Alley Cat

YOUR FULL-SIZE SPORTS AEROBAT

38 inches of spitting fury for .10 to .20 engines, designed by Harry W. Gilkes

'Alley Cat' will hapilly accept two-stroke power units in the .10 to .20 range; you'll have fun with the former, white knuckled excitement with the latter!

Why 'Alley Cat'?

Well, an alley cat, the feline type, is usually a tough little character who will take on anyone who ventures into its territory. That description fits this 38in package of balsa, film and radio gear – especially with an OS15 FP (ABC) up front. Then it will challenge – and most times 'see off' – your average Club 40 sports model, both in speed and its aerobatic capability.

History

Over many years of building and designing for R/C I have always been intrigued by the challenge of producing a really good small model. This has resulted in a few what might be termed 'average' aircraft, a couple or so of what I call good designs, and quite a few of "well it flies" packages.

Over the years the improvement by lower weight and smaller size of general R/C equipment, together with lighter overall finishing techniques (Solarfilm, etc.), and vast improvements in small engine performances have, in all, given a far better base formula to work from. With regard to modern power units, I have also had satisfactory and promising results using the new generation small four-strokes in 38-40in aerobatic models – but that's another story for a later date (sez he – twisting the Editor's arm).

Despite the improvements in equipment we still had the design task of holding the engine, R/C gear, etc., together, and defying gravity – in other words, the airframe. After many spare moments at work and home, doodling outlines, packages, structures, and pushing calculator keys, the concept of the 'Alley Cat' family was born; the requirement being to provide a modern day 'Ugly Stik' concept of fun aeroplane. I also decided to utilise to the full, standard 36in wood lengths (who said, but it's 38in? – read on non-believer); a one piece airframe for both maximum space package to bury the gear, etc., also accurate line up and strength/weight ratio. (Fingers crossed, my calculations would be right!).

With recent reductions in servo costs, the use of mini servos is not as prohibitive as a few years ago, so the formula arrived at really requires at least one mini for full house; two is better, but the combinations of radio and power variations are many, and indeed suit all pockets. However, the airframe construction is not relative to number or type of servo used, so let's get on with the "wood chopping".

Construction

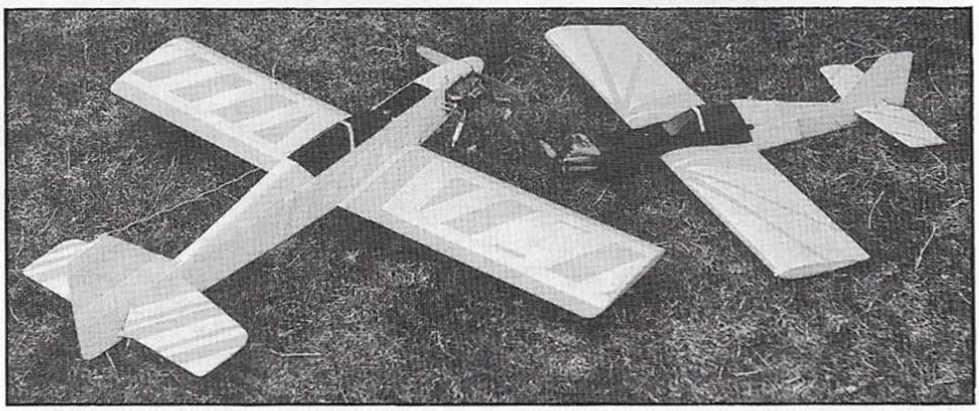
First step is to make two templates – one of the full wing section outline. This can be cut from card, and the usual 1/16 ply template for wing ribs (there are only 16!). Pin all blanks together, sand and razor saw cut half depth spar slot. Kit the remaining wing parts to sizes on plan and commence the wing build.

First pin down bottom 1/16 trailing edge (T.E.), add 1/8sq; next, white glue ribs on spar (slot in spar at top) and glue/pin in position on T.E. The rear of wing section is straight so all that is needed is a packing jig under the front of ribs – I use an old piece of T.E. section.

Now add leading edge (L.E.) and L.E. sheet and also top T.E. sheet, together with capping strips (Note: cut out over R1 ribs of L.E. sheet). When dry, turn over – rejig and add remaining L.E./T.E. sheeting, capping strips, and (bottom) centre section sheet. The 1/8 tip can also be added at this stage; by the way, don't forget the 1/8 gussets. At all times check for warps, keep jigged and weighted down well whilst drying. Repeat for other wing; try to make one left and one right – it does fly better with only one of each!

Now to joining the wings; carefully razor saw away the two inner ribs to fit wing joiner - allow a wide enough slot to make sure you don't wipe off the adhesive when fitting joiner.

With the wing panels pinned down – note dihedral – and carefully jigged, fit the pre-laminated wing joiner, rear hardwood sub



'Alley Cat' (in the background) alongside its big brother 'Street Cat', another Gilkes design, for .40 to .45 engines; look out for RM plans for the latter soon.

spar/servo mount, and also L.E. joiner. NOTE: USE SLOW DRYING EPOXY FOR THIS STAGE. Before fitting top centre section sheeting, epoxy fillet all joiners to ribs, etc. CHECK FREQUENTLY THAT THE PANELS ARE IN LINE AND KEEP PINNED DOWN AND JIGGED UNTIL COMPLETELY DRY.

To complete the wing, remove from board, fit aileron horn assemblies – note 90° movement required – add centre T.E. section, sand to section. All that is now needed is to add the 2in bandage around the root of each panel. DO NOT, repeat, DO NOT, OMIT.

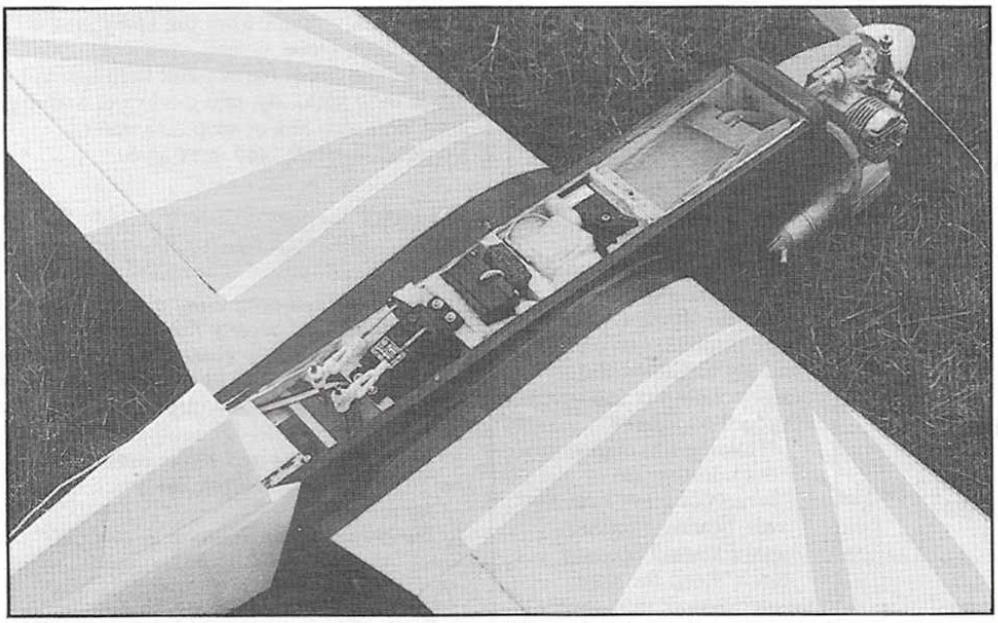
While the wing is drying out at its various stages the tail feathers can be made; also the ailerons which are made from stock 1/4 x 1in T.E. and 1/8 sheet cap, and the fuselage/"cockpit cover" kitted.

The fuselage

The fuselage has been designed to enable accurate line-up to be obtained, by making the top edge straight to become the datum. So start by cutting the top edge with a straight edge and clearly mark the wing centre line (extend this line one inch over length at both ends) to dimensions shown in plan. THIS IS IMPORTANT TO OBTAIN THE CORRECT ANGLE OF ATTACK.

Now comes what might be called the 'tricky bit'. The joining of wing and fuselage. Take the completed wing, MARK ON THE CENTRE LINE OF SECTION ON L.E. ROOT AREA: carefully slide the fuselage assembly over wing, rotating the aileron wire forward to pass through opening, and line up wing datum on sides with T.E., and centre line on L.E. by local scrap balsa shims in gap around wing root. When you are sure you have wing/fuselage lined up at 90° (IN ALL VIEWS) use instant or 5mm epoxy to fix shims. Double check the assembly by usual diagonal checks from wing tips to nose and tail, and set squares. When you are happy with accuracy, fill the gap with epoxy and scrap balsa (messy bit, this stage), and fillet with epoxy on inside all round. Keep the outside join clean at this time.

Now cut ply outside doublers over size and again, using card template, cut out wing opening: slide over wing and mark fuselage outline. After trimming to size fit to sides – I use aliphatic for this – by pinning and Sellotaping in position. Complete wing/fuselage assembly by adding bottom sheeting and ply, not forgetting to epoxy fillet the outside joint. When dry, the top temporary cross pieces can be removed. The whole airframe and components can now be sanded to shape and prepared for covering.



R/C can be two, three or four channels – but you'll need mini gear for 'full-house'.

(Contrary to belief in some circles, wings do not work at 0° angle of attack!). After cutting sides to shape, mark wing section outline with the card template mentioned earlier cut out wing opening with approx 1.1/2mm clearance (1/16in). Now complete side assembly by adding tail doublers, balsa and spruce strip, etc; as usual, make sure you have one left and one right hand; that the tail slot is parallel to datum and the front edge (F1) is at 89° to top. The fuselage can now be assembled in the normal manner, but DO NOT FIT ANY BOTTOM SHEETING BETWEEN F1 and F3. The detachable part of top decking can be spot glued in place. Sand top, front, and 'cockpit cover' to shape; don't forget fairing pieces around engine mounting position.

Finishing

The prototype 'Alley Cats' have been finished in Solartex on body and wing roots – after Balsalocking, and the remainder of airframe covered with Solospan. The fuselages have then either been covered (2nd layer) with Solarspan or Solarfilm over Solartex areas, or doped and painted. Protect engine/tank bay areas, etc. with a sealing coat of dope or matt polyurethane and final coat of hot proofer as required, inside and out. Finally, hinge with mylar or mini pinned hinges.

Radio installation/channels?

The radio installation applies to two, three or four channel versions – it is up to you and the equipment available. A few suggestions of versions may be of assistance now you have your airframe ready for installation stage. If you wish to go for the full house/maximum potential, you really need two mini servos to keep the weight down to around 2.1/4lbs.

If your choice is two (aileron/elevator) or three channel then there is no real problem, especially if you use the 'Cat' as a pylon race trainer or club 'one off' competition model. In two channel mode you can use the non-inverted feed type tank system. However in all versions I recommend you use a minimum 500 size battery pack, i.e. the type covered with heat shrink (or make your own by using tagged cells soldered together and wrapped with magic tape or Sellotape); seal joints in tape with polyurethane.

One point to remember: make switch flush with side – no switching off on launch!

Power units and things

The prototypes have all used the OS15 FP ABC motors, initial test flights using 8 x 4/8 x 5 props and then changing to a 7 x 6 Graupner (I am getting 1300+ with electronic counter on 5% nitro!). Tanks used have been 4oz. SLEC.

Setting up and flying

All protos have balanced at point shown with either three standard + one mini or two + two minis; weights have been a maximum of 2.1/2lbs. Throws at low settings of Tx are recommended at:

Elevator:	5/16" down 1/4" up
Rudder:	3/4-7/8" each way
Ailerons:	3/16" down 1/4" up
Throttle:	Set to cut on "back trim"
Thrust line at	1-2° down and right

These settings will give you very smooth and crisp handling.

Now comes the 'really enjoyable part' – leaving terra firma. For first flights I recommend you use an 8 x 4/5 prop, hand launch on 2/3 throttle only, with nose slightly down. The 'Cat' will (providing you have built it accurately) go away level, with a slight kick of the tail to right (torque, mate!).

Let it settle down for 150ft or so and then open the throttle – Bingo, you're away! The only limit with this model – especially if full house – is your prowess on the stick and eye sight. Be warned, it covers the ground (or should we say 'air space') at a very quick rate – especially on a 7 x 6. Have fun; it will knife edge and four point with the best, and on full throws, goes crazy on those 'sticks in the opposite corners' manoeuvres. Recovery is instant, so make sure it is the right way up, i.e. its claws are at the bottom!

So fellow aeronutters here it is, my 'Alley Cat'; it's fast, it's fun and unlike many small models, it is very groovy and precise. Hope you like it. Oh, by the way, it's got one hell of a glide – be warned – and it will fly slow – really slow. Happy landings!

Footnote: There are obviously many combinations you can adopt the Cat to: from .10 2/3 channel to screaming 20 projectile. Let's hear about your version via the editor. REMEMBER – FLY SAFELY!