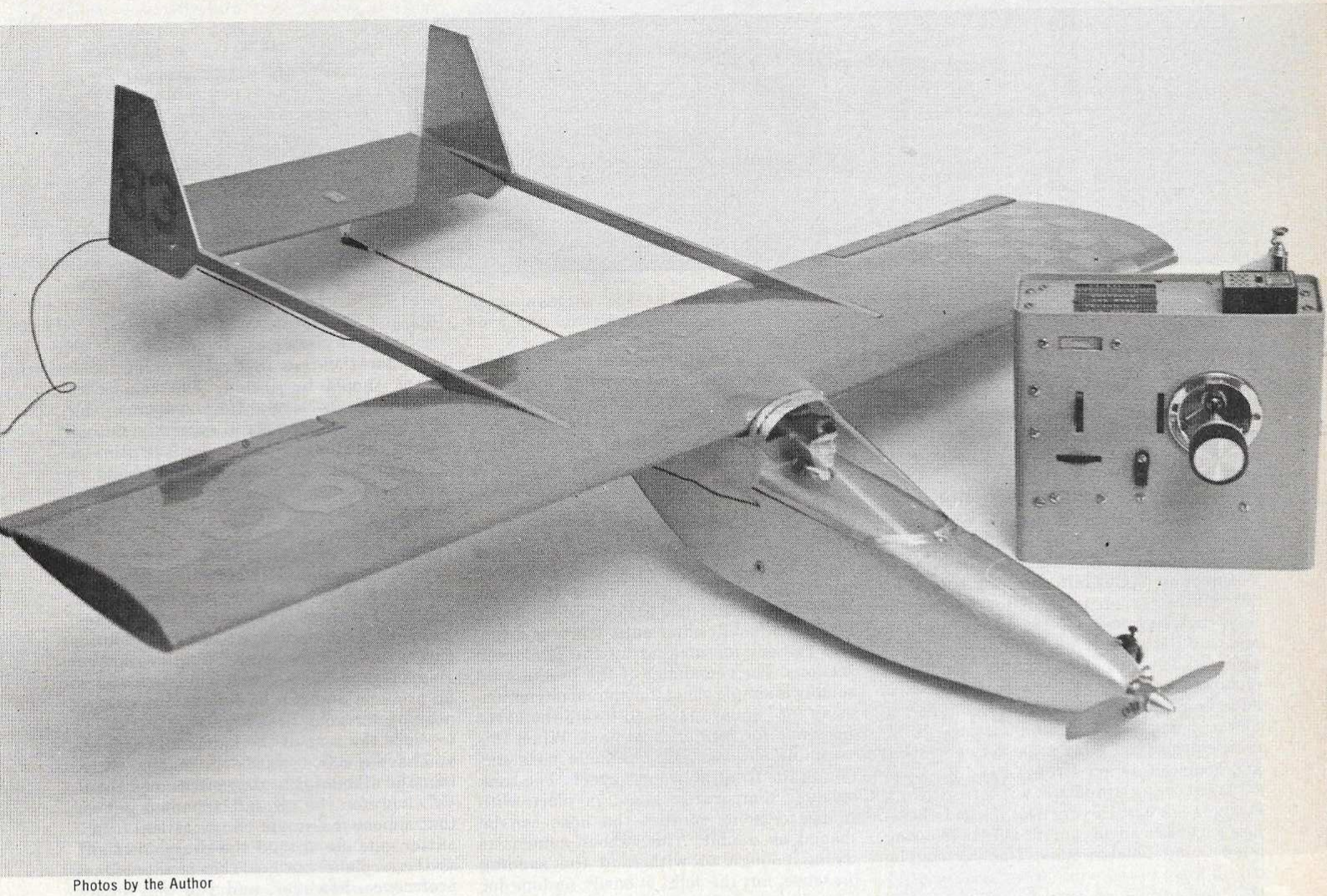
Race the "LIT Special"

by V.A. Caluori



Photos by the Author

This 1/2A Pylon Racer is light and tight with twin booms and even a pop-in/pop-out flying stabilator.

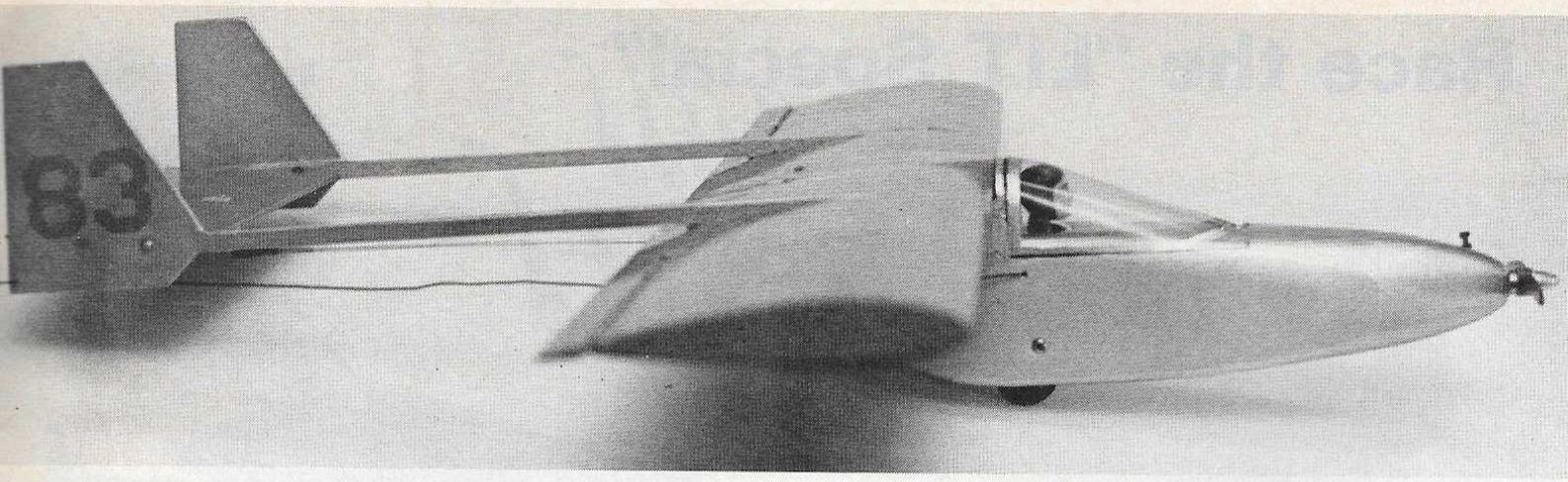
The original "*LIT Special*," designed and built during the heyday of the Goodyear event, was one of those airplanes that should have conquered the world, but didn't. Like many other aircraft of unusual, but attractive (if unproven) aerodynamic configuration—the *Northrup* flying wings, the Curtiss *XP-54* (a twin boom pusher with ducted wing)—the "*LIT Special*" no doubt suffered the pains of "new ground breaking." Look up a photo of the above aircraft; they are all beautiful but never went past the prototype stage. Unfortunately, it seems that the really "good" airplanes are the culmination of a long and proven series of refinements. It's also the surest, if dull, way to get there—Good Luck, Jim Bede!

The *LIT Special* promised a significant reduction in drag with its clean nose, fuselage buried tandem wheels, and an efficient wing working in clean air undisturbed by the prop slipstream. The pusher prop promised higher effective thrust, while increasing the stability and control of the aircraft. If you think I liked the airplane, you're right.

Like its forerunner, our ½A Pylon Racer looks fast but leaves behind the problems of a pusher installation, substituting a clean and accessible engine installation. Hand-launched, it doesn't suffer the poor ground handling of the tandem wheel original and with only elevator and ailerons to worry about, it features a simple control system installation. Since the PROPS (Pylon Racers of Puget Sound) organized ½A Pylon Racing in the Northwest a couple of years ago as a training ground for new Formula I pilots (it didn't work—there are more guys flying ½A by a long shot than F.I), it has become obvious that the winner is a good flyer who has a correctly propped, consistent engine which he knows how to start. These same winners also build very nice, clean, and, probably most important, light airplanes. Lighter means faster and tighter turning airplanes.

If you utilize an Ace foam wing, the "*LIT Special*" will weigh between the minimum allowed, 20 oz. and 22 oz., without any special efforts. This weight includes two of the mini-servos (KPS-12's, RS-4's, etc.), receiver and 225 mah battery pack. This airplane builds very easily and quickly. The fuselage is extremely durable and the wing/empennage assembly is such that you will be tempted to build and keep a spare handy. The "pop-in/pop-out" flying stabilator should last forever! The original fuselage has now seen close to three hours of actual flight time (that's a lot of 4-minute flights) and is on its second wing. Some of you experimenters will enjoy the ease with which different wings can be substituted.

There are two other features of the design worth mentioning. The first is the deep fuselage with high wing which makes for an ideal hand-launcher, while the other is a forward center of gravity. A forward C.G. is something which is completely strange to a lot of modelers who as a rule consistently turn out tail-heavy airplanes. It makes the airplane very groovy, which is a desirable flying quality in a Pylon Racer. The all-flying horizontal tail or stabilator has plenty of control authority to cope with this forward C.G. and reduces trim drag to a minimum. Too far forward a C.G. will cost



you in trim drag but it is always preferred over an aft C.G.

The construction notes that follow are not in great detail, primarily because the aircraft is simple and with study of the plans and photos you should have no problems.

Wing/Empennage Assembly

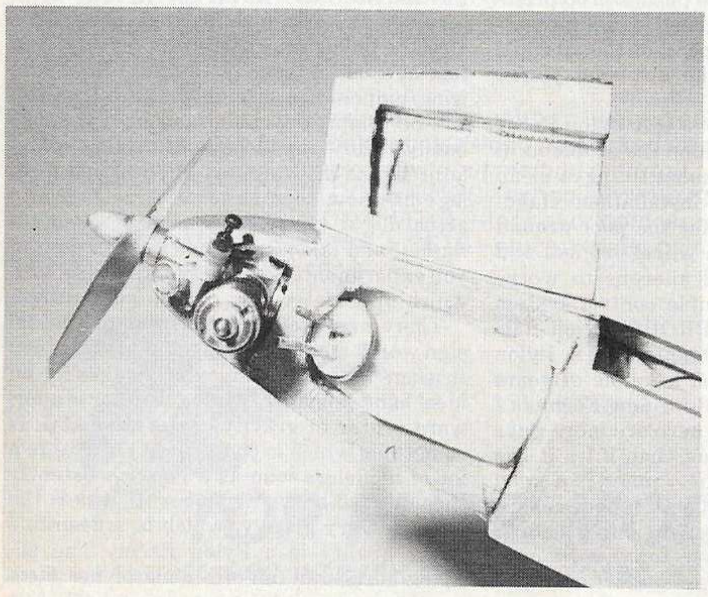
Follow the instructions that come with your Ace foam wing as to adhesives, etc. Since there is no dihedral, there is no need to sand any angles into the wing halves for the center-section joint. After joining the wing halves, mark off the boom locations and cut the slots slightly undersize for a tight fit to the booms. Assemble both booms including vertical fins. The ¼" thick balsa added on to the bottom of the boom on the forward end serves two purposes. It increases the glue joint area between wing and boom for added strength and its lower straight edge lines up with the lower straight edge of the vertical fin and therefore serves as an alignment aid for insuring a true wing/tail assembly. This part can be cut off flush to the wing lower surface after the wing and booms have been joined. Join the wing and both booms on a flat surface while using the aforementioned lower straight edges to insure alignment. Add the aileron torque rods and trailing edge to the wing. The ailerons and stabilator can now be fabricated and installed after finishing. Add the fairing block to the wing and this unit is complete with the exception of the fuselage attachment points which are added by drilling the locating holes in both wing and fuselage at the same time.

Fuselage

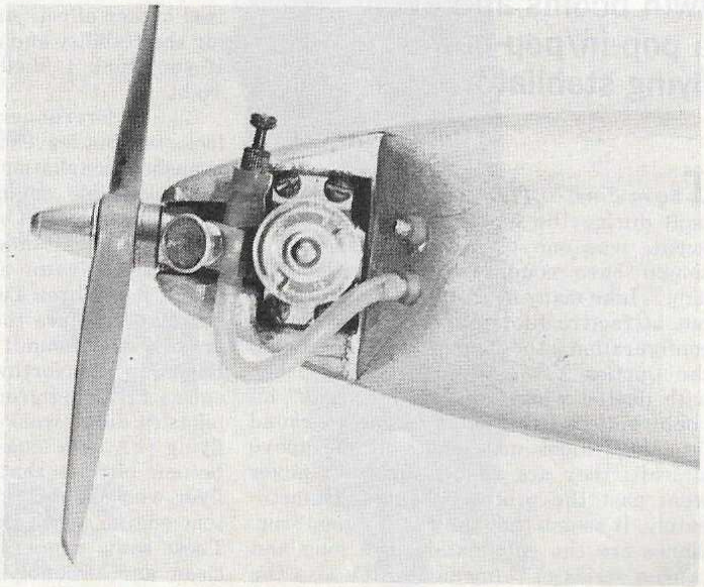
The heart of the nose or engine/tank installation is a ¼" plywood crutch. Before laminating the balsa sheet parts to the ply crutch, locate and drill the engine mounting holes and install blind nuts. I prefer a contact cement for making up the laminated sections. The remainder of the fuselage assembly is simple sheet/former construction, using 3/16" square stock to frame the sheet sides and for former alignment. When this assembly is done, join the main nose section to the front plywood former. The tank hatch is temporarily glued in place with rubber cement, so that the nose can be shaped as a unit. The rubber cement is strong enough to withstand the sanding pressure, but the joint is easily undone for later fuel tank installation. Sand the fuselage to shape. The wing can now be carefully located on the fuselage. The leading edge single dowel hole through both fuselage former and wing, as well as the holes for the two nylon bolt wing hold-downs should be drilled. The remainder of the job is straightforward plumbing of engine, tank, control system, and, of course, finishing. Since I use the iron-on method of finishing I hold the windshield as well as tank hatch in place with the same material.

Flying Trim

Once the airplane is set up properly, it is really a pleasure to fly. It is sensitive in roll as all of these type aircraft seem to be, and you should take care to limit the aileron throw and eliminate any binding and/or sloppiness in this linkage. The stabilator is no problem and can be left at a zero-zero position for your first flight if the C.G. is towards the rear of the indicated range. If you have a C.G. towards the leading edge, trim the stabilator leading edge down about 1/8". I prefer the aircraft trimmed out so that almost maximum throw at the transmitter gets me around the course as tight as the airplane can go. This is a personal preference, however, and you may enjoy more sensitivity. Before each flight, check the stabilator, insuring that the booms have not been moved out along the machine bolt hinge pin and that the lock nut on the inside of the boom is still drawn up tight.



A one ounce tank will do. Try the slanted cap type detailed on the plan, it fits perfectly. Your fuel flow must be right, racing places demands.



The engine installation, keep it clean and neat. Fuel line emerges from nose, sneaks around hot cylinder to needle valve. Avoid the sudden kink.

Racing

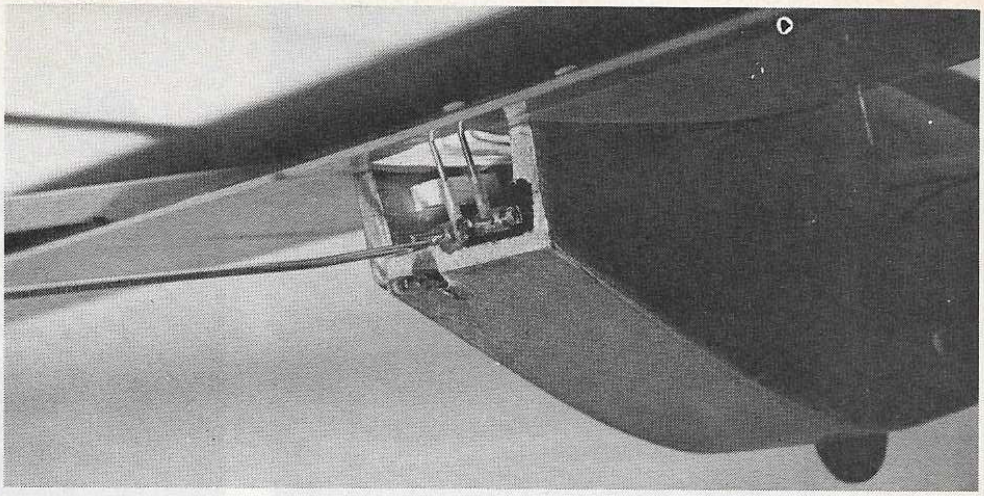
To appreciate the popularity of ½A Pylon Racing in the Northwest you have to realize that in addition to regular season activities we fly a winter series of monthly races—every first Sunday starting at 11:00 AM at the Boeing Hawks Field. That may not seem to prove anything to you strangers to these parts until you realize that it rains continuously in the winter (and sometimes in the summer too!) and the Hawks Field is usually under water. But the races go on.

Seriously, the ½A races are run without the formality and abundance of officials that the Formula I races require. Callers are not allowed by local rules which otherwise reasonably follow the original RCM rules. The light, slower moving airplanes (compared to F.I) remove much of the safety hazard of the larger racers without killing the excitement associated with a close race and the sound of tightly wound engines.

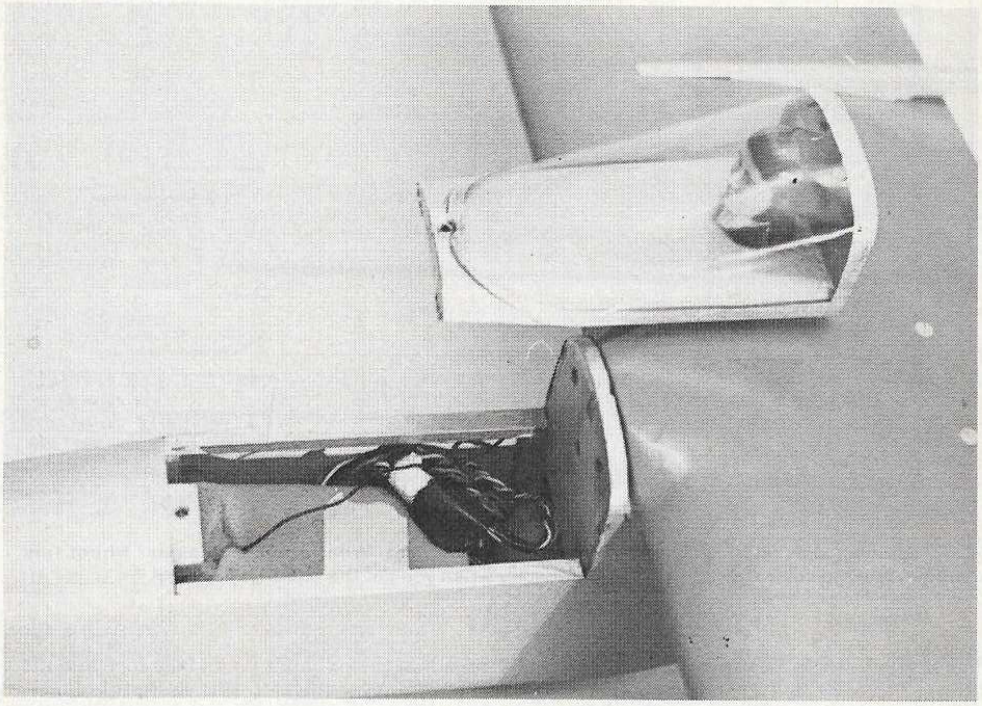
If you want to take advantage of a good hard hand-launch you will have to run pressure. Without pressure anything but a gentle hand-launch will starve the engine. A common tactic on the starting line is to hold or have your helper hold the airplane slightly nose down to richen up the mixture just prior to the launch—it seems to help. If you decide to add pressure, the Kirn-Kraft crankcase pressure tap is an excellent way to go since it is not as critical as the built-in timed high pressure— Tee Dee pressure tap. With pressure, the Venturi can be opened to the recommended maximum diameter.

The KirnKraft "piston ball socket tightener" is another must if you don't want to break crankshafts. A loose con rod ball to piston socket fit apparently results in overloading the crankshaft at the crankpin with the ultimate result being a busted shaft. The 1974 Tee-Dee's have beefed-up crankshafts which can be retrofitted together with a new crankhousing. (The oversized crank will not fit the old housing.)

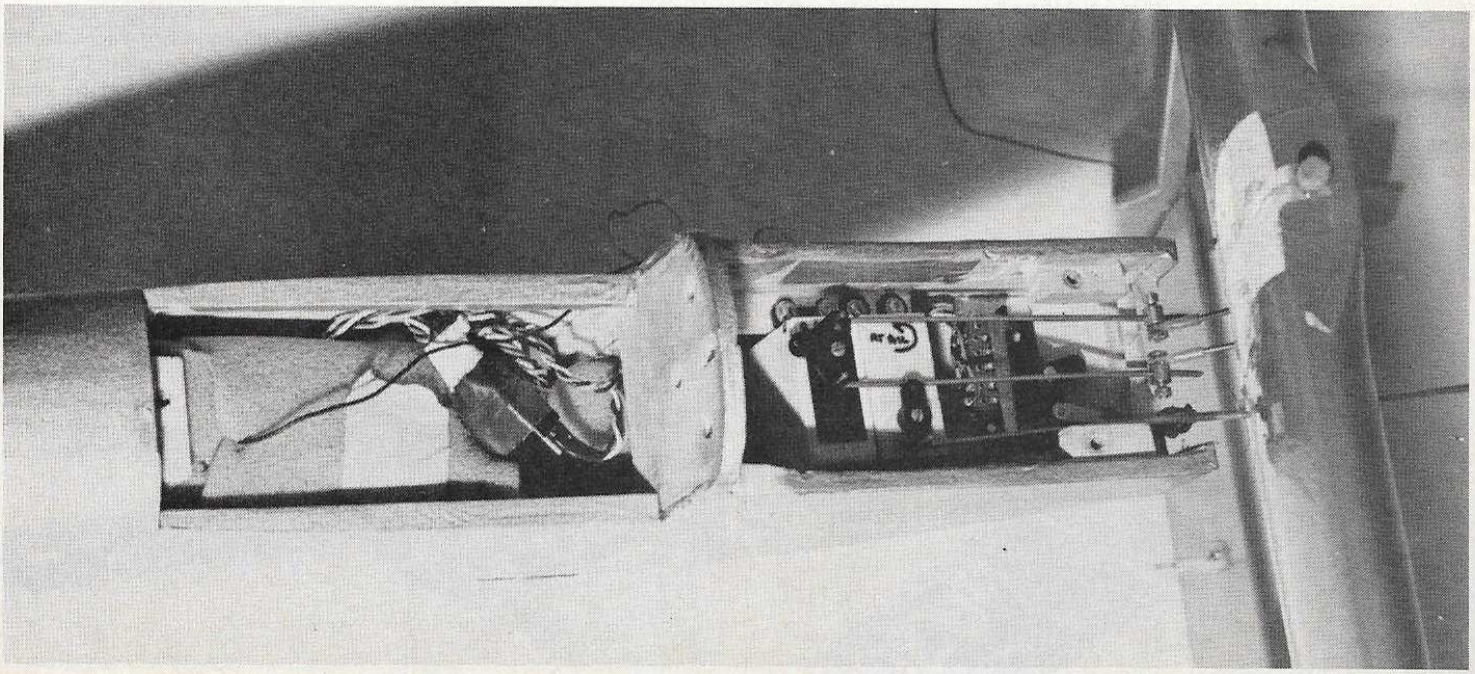
There have been a whole series of "how to make your T-D's run faster" articles. If you read them all and listen to everybody who seems to know, it becomes obvious

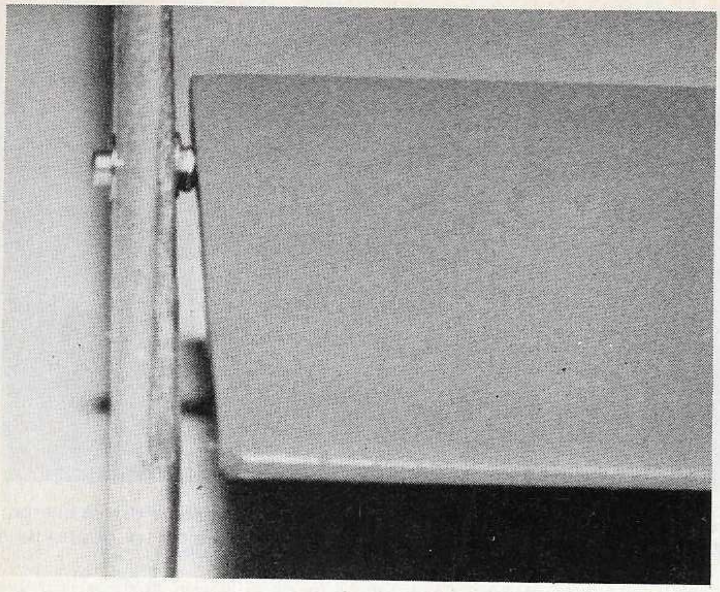


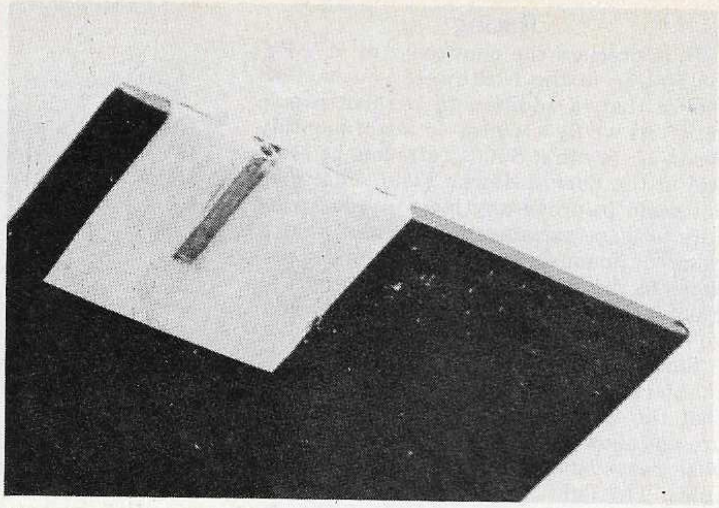
A view from the rear. Aft end of the power pod focuses on the link-ups. One serve drives aileron horn, the other to the stabilator. Easy access here. Servos nest beneath the center of gravity.



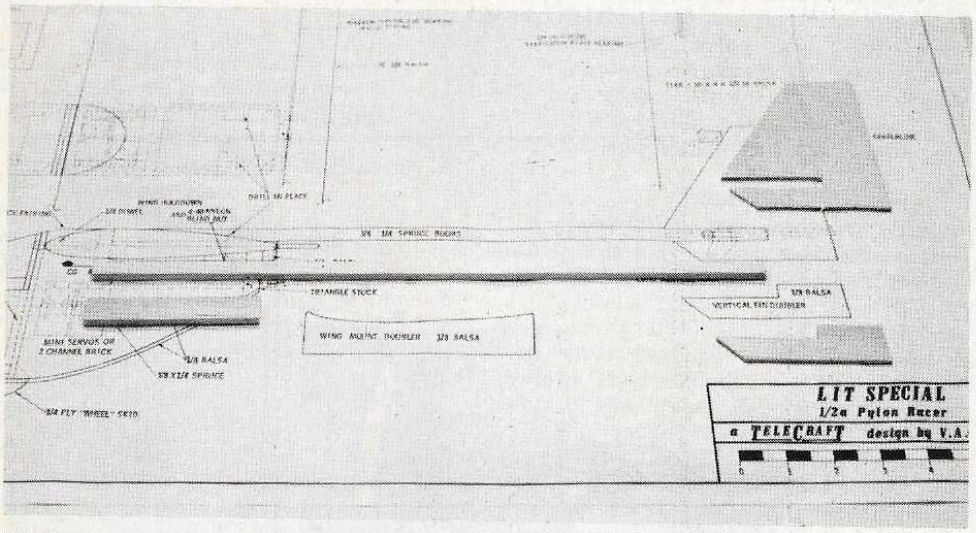
The radio lies beneath. Pop the canopy hatch assembly and your electronic goodies see daylight. **Below:** The complete equipment installation and a view of the wing hold-downs. Adequate room for receiver and battery pack forward, servos aft, two in number. The pushrods are short and simple.







⅛" dia. tubing forms stabilator pivot. Simple to install, and durable. Flying stab concept does away with the need for a hinged type elevator. At left: the boom, the pivot and stabilator. Horn size shown works well.



¼"x⅜" spruce booms offer rigid support for sheet tail surfaces. What could be easier? Sheet fins, doublers fall into place. Design can be built quickly when you get the hot urge to race.

that a good stock T-D is competitive. This "competitive stock T-D" happens to have all the right loose fits, the most important of which is the piston to cylinder fit. A dry piston ought to just about drop through the cylinder. If you get one with this kind of fit or loosen your own engine up, don't let varnish steal back the whole improvement plus more. Keep the varnish out, using steel wool per Cox instructions.

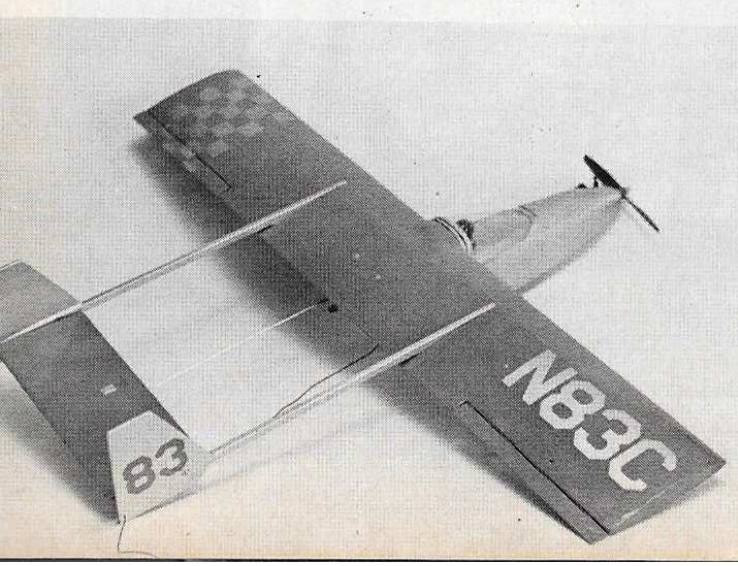
Another thing to look for is proper alignment of the cylinder transfer ports and the crankcase. The cylinder is properly aligned when the exhaust ports face fore and aft. If your engine doesn't, it's easily taken care of by careful removal of material or facing of the crankcase where the cylinder seats. Do this a little at a time (it's soft aluminum) and make sure you thoroughly clean your engine afterward. If your backplate doesn't completely pack the crankcase, you can use the same technique to bring the backplate face up to the crankpin. Incidentally, the adjustment of the cylinder to crankcase fit for proper port alignment does increase the compression ratio—it is rumored that some of the really hot ones have that cylinder turned in a half turn more than they needed for port alignment.

Fuels run heavily to home brews using around 50% nitro which is getting pretty close to the limit for glow plugs. But the T-D's love that nitro.

Cox Grey props are the most popular with the 6-3 cut-down a favorite. Tornados and Top Flites replace the Cox props usually right after you've broken two or three Greys in a row (they are comparably brittle) and especially after you've spent a good deal of time working them over. All props are always balanced.

One last word on the "*LIT Special.*" Using the Ace foam wing is neat and quick, but often you'll find that the wing is oversize in thickness by up to ⅛". If you add up that ⅛" over a 30" to 32" span, it adds up to almost half the cross-sectional area of the fuselage. Sand your wing down to the ⅞" minimum allowable thickness, or build a balsa wing to the correct minimum thickness and save an ounce or two of weight while you're at it.

Whatever you do, try ½A Pylon Racing—it's low pressure fun competition at its best and it's cheap and easy to get into. With summer here, the evenings are long enough to allow a whole set of races to be run. And if you enjoyed evening flying a month or so earlier this year, write your Congressman and tell him you like the Daylight Savings Time. If you don't we will surely go back to the old system.



Twin booms lend a different look. Easy to fabricate, install or replace. **Below:** A snarling .049 up front simplifies things. It's more practical.