



**Jim Mosley from
Ontario based this
model on a design
first published in 1969**

Druid owes its name to the fact it is based on an unnamed A/1 design by Elton Drew published in the July 1967 Northern Area News. The new ID of this Drew design is thus in recognition of its origins i.e. Drew-ID = Druid.

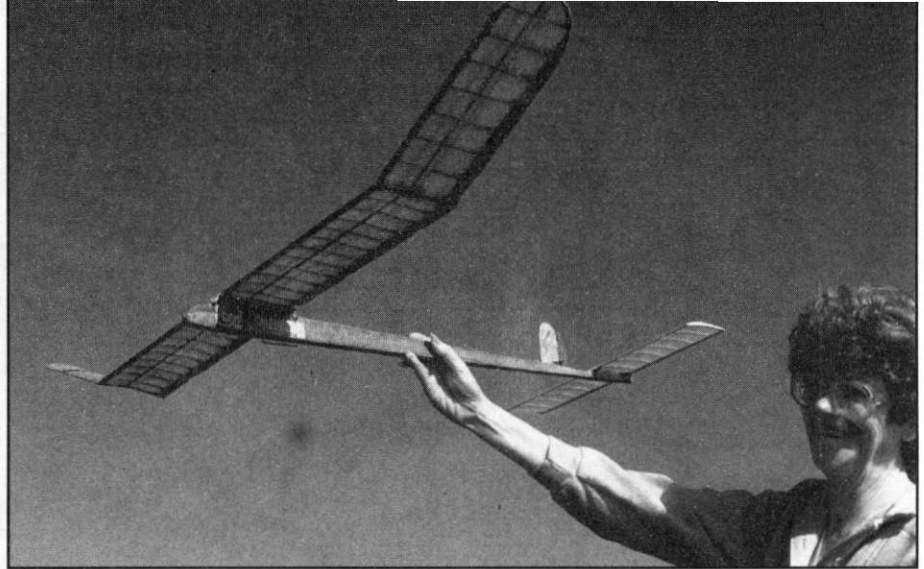
Two replicas of Elton's design were built and proved to be excellent gliders though ultimately suffering wing failure under tow. A completely new one piece wing was then built, of slightly higher aspect ratio and incorporating the airfoil from a Wichita 8 A/2 which was flying well for me at the time. This revised A/1 proved to be an immediate success with better performance coupled with exceptional towline stability. The design has since remained proportionally unchanged over the years other than a small increase of fin area; indeed one of the original 1967 fuselages is still in use though sadly faded and somewhat worn.

Minor structural changes have been made in that external ply doublers have been added to the fuselage nose to prevent breakage at the timer aperture, which are not unsightly when chamfered to blend to the fuselage side and perhaps incorporated as part of the colour scheme as indicated in a photograph. Stabiliser spars have been repositioned to reduce upward bowing of this unit. In recent versions the lower centre panel spar has been reduced from 3/16" square spruce to 1/8" x 3/16" as some airfoil distortion at the spar location was noticed when wings were several years old (though no difference in performance or handling was noted) and this appears to be adequately strong. The next version will have carbon fibre added to this spar to further increase the bending strength of the wing.

The outcome is an attractive easy-to-build and easy-to-fly A/1, well within the ability of a relative beginner and which can hold its own with any of its class.

Wing

I prefer to start any new model by building and fully finishing the flying surfaces to give them time to begin ageing whilst the rest of the structure is assembled. An accurate plywood rib template is essential and should be identified and stored for future use. (I'm still using a 24-yr-old template). Prepare the requisite number of ribs from medium-grade 1/16" balsa using the template. Spar slots may be incorporated but I prefer to slot spars into the structure once the ribs are cemented into the LE and TE structure. The trailing edge is carved from a 9/16 wide strip from firm 1/8" stock. I find it better to first cut a 1" strip from which I then re-cut the 9/16" TE with a good metal straightedge as guide. If the TE is cut



Jim's wife Janet holds aloft a Druid which was lost in a bean field for three months. Although the wing was new, the fuselage is the original one from 1967 with which Jim got into our Nats fly-off.

DRUID

directly from the sheet I find that stress relief in the wood can result in a strip that is far from straight.

The front edge of the TE should be packed up with scraps of 1/16" to conform to the undercamber, and the rear edge of the LE similarly packed with 1/32. Cement all centre section ribs into place except those at the dihedral joint, and add 1/16" gussets to the TE. A chore, but they add immeasurably to the eventual strength and warp resistance of the wing.

Dihedral joint ribs are installed with the aid of the template, the top of the rib thus sloping towards the centre. Two upper spars of 1/8" sq. spruce may now be slotted, or dropped, into place depending upon how you chose to cut your rib template. If slotting in, a metal straightedge and a new razorblade are required, with due care not to cut deeper than necessary and thus weaken the rib. When all is thoroughly dry remove the panel from the board, invert it and carefully add the lower spruce spar. Balsa cement is not recommended for these spruce/balsa joints, a slower drying PVA being far more preferable. The LE may be carved to section and the spar ends carefully trimmed to conform to the slanted end ribs.

Tip panels are built similarly though slightly lighter stock may be used for ribs and LE/TE than in the centre panel. After pinning down the LE and TE with appropriate packing, laminate the tips into place. This may be done around a wall of pins or against a foam or cardboard inner former. There is no need to soak strips of 1/32 as PVA - or balsa cement if you work quickly - softens them sufficiently. A set can be put together and then carefully eased around the form until they can be secured to the LE and TE and left to dry out thoroughly. During this time ribs may be added with the end ribs slanted as before, and 1/8" sq balsa spars added to the upper surface and blended to the curved tip. When all is quite dry, and add the lower 1/8" spar and finally trim tip laminations to a suitable smooth shape.

The completed tips may now be butt jointed to the centre panel, which should now provide 5" tip dihedral, and gussets added to spar/rib

joints as indicated. This structure allows a tip to break off cleanly in circumstances that could render substantial spar damage to a wing assembled in the accepted manner with ply dihedral keeper. I have used this system for many years on all kinds of models including .40 power duration types without any problem but it is a matter of choice. Add ply braces if that is your preferred method.

The centre panel of the wing is covered with heavyweight Modelspan, or equivalent, and the tips with lightweight, water shrunk and given as many coats of 50/50 dope/thinners as is required to fill all pores in the tissue. Five or six coats is the norm but much depends upon type and grade of tissue. The centre section should then be left pinned to the building board for as long a period as possible. It actually takes several weeks for dope to fully 'gas off' and unpinning early increases the risk of warps occurring. The tips are fairly warp-resistant but keep an eye on them and steam out any warps that might occur other than slight washout at the extreme tip, which is desirable.

Stabiliser

The stabiliser is a very simple affair with ribs cut from light, firm 1/32 sheet, with exception of medium 1/16" end ribs and a harder 1/16" rib at the centre. All ribs are slotted 1/32" into the TE which is packed up 1/32 to conform to the section. Add hard 1/16" sq. spars, gussets and the 20swg hook epoxied to the centre rib and the stab is ready for careful sanding and covering with Japanese tissue. Several coats of well-thinned dope after water shrinking and the stab should again be left pinned down to a flat surface for an extended period.

Fuselage

The basic fuselage builds fast - I have used PVA for this structure because of the convenience of its slower drying properties but it seems feasible that cyano could be utilised to enable faster construction. By means of a straightedge, the rib template and a few simple measurements, a fuselage side can be quickly drawn on a sheet of medium 3/32" balsa. However, it should be cut from the sheet approx

1/4" oversize top and bottom, allowed to rest awhile while stresses are relieved and then cut to accurate size and used as a template to produce a duplicate from a similarly aged blank.

Pin down a side and add the 3/8 x 1/8" medium/hard longerons and insert the spacers. These may be from much lighter material aft of the wing. When the lower doubler is in place pierce the longeron assembly at the towhook position, insert the 18swg towhook and press the forward point into the doubler. Add a suitably shaped piece of 1/8 X 3/16" to secure it and liberally coat the area with five-minute epoxy. Ensure that the hook is accurately placed as experience with many models has shown this to be the optimum position. The final rearward bend is made with a pair of fine nosed pliers when the structure is finally removed from the board.

The upper fuselage side may now be cemented into place and the whole left to dry for at least 24 hours. Lift from the board, trim edges and add 1/32" ply doublers to each side of the nose, chamfering the rear of each to a feather edge. The timer aperture may be cut out of the port doubler at this stage if desired.

Round off the fuselage corners at the nose and sandpaper smooth the entire fuselage. The fin and rudder are cut from medium 3/32", the rudder tapered and sewn into position a 1/16" ply rudder horn inserted. Add wing dowels, wing and stab mounts, and the fuselage is then ready for covering with lightweight tissue, doped on and given a further three or four coats of thinned dope. If possible the major part, between wing and stab mounts, should be weighted down on a suitable surface for an extended period.

D/T and autorudder

All that remains is to add a D/T timer, D/T and autorudder lines and ballast. The timer may be screwed into place though I prefer a tight fit into the aperture so being easy and quick to remove on the field if attention or replacement is required. The monofilament d/t line should be run through small gauge aluminum tubes as indicated, the one immediately under the LE of the stab being necessary to prevent the stab mounting bands trapping the line and so preventing d/t function.

A 6BA washer should be attached to the front of the monofilament so that, when in contact with the front aluminum tube, the stab is limited to approx 50 degree tip angle. When hooked to the timer arm the trailing edge of the stab must be firmly held on it's mount. Some slight stretch in the monofilament is helpful in this respect.

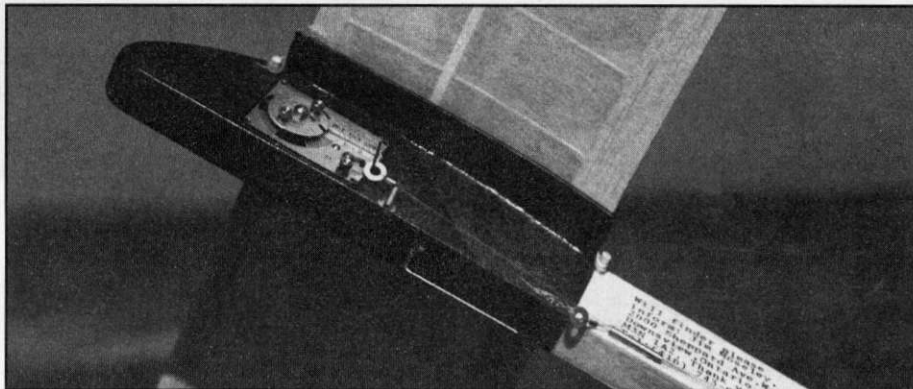
An autorudder line also runs through the front tube, again terminating in a washer. There are varied methods of operating autorudders when the model is released from the towline, and of activating D/T timers. I prefer a simple method whereby a pin from the towline ring slips through a short, angled, brass tube on the fuselage side and retains the a/r line washer. As the model is released the pin pulls free and the rudder moves to the glide position.

Similarly a length of relatively thick monofilament is inserted through the timer switch aperture once the timer has been set to the desired time and switched "ON"; the monofilament neatly jams the clockwork mechanism but pulls free on launch allowing the timer to run normally. Though sounding much like a 'Heath Robinson' arrangement I have used this simple system for many years and lost only two gliders to timer failure in that time - and with some doubt as to whether the timer was actually switched on at all on one of those occasions - so its reliability is proved and simplicity is its virtue.

Add autorudder stops, either a simple length



Druids old and new. Immediately after taking this picture the posh one was lost in a forest. Back to the building board Jim!



A close-up of the nose shows the timer set-up and an address label that did not help much this time. Careful feathering of the external doublers makes them blend in neatly and simply.

of thin ply with balsa pads to limit rudder movement or, for more accuracy in adjustment, thin aluminum angles tapped to take very small nylon screws.

Fully assemble the model with timer in place, etc. and add ballast to the nose so that the model balances approximately 1/8" aft of the indicated position. The short nose accommodates quite a lot of lead, which may be in the form of fine lead shot inserted through an aperture immediately ahead of the wingmount. I prefer to pour small amounts of molten lead into the dampened nose, quenching same under a running tap, until the required amount is in place. This procedure is potentially hazardous and care should be taken. Eye protection is a wise precaution.

Flying

At last... flying the glider! In a very light breeze, hand glide the model over soft grass and a slight stall should be apparent which may be corrected by adding necessary rudder to give a gentle turn. Now, attempt a tow on a full length 164' line; ideally Druid should climb to the top of the line and 'kite' until launched. If the model weaves slightly from side to side add a slight amount of extra ballast to the nose to correct the problem; alternatively if the model pulls consistently to one side, check again for warps and if all is true adjust with rudder deflection to straighten the tow. A severe pull to one side is unlikely but should this occur and the glider assume a diving position, remove ballast and retrim the glide with reduced wing incidence.

When satisfied with the towline behaviour, watch the glide carefully and fine tune same with wing or stab incidence adjustments. Ideal

trim is a gentle circle very close to the stall. In a thermal the circle will tighten up a little without any tendency to spiral down although at times a marked banking attitude may be observed.

Never tow up your Druid without activating the D/T timer! It can thermal in the lightest of air and at the most unlikely times of day. When satisfied with the tow and the glide, PRACTICE! Become thoroughly familiar with the behaviour and feel of the airplane on the towline in varying wind-conditions (the wings can take a lot of abuse, by the way, but don't overdo it...) until you are confident enough to be able to let it 'kite' up there behind you without observation whilst you wander gently forward or even stand at one spot, judging the model's position by the feel of the line and taking the opportunity to watch other models or birds thermalling or to await the positive feel of Druid accelerating to the top of the line in a thermal. Five or six feet of slack line between the hands is useful to assist in release in a strong thermal.

Take the trimmed model home and weigh it. It will probably require extra ballast to bring it up to the required FAI weight of 220gr. This should be added through a hole bored through the wingrest and upper longeron exactly at the finalised CG position, with cement poured in to secure it firmly into place.

Druid has flown well at all the various FAI weights imposed over the years and, for that matter, excels as a lightweight for pleasure flying or for Open Glider work. The choice is yours... but do put your name, address and 'phone number on it and do use the D/T at all times, otherwise you'll be picking up that rib template and starting over once more long before you anticipated....