ARIES III

1977	*Scottish Nats, % slot*	*1st*
	Scottish Nats, open	*3rd*
	Scottish Soaring Gull	*1st*
1978	*B.A.R.C.S. No. 1 (postal)*	*1st*
	Glencraig, % slot	*1st*
	Blackwood, % slot	*1st*
	Irvine, % slot	*1st*
	B.A.R.C.S. No. 2 (postal)	*1st*
	Blackburn, open	*1st*
	Glencraig, % slot	*2nd*
	Glencraig, % slot	*4th*
	Scottish Nats, % slot	*1st*
	B.A.R.C.S. No. 4 (postal)	*1st*
	B.A.R.C.S. Postal Overall	*1st*
	B.A.R.C.S. Scotland overall	*1st*
	Scottish Soaring Gull	*1st*
1979	*Glencraig, % slot*	*1st*
	Glencraig, open	*1st*
	Montrose, % slot	*1st*
	Blackwood, % slot	*1st*
	Blackburn, open	*1st*
	Glencraig, % slot	*1st*
	Glencraig, % slot	*1st*
	Glencraig, % open	*1st*
	Scottish North Area Thermal	*1st*
	Scottish Soaring Gull	*1st*
	B.A.R.C.S. Scotland Overall	*2nd*

The competition results of the author's Aries Designs are quite impressive. This, his latest design, spans 141 inches and suits 2 to 4 function R/C systems.

by RON RUSSELL

DURING THE summer of 1977 the original ideas for my *Aries* started taking shape, when I decided that the *Cirrus*-type models I had been flying up to this time were not competitive enough for serious competition work. What I wanted was a model that could soar in flat-calm conditions yet, when ballasted up, could be made to penetrate through rough wind conditions and put up reasonable flight-times in the process. I wanted as big a model as was practical, yet was still going to be very easy to handle close to the ground. (Landing bonuses can be very important in competition flying.)

With the above desires in mind, rough sketches were made until a pleasing design layout finally appeared. A polyhedral wing was chosen because of the markedly better handling characteristics this layout has compared with straight dihedral. A flat-bottomed wing section was used with washout built in towards the tips for extra stability. A fairly thick all-flying tail plane with a fully symmetrical section, and an all-flying rudder were chosen. The original sketches were of a pod-and-boom layout but for convenience an epoxy/glass *Super-Alpha* fuselage was used in the first model of this series. The second and third models were pod-and-boom. Releasing hooks were incorporated into all the models, as were airbrakes, which have proved themselves worth their weight in gold on many an occasion.

The culmination of all these ideas, plus any detail changes I chose to carry out for improved reliability and performance, is presented here as *Aries III*.

As anyone who is considering flying this model should be a fairly competent builder, I have not gone into great and lengthy details on the construction of the basic parts. However, where the design differs from the norm a few pointers have been given.

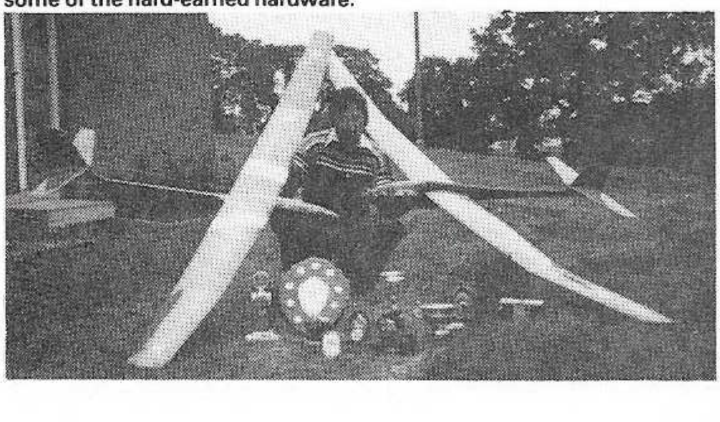
Wings

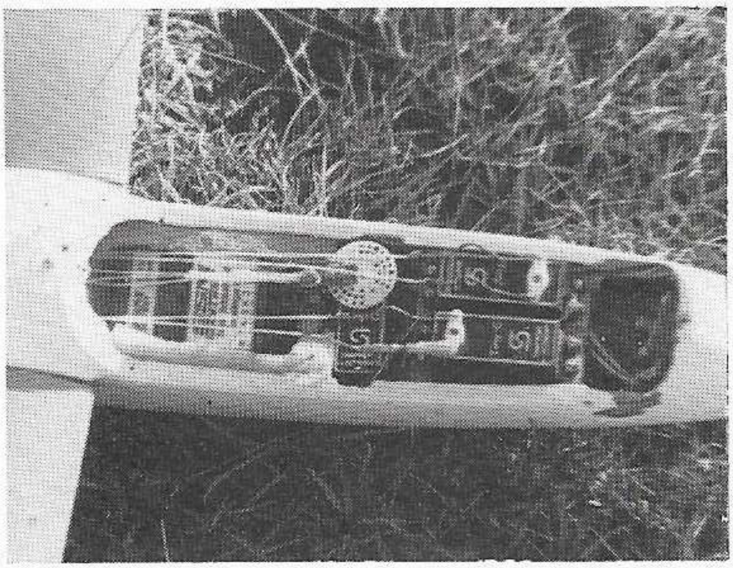
I prefer to start with the wings while I have sufficient excess enthusiasm to build them accurately. The wing ribs are made by the sandwich method. The inner panels are constructed by firstly pinning the leading edges, trailing edges, bottom sheeting and spar to the building board. All the balsa ribs can then be trimmed and glued in position using P.V.A. The balsa/ply sandwich ribs are epoxied into position in two parts, front and rear. The top spruce spar is added next, followed by the false leading edge pieces. As the false leading edge is really there just to support the top sheeting, an alternative method of using a full length strip could be employed.

The airbrakes and their mechanics are next installed so that the 16 g springs hold the brakes closed. The pressure required to open the brakes can be altered by changing the angle of the spring before installation is complete. (A narrower angle of 30 degrees will reduce the pressure, while a wider angle of 50 degrees will increase it.)

The brass rectangular wing joining tubes are now epoxied securely between the spars. The rear tubes and

Heading photo and below, designer/builder Ron shows off the *Aries* and some of the hard-earned hardware.





Close-up of the radio installation. Closed loop linkages are preferred for their light weight and precise movement. Third servo with extension to servo disc operates spoilers and releasable towhook.

plywood wing hook supports are fitted and epoxied into position. The shear webbing is fitted between every rib, leaving only the top sheeting and ply root facing ribs to be added to complete the inner panels.

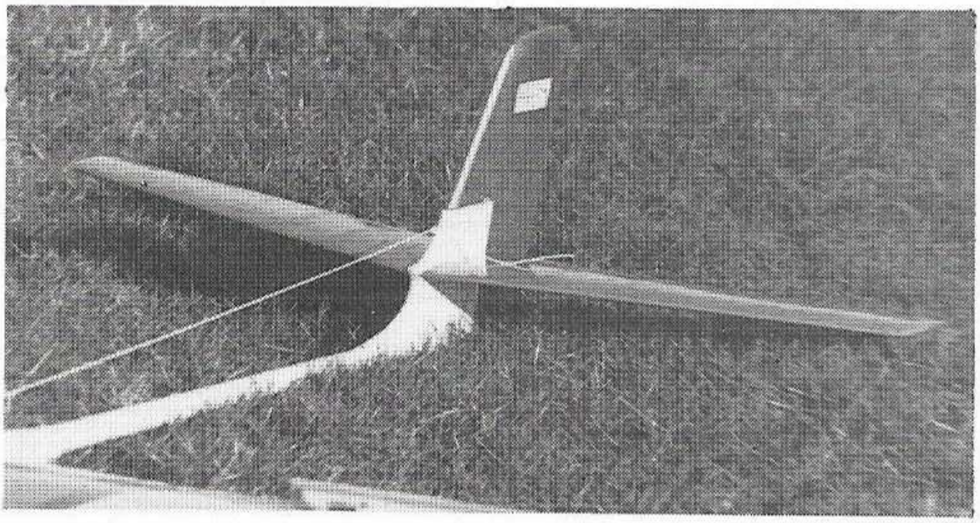
The outer panels are built in the same way, ensuring that the washout is built in by using tapered packing pieces along the trailing edge.

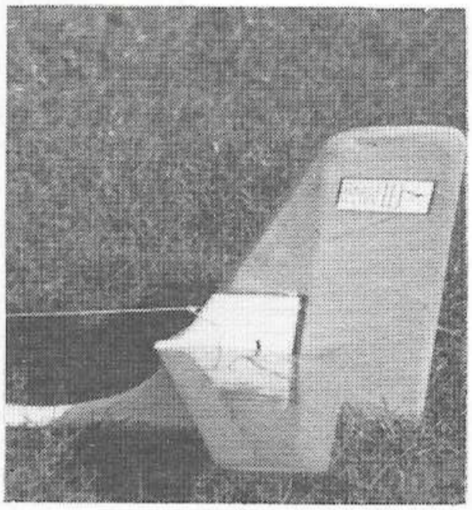
The polyhedral break ribs are chamfered and then the inner and outer panels are butted together with epoxy. If this is done correctly it is unnecessary to fit dihedral braces of any sort.

Tailplane

The construction of this is somewhat different to any of the current trends. It is, however, quite simple and certainly gives an ultra-lightweight rear end to a model. The ribs are made by the sandwich method and are notched to fit the full depth balsa spar. This assembly is then glued to the bottom sheeting with balsa cement. (I would recommend that both halves of the tailplane be built at the same time and supported on blocks so that the tailplane tubes can be fitted accurately and warps are not built in.)

The top sheeting is added next, followed by the leading edge and tips. When the assembly is dry lightly sand to a smooth section. Remember that with 1/32in sheet it is very easy to sand too much wood away, so take care.





Both photos above show the all moving tailplane and all flying rudder in detail.

Fuselage

Being a pod-and-boom layout, some problems came to light with the pod/boom joint, however, no difficulties should arise if the following method of assembly is used:

Make up two fuselage sides complete with plywood doublers, spruce strips and triangular fillets.

Epoxy formers 1, 2 & 4 in position, tack former 3 but do not permanently epoxy it in position as it has to be removed later.

Glue the ½in top rear sheeting in place.

Glue the 3/16in and ¼in bottom front sheeting in place, lightly tacking the rear bottom sheeting.

Carefully rough out the boom exit hole in the rear of the pod until it is just undersize.

Remove former 3.

Attach glasspaper to the *small* end of the **Ronytube** boom. Feed this through the hole in former 4 and into the pod exit hole.

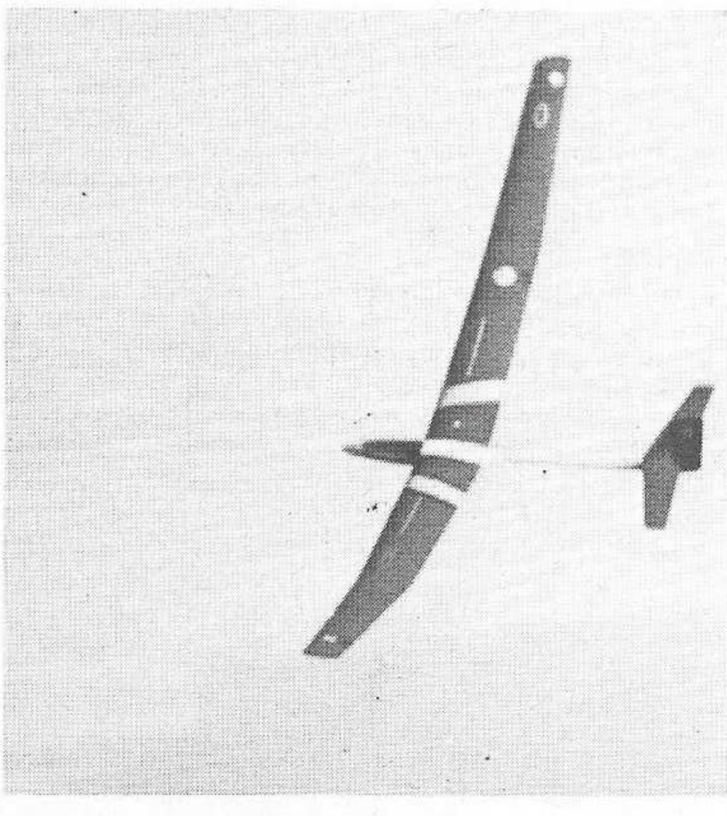
Carefully sand out the exit hole until the boom is a snug fit in the pod.

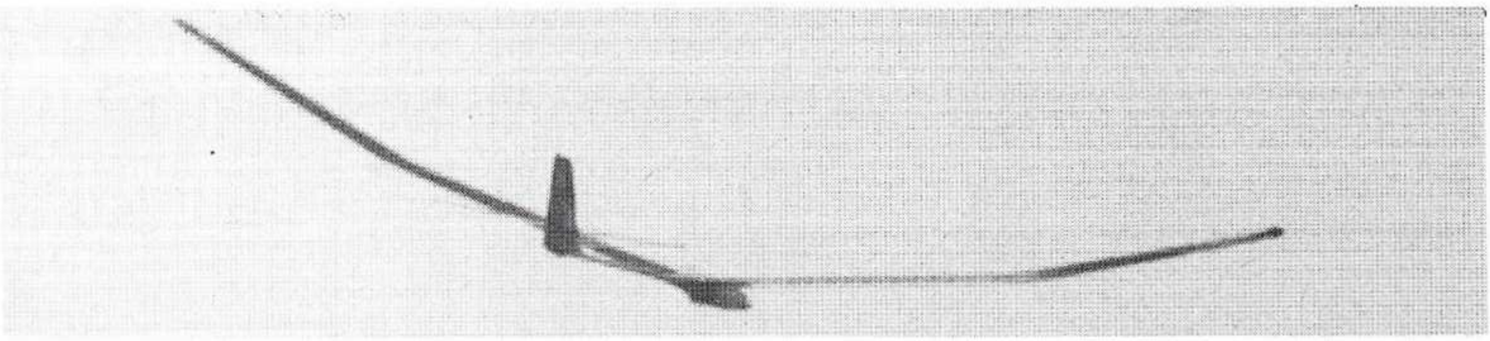
Remove the bottom rear sheeting and securely epoxy the boom to former 4 and the rear of the pod.

Former 3 can now be epoxied in place, ensuring that the brass wing tube is secured accurately in position by the saddle clamps.

The balsa top and bottom fuselage sheeting can now be glued in position.

Below, *Aries* pulls into a tight turn, probably thermal sniffing.





The ¼in balsa and 1/16in ply wing facing ribs can now be fitted, aligning them to the wing tubes.

The balsa fill-ins, wing fairings and noseblock can now be added and when the assembly is dry the complete pod sanded to shape.

The canopy hatch is then cut out, and the canopy attachments fitted inside. The plywood tow-hook mount should be fixed to the inside bottom of the pod with epoxy.

A lightweight glassfibre cloth should be applied to the outside of the pod for added strength.

Tail fin

At the other end of the boom the tail fin is constructed from balsa strip and 1/16in ply sides. The tailplane operating mechanism should be installed during construction. This assembly and underfin should be attached to the boom with 5-minute epoxy. The all-moving part of the fin is constructed in the normal manner from balsa strip and soft block.

Finishing

All the original models were covered with heatshrink film.

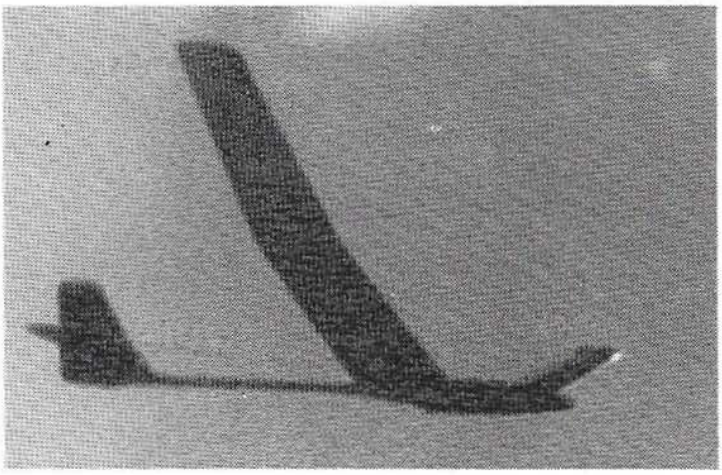
The completed model should weigh around 3½-3¾ lb., giving a basic wing-loading of around 7½ oz/sq. ft. There is sufficient room inside the fuselage to carry up to 2½ lb. of lead, so once you know the model you should be able to cope with any wind conditions that you might meet on the flying field.

Control system

I chose to fit "pull-pull" (closed link) controls for both rudder and elevator mainly because of the accurate response this system gives. It is also the lightest and most versatile system available. I normally use lightweight "laystrate" covered with a thin P.T.F.E. sleeving for the controls. Adjustable connectors are fitted at the servo end of the cables.

Flying

Before you leave for the flying field ensure that the model balances laterally (spanwise) as well as longitudinally, as this can affect the model's trim and performance.



With wing and tail plane incidences as indicated on the plan, and the centre of gravity in the most forward position no difficulty should be encountered with initial trimming. Choose a calm day for the first flights and check the basic trim with a few hand-launches. With the model at head-height run forward and *push* the model straight and level into the air. It should land 50-60 yards ahead of you. Naturally, you should be prepared for the possibility that perhaps you didn't build it quite as true as you'd like to think, so keep your thumb near the transmitter stick.

Once the initial trim is settled, ask your favourite tow-person (well, some of us have keen wives) to give you a gentle tow to the top of your line. The model should climb straight and true, with no veering at all. The one thing you must remember with this model is that there is no flex at all in the wing joiners so the wing itself takes all the strain. I have not overstressed a wing yet and have flown the models in winds from 0-35 m.p.h., and it still comes back for more. With this method of wing joining, full height bungee and tow launches are extremely easy to achieve, simply because the wing cannot overflex with every gust of wind, making the model more efficient and a predictable climb easy to obtain. However, on initial flights, take care.

Aries can be made to turn in nicely banked circles inside thermals and has several flights of over one hour to its credit. Near the ground it is still very easy to control and, with the use of airbrakes, it can be landed on the proverbial sixpence.

During the initial flights you may find that the model does not respond as quickly as you would like, so try adjusting the C.G. position within the indicated limits until you get it right for yourself.

My own models are trimmed so that the rudder moves approx. 2¼in in each direction and the elevator moves 9/16in up and 7/16in down. The measurements are taken at the trailing edges of the surfaces. With this amount of movement loops, stall turns and barrel-rolls are possible. The barrel-rolls look ridiculous but at least the wings can take it. I have never been able to make the model spin properly: it just falls into a tight spiral dive which can be easily recovered from. The model can be brought down from the top of the line in under 60 seconds by using full airbrakes and a tight spiral dive. This is handy in % slot competitions or just for getting out of one of those boomers you always seem to find on non-competition days. It is not as twitchy a model to fly as it might seem from the above, the thick, symmetrical tailplane section gives the model a very soft response around neutral but still plenty of power from the larger control movements sometimes required.

Well, that's about it. If the appearance of *Aries III* suits you, and the results list has impressed you enough to buy the plan, then I wish you all the success possible with the design. The model itself is a contest-winner, the rest is up to you . . .