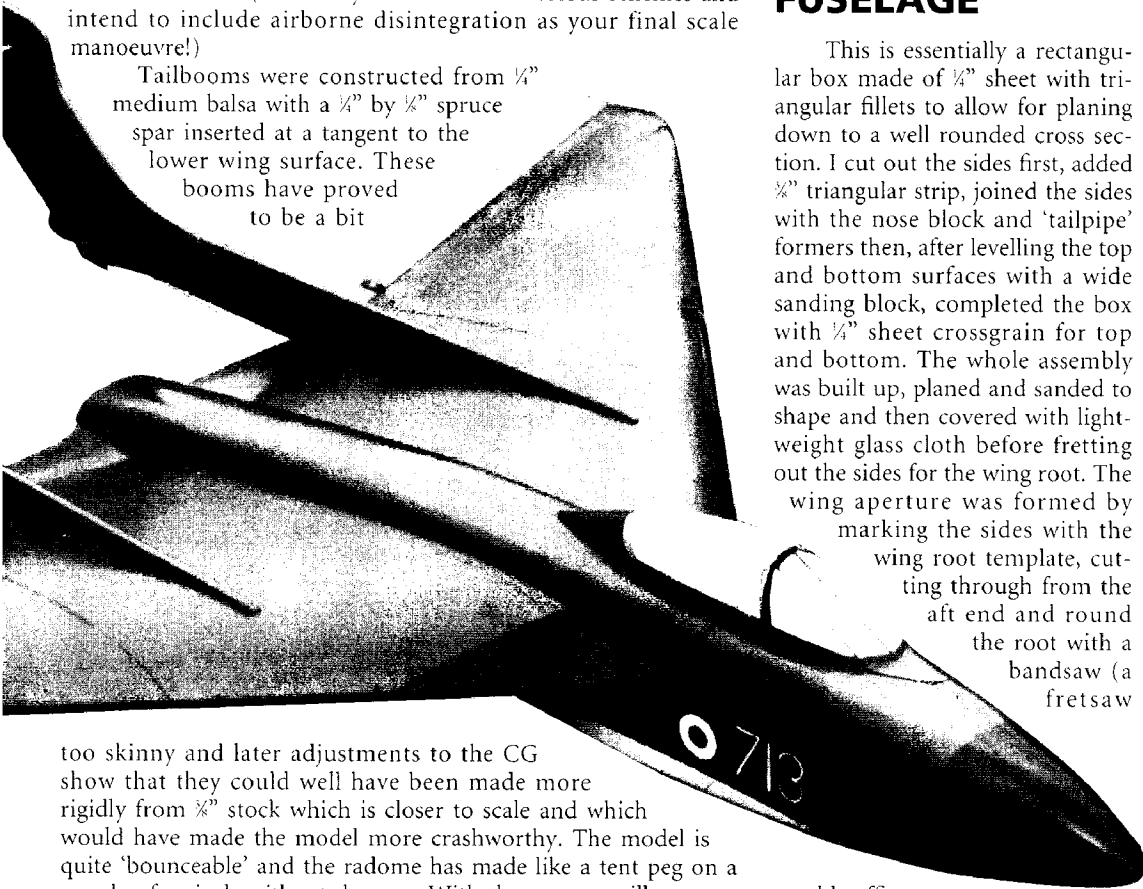
would impress the LMA!!). I obtained some close up photographs and outline views with the idea of generating drawings from scratch but was fortunate when posted back to Yeovilton in 1989 to discover a back copy of that other most useful reference "Aviation News" (Vol 2 No 10) in a local plastic models specialist shop. This contained some excellent scale information and

13". I decided to try blue foam for the only reason that it was a new material to me and offered the prospect of applying resin directly to the foam. The plan view suggests a double LE taper inboard of the wing fold hinge resulting from the engine intakes and fuselage blending. Closer study of the original showed a 'wing-root' outline inboard of the engine intake which matched the main LE so this enabled a barely noticeable 'cheat' by keeping the wing to a single taper and disguising the root area by painting the engine intakes matt black. After setting up a root template on my cutting board and securing the wingtip end of the cutting bow to the point where the extended LE and TE would meet, I cut a pair of cores by the single template method which is probably the easiest way of forming this sharply swept and tapered mainplane. As an experiment I tried vacuum bagging a brown paper/resin skin directly onto an early test piece of foam. This produced a high finish (SRBP) which was very light but for the eventual model I chickened out and reverted to obechi veneer as I didn't want to break too much new ground in one go! Wingtips were from soft balsa sheet with LE and TE added to taste. The wings were joined by a constant chord centre section the same width as the fuselage. This was glassed directly over the foam and neatly connects the two veneered panels. There is a lot of strength here and large holes have been excavated for the RC gear. The area between the booms was corrected simply by extending the TE with 1/8" sheet to match the scale platform.

# Sea Vixen

The fuselage has a distinctive 'kink' under the LE (where the ventral airbrake is on the original) and the rounded corner square box of the subject was easily constructed from 1/4" sheet and triangular stock. The other distinctive feature is the offset cockpit which is to the port side while the very trusting observer worked in his 'coal hole' beneath a flush hatch slightly starboard and aft of the pilot. I cheated with the nose profile as the fullsize radome reduced to a 32" span model would be illegally sharp but if anyone wanted to keep all scale judges happy and stay within the nose radius rules you could model the prototype DH10 which had a much blunter, rounded radome. (That's if you like all black colour schemes and intend to include airborne disintegration as your final scale manoeuvre!)

Tailbooms were constructed from 1/4" medium balsa with a 1/8" by 1/8" spruce spar inserted at a tangent to the lower wing surface. These booms have proved to be a bit



too skinny and later adjustments to the CG show that they could well have been made more rigidly from 3/8" stock which is closer to scale and which would have made the model more crashworthy. The model is quite 'bounceable' and the radome has made like a tent peg on a couple of arrivals without damage. With the present tailbooms, a cartwheel arrival which strikes a wingtip first tends to distort the boom/tailplane assembly as a trapezium (I can't spell para-llelo-thingy) leaving the booms firmly attached to the wing but shedding the stabiliser. A bottle of cyano is part of the fieldbox! Stabiliser and elevator are from 1/4" sheet.

## WING CONSTRUCTION

This is in three sections. The two sharply swept outer panels were cut using a single root template while the other end of the hot-wire bow was fixed at the point where the extended LE and TE would meet (see diagram on plan). The centre section is the same width as the fuselage and needs two root templates to hot-wire-cut a small, constant chord joiner for the two outer wings. I found that it was worth doing this as it got round the problems caused by marrying the 45 degree swept planform to the fuselage eased the cutting out of housings for the R/C gear. The outers were covered normally with obechi veneer while the centre was left as raw blue foam with glass bandage applied directly both to cover it and join the outers at the same time. Dihedral is zero. LE, sub TE and tips

are included in this construction but leave the main trailing edges off until after the booms have been attached. The channels for snakes to the control surfaces were burned out with a curved stiff hot wire after assembly but they could be let in before skinning the wing if preferred.

## FUSELAGE

This is essentially a rectangular box made of 1/4" sheet with triangular fillets to allow for planing down to a well rounded cross section. I cut out the sides first, added 1/8" triangular strip, joined the sides with the nose block and 'tailpipe' formers then, after levelling the top and bottom surfaces with a wide sanding block, completed the box with 1/4" sheet crossgrain for top and bottom. The whole assembly was built up, planed and sanded to shape and then covered with light-weight glass cloth before fretting out the sides for the wing root. The wing aperture was formed by marking the sides with the wing root template, cutting through from the aft end and round the root with a bandsaw (a fretsaw

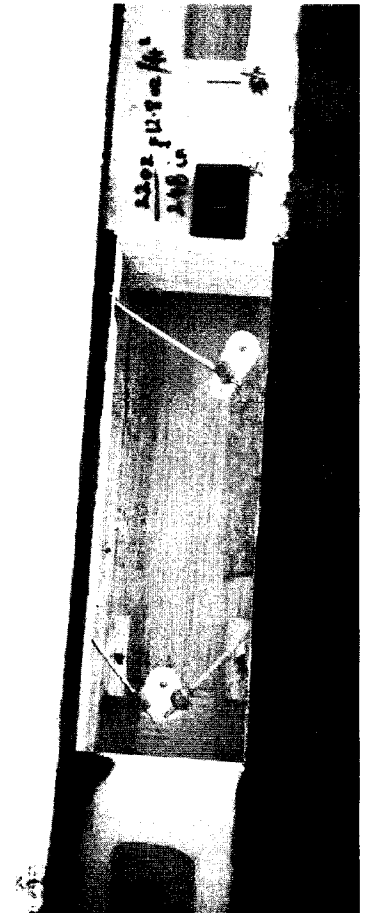
would suffice but cut well inside the line for fitting), ensuring a good fit to the wing by cleaning out the cut with files and sandpaper. Once a good fit to the wing was obtained the cockpit block was added and faired down to the rounded fuselage with filler putty. Next the top hatch was cut away from the canopy arch to the wing LE. The wing was then secured to the lower fuselage shell with epoxy leaving the top hatch already shaped and a snug fit, leaving just the catches to make. I used a single dowel (snake inner and outer) at the canopy end and a pair of 1/8" pins at the tailpipe. The long hatch then comes off with a rearward movement, exposing the whole wing root area.

## BASIC DATA

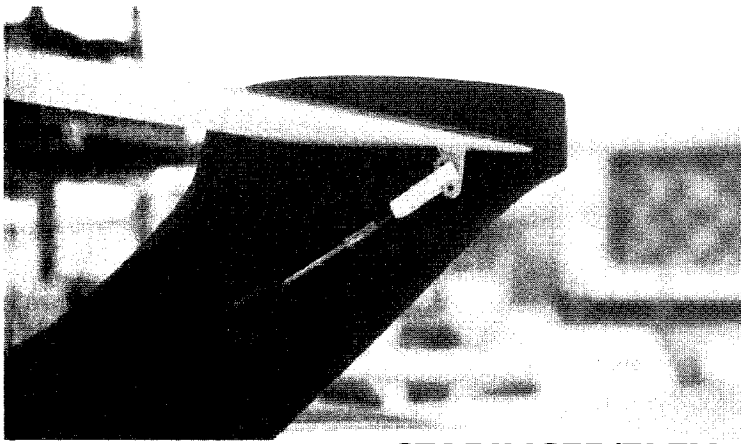
Span	33.5"
Length	34"
Chord	
Root	14"
Tip	2.5"
Wing area	248in <sup>2</sup>
Weight	
Empty	15.5ozs
with R/C	22ozs

## CONTROL THROWS

Ailerons	
low rate	±1/4"
high rate	±1/4"
Elevator	
low rate	±1/4"
high rate	±1/4"



The control cables all run into the fuselage at the 45° angle of the wing - at the front is the aileron control with elevator at rear.



The elevator pushrod exits the boom at 45° to give a good, clear run to the elevator horn.

## STABILISER/ELEVATOR.

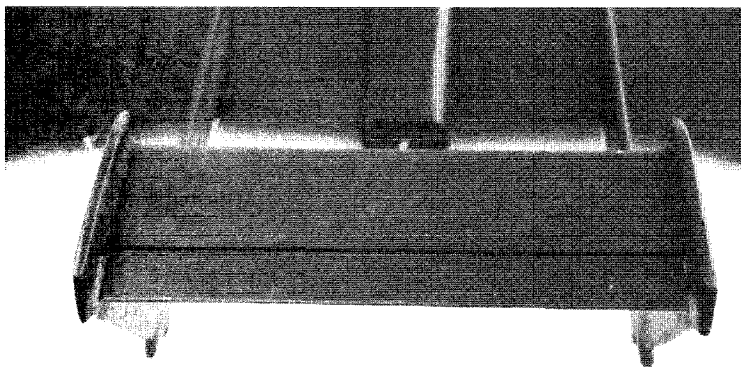
These are made up from 1/8" sheet and pinned to the booms with 1/8" dowels. Fit the stabiliser between the booms after they have been secured to the wing assembly and check before final gluing that the stabiliser is rigged with about 2° negative incidence relative to the chord line of the mainplane. I used small pin hinges for the elevator and cyanoed in a control horn from a piece of printed circuit board.

## RADIO INSTALLATION:-

Although I have used a Fleet

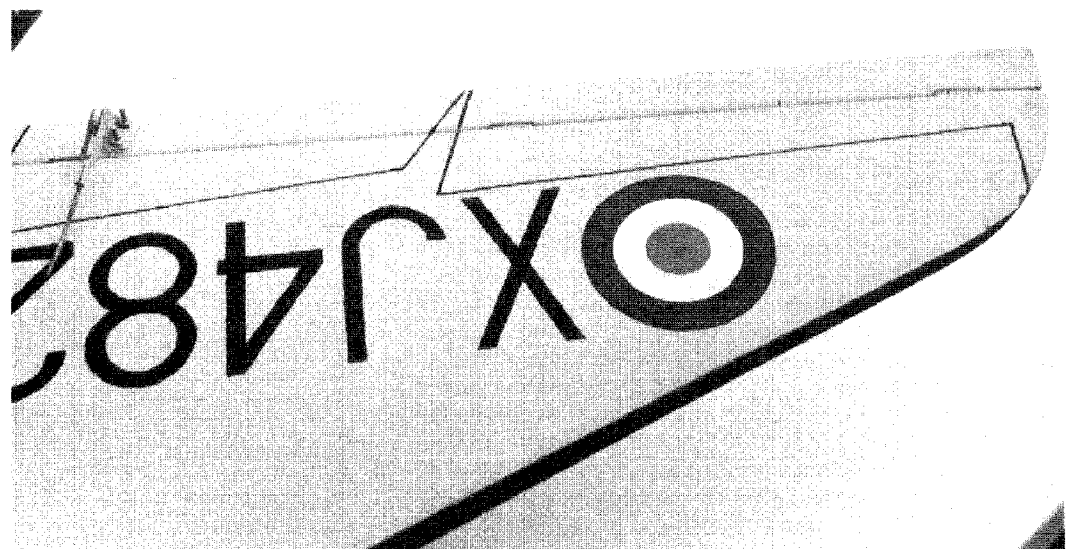
## BOOMS

These are simple sheet profiles but don't omit the spruce insert or you will find they break too easily. The snake outer for the elevator was let into a channel and covered with lightweight filler in the starboard boom before attaching to the wing. When attaching to the wing make sure the wing is level and the booms are resting on a common surface or the whole back end will end up twisted.



The elevator may appear to be fairly short in chord but has proved more than adequate with the CG in the correct position. With the CG too far back, the elevator can get 'blanked' to the airflow at lower airspeeds.

The markings on the model ended up as a mixture of stencil and freehand. Panel lines were drawn on in felt tip pen and the roundels were painted with a compass outline and then filled in by brush.



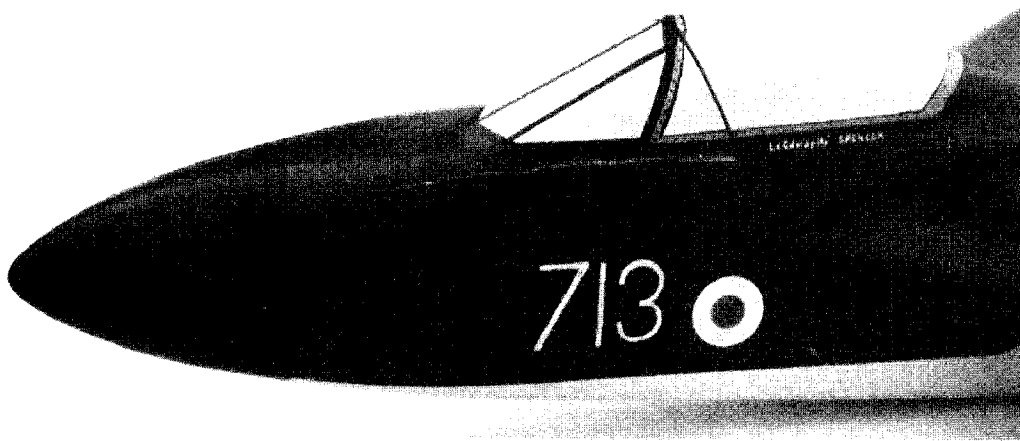
micro Rx and a 225mAh nicad there is adequate room in the fuselage for standard size gear. Flights to date have shown that an increase in weight would be an advantage in the 15-20 kt winds which are ideal for this little whizzer. The servos are standard size mounted in tandem with bowden cables to the control surfaces. All control cables arrive in the fuselage parallel to the LE so holes at 45° to the fore and aft line are used on the servo output arms. The elevator cable runs out into the wing and is buried in the starboard boom, exiting under the elevator at -45° with an appropriately angled horn on the elevator.

## FINISHING

The surface finish of booms and flying surfaces was with doped tissue, while the fuselage centre-body was given the glass-cloth treatment before mating to the wing. This has kept the weight down while giving a good 'dingproof' point of contact with the ground. Colour was applied for Yeovilton's 766 Training Squadron markings with sprayed on Humbrol base colours and both stencil and freehand lettering. Roundels were drawn in paint with a compass bow and filled in by brush while panel lines were applied with a felt tip pen. The cockpit is a lump of soft balsa painted a suitable 'greenhouse' colour – don't ask me what it is, I just mixed different colours until it looked right! Then a final spray of matt varnish subdued the colours nicely.

## FLYING THE VIXEN

I was fortunate to find a good SW wind blowing on the first opportunity to fly the model and headed for the Beacon ridge at Corton Denham. This first flight, in sight of RNAS Yeovilton, was a good omen and I was able to explore most of its flight envelope over the next 15 minutes or so, without suffering any damage. This is not a model for the novice and flying is lively to say the least. It needs a good blow (15-20 kt) or a hill with a good steep slope. The flying weight came out at 22 oz which, at approx 248 sq in, gives a loading of some 12.8 oz/sq. ft. The sharply swept wing is draggy if slowed down too much and in higher windspeeds it is advantageous to ballast up a bit (4x20p coins at the last try) to maintain penetration. On subsequent sorties I had some fun adjusting the CG to harmonise the mushy elevator with the very brisk roll response even with only 1/8" each way on the ailerons. I went a little too far back at one stage and despite achieving stable, crisp elevator response at high speed, lost pitch control as the stall was approached. The CP shifted forward rapidly and the stabiliser became blanketed generating a marked pitchup (Just like the real one tended to do when the catapult was not getting enough steam. It brought back memories of old songs in the Carrier's Wardroom "Ashes to ashes, dust to dust. If the devil don't get you then the Vixen must..."). With the CG just a tad forward of this unacceptable data point it will take lift quite well yet still retain the ability to really move along the slope when trimmed forward. With full aileron rates it nearly exceeds my ageing ability to keep up but

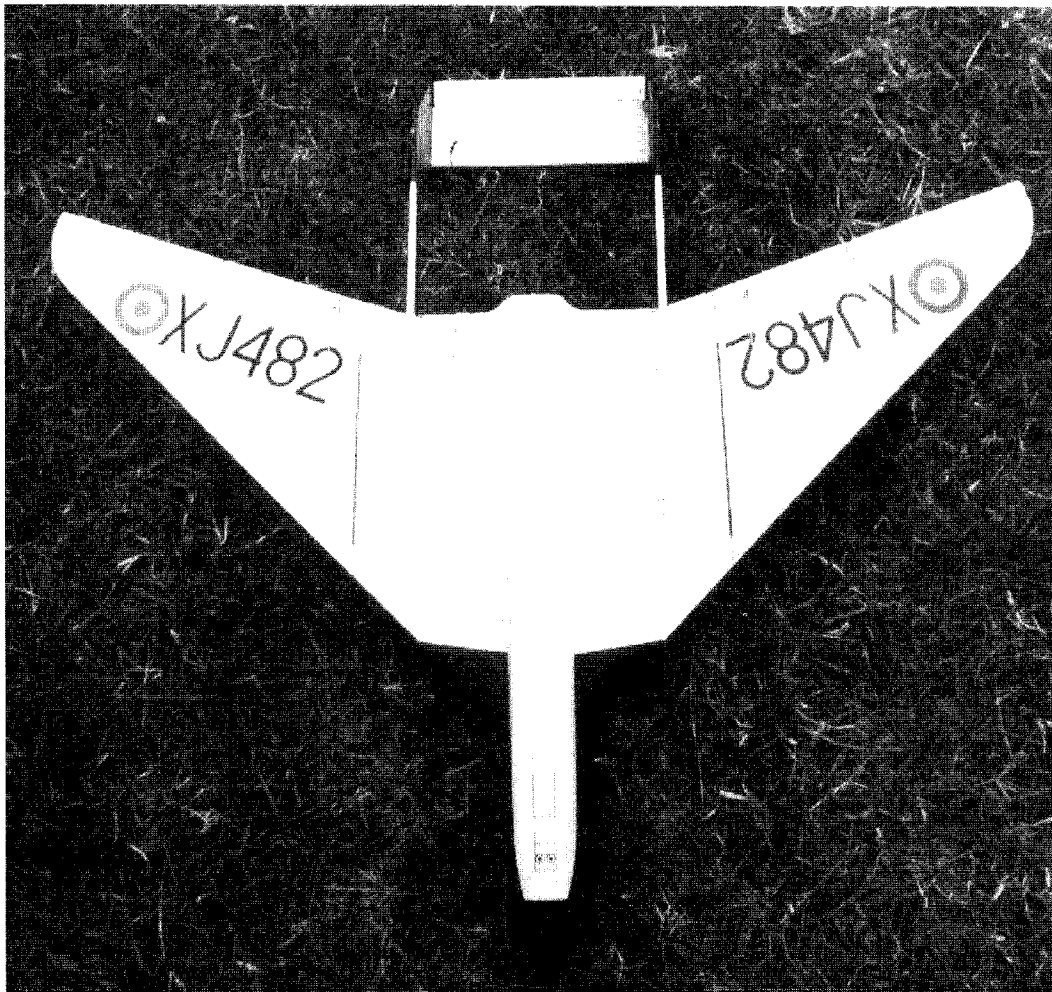
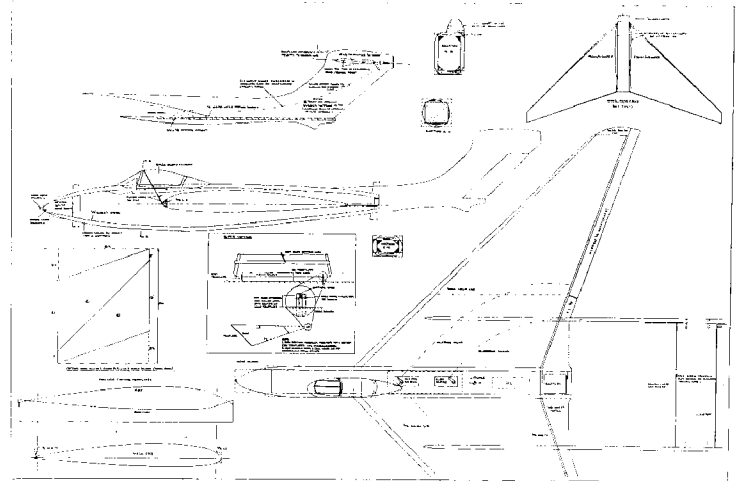


The nose on my Sea Vixen is slightly more 'rounded' than on the prototype in order to meet with BMFA nose profile guidelines. If you wished to model the DH110, you would be able to get away with the more rounded radome of this type.

when flown smoothly looks 'just right' in the air. Derry turns are a dream. Inverted performance is remarkably good with the fairly thick NACA 2312 section (near scale) but it is probably not the best 'gliding' section in the PSS role. I'm sure nobody would notice a change for the better here. Being a fairly small model it disappears quite easily and the delta planform combined with the scale colour scheme makes orientation quite difficult at times (on a few occasions I have had to just pull and see which way the little black dot went). If I ever get round to building another or larger version I would be tempted to use the RAE Orange Yellow and Black colour scheme to stop it from disappearing when below the horizon.

## CONCLUSIONS

Overall it has been an interesting foray into PSS and I am well pleased with the result although I sometimes think I might have bitten off more than I can chew. If you thought 'Blobs' and 'Things' were lively, try this one – I can't take my eyes off it for a



Copies of this plan number MW2438 are available from Radio Control Model World (Plans Service), Traplet House, Severn Drive, Upton upon Severn, Worcs, WR8 0JL. Price £8.50 plus £1.50 p&p.

in the firm's time... I could claim it is in the interests of Flight Safety (?) For other potential enthusiasts of this form of slope soaring there are still many attractive and rarely modelled jet types in the Fleet Air Arm Museum which would make good PSS subjects – Seahawk, Scimitar, (Wessex!) Yes, I really have slope soared a Wessex 5 Helicopter, buy me a beer sometime and I'll tell you where that rather impressive ridge is.

The planform of the Sea Vixen is unmistakable in the air but do bear in mind that it is only 33.5" wingspan and can get small awfully quickly! If I modelled the Vixen again, I would go for one of the brighter scale colour schemes such as the Orange, yellow and black of the Royal Aircraft Establishment aircraft.