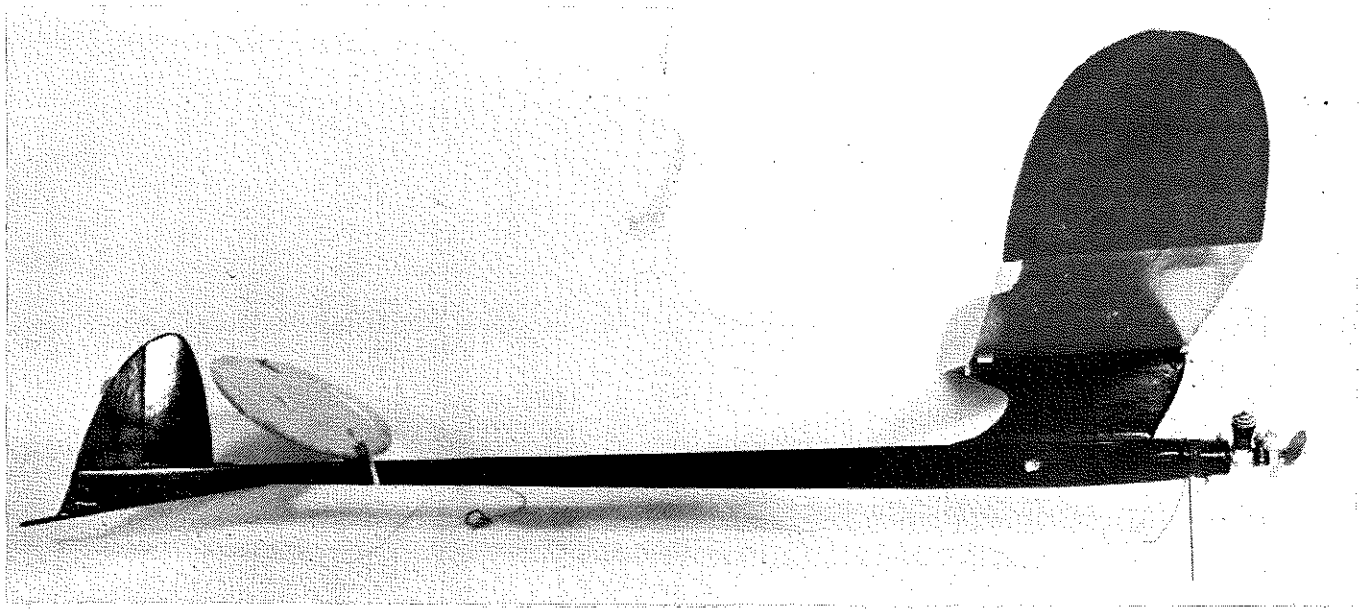

FIREDRAKE 1/2A

By LARRY SICURANZA

A triple-threat design to consider in your search for the ultimate Half-A . . . it climbs, glides, and penetrates.

• Firedrake is one answer (mine!) to a knotty problem. The problem is double-category 1/2A competition.

Unlike their bigger brethren, 1/2A's don't fly too well to begin with, and current designs tend to emphasize either climb or glide. The results are 200 inch bombs that climb like balsa prices and glide like anvils, or 350 inch overcasts that will do 7 minutes from an altitude of 63 feet. They will also, exhibiting all the penetration of an overcooked artichoke, drift out of sight in 2 minutes and 49 seconds. Considering that a pair of each is needed for a busy season, you'll see why I view 1/2A competition as a problem . . . if not a four-star pain. I also view it as a helluva lot of fun, what with relatively inexpensive planes and hordes of flyers.

The logical step, then, is to try to design a ship that can climb, glide and penetrate. All three, not the best two of! Firedrake (a kind of little dragon) does the job. He doesn't have a terrifying contest record, because he's fresh-hatched, but four other flyers have the plans, so time, as always, will tell. The kit that is in planning will also help in this regard. Seems the chugbugs that win the most come out of boxes, so watch the Digest.

Design philosophy is not so simple as you might think, since 1/2A's are not visions of efficiency, due to their size. Scaling down bigger birds often results in mini-duds, so Firedrake started life as what he is. I call it 'he' because it is no lady. He'll bust you in the ear quick as a wink if you don't pay attention. As far as numbers are concerned, the aspect ratio is set at 7 plus to allow some airfoil efficiency. Foil thickness is near 11% for the same reason. Reynolds number is not found only on boxes of aluminum wrap! Incidence is low, as is stab area, but it's placed way back. That's why no down-thrust is needed. Aft fin is used because it looks better than underslung and is less likely to be damaged, being light and built-up. The fin is thick to allow for better alignment and less critical tab adjustment. CG position is moderate (75%-80%), and tail moment is long. Left thrust is required for VTO stability, and wash-in is used in the right main wing panel to keep it up in the power phase. Parabolic surfaces are used because of their warp resistance, their ease of plotting, and their extra 5% of area over an equivalent ellipse. Also I think they're pretty. I like to cant the engine to keep exhaust glop off the timer(s) and/or fuse. The big pylon makes a nifty baffle. Finally, a pressurized fuel system is pretty well necessary for consistency.

Construction is very simple, since it's lifted off Tom Hutchinson and salted with Satellite dust! It's best to build the flying surfaces first as they can stay pinned down for a couple of days. That's right . . . days! I like pretzels too, but to chomp, not fly. Since this is not a beginner's bird, I'll only bore you with the fussy stuff.

The stab should be built using epoxy for light weight and high strength. A little dab'll do ya. The turbulator spar notches are cut after the ribs and top spar are fitted. Let the completed structure dry pinned down for at least 24 hours. The diagonals are optional, I dry (don't install dihedral break ribs yet). On the right main panel, remove the pins from the leading edge, except for one at the root. Block up the leading edge at the tip dihedral break 3/16 inch, and slip a 3/32 shim under the leading edge at the mid-point. Now pin the leading edge down against the shims, install upper main spar and fit and glue the diagonal ribs. On the tip panels, unpin the trailing edge, except at the inboard end, and shim up 3/32 at the point indicated. Pin at this point and finish assembly. When all panels have dried at least 24 hours, remove and trim spar ends to dihedral angle. Fit dihedral ribs and epoxy panels together, blocked to correct angle. Again, let set as long as possible. When thoroughly dry, remove and epoxy in gussets. If you fly over hard ground, a piece of 1/32 ply backing up the top main spar at the center dihedral break will help absorb DT shock. Finally, install turbulator spars and hold-down rubber braces. Carve and sand leading edge and tips and apply two coats of unthinned dope to the edges.

The fuselage is of the familiar profile type, but is deeper than average because the greater cross-section is more warp-resistant. The little beast is looong. The nose length and shape depends on the type of mount used. Use epoxy to install the pylon and laminated firewalls. Sand in at least 1° of left thrust before installing firewall. Epoxy a bit of 1/2 inch nylon or fiberglass tape around the firewall and cheek fronts. Once again, leave the structure pinned down for at least 24 hours, especially if white glue is used.

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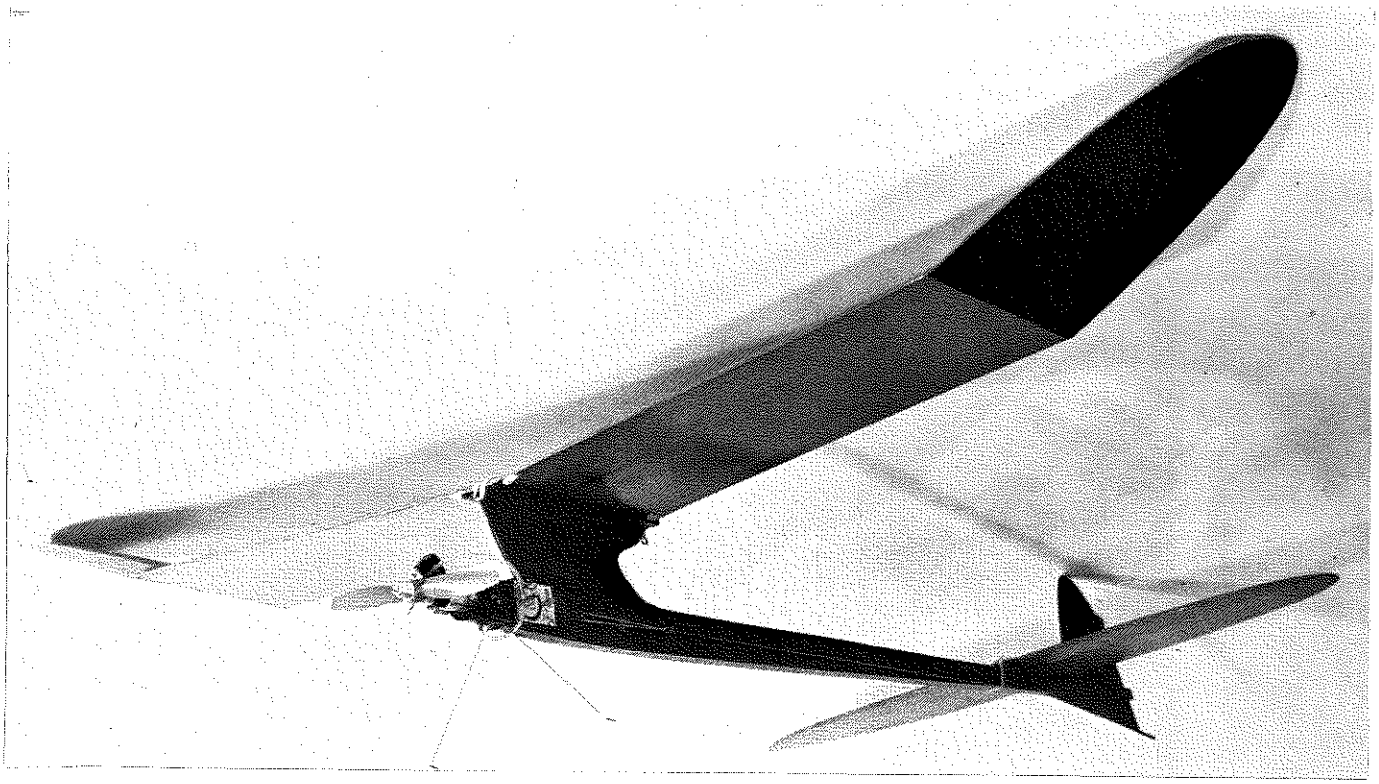

When enclosed, it dries very slowly. When dry, add the wing and stab mounts and sand. Epoxy hooks in place and drill holes for DT line-guide eyelet and snuffer tube, if applicable. Finish fuselage by covering with tissue and doping generously. Nose should be epoxy painted to an inch or so aft of the pylon. Dope just won't stop 50% nitro. Cover wing, stab and fin with tissue and apply five or six coats of thinned dope. The last two coats should be plasticized. Now check fuselage for straightness and mount fin in line with the pylon. The thick fin will allow for some bend in the fuselage, but the less the better.

A pressurized engine should be used for top performance. Pitch and balance the prop and buy or mix 50% to 60% nitro fuel with 15% to 17% oil. If you normally use a starter, fit the ship with a pacifier tank. The pacifier can be placed to balance the bird by using water to simulate residual fuel. Or use the engine tap to pressurize a TD tank (mount). Assemble the heap and balance within an 1/8 inch of indicated CG.

Preflight checks at home will save a short day at the field, not to mention your nerves and the little dragon. From the nose back; check for left thrust (some) and down thrust (none). Wing is keyed at 90° to fuselage. Just visible washout in both tips, quite visible washin in right main, flat left main. Flat stab tilted parallel with left main panel. Due to wash-in and left tab, he wants to glide left. Since transition is quite good, I let him. You can force him to turn right, but when he encounters lift he may (and has!) reverse and turn left anyway! Rudder tab a good 1/16 left. It seems a lot but isn't, what with the thick fin. Check timer and DT action, and off to the field.

Hand glide, looking for a very flat glide with a trace of left turn. Adjust glide with nose or tail ballast and stab tilt *only*. No incidence changes were necessary on the original.

Now take a breath and light-off the engine as near full power as you dare. Set the timer for 4 seconds, no more. At this point we aren't worried about transition or the glide. Use a short fuse in case the glide is stally. Point the nose up at about 60° and just let go. It'll go up and right, never fear, but watch how much right. If it starts turning very soon, you need more left thrust. If it moves out in a smooth arc and starts to tighten up at cut off, more left tab is indicated.

Increase engine run in 1 to 2 second increments. Once past 6 seconds or so, the transition will improve. Watch for the right wing dropping and correct with trailing edge shims under the right main panel. Firedrake should make about 1 turn in 10 seconds, transition with no stall, and glide left in 40 to 50 second circles. Treat him with respect and he'll chomp the competition.

HE'S A DRAGON. ●