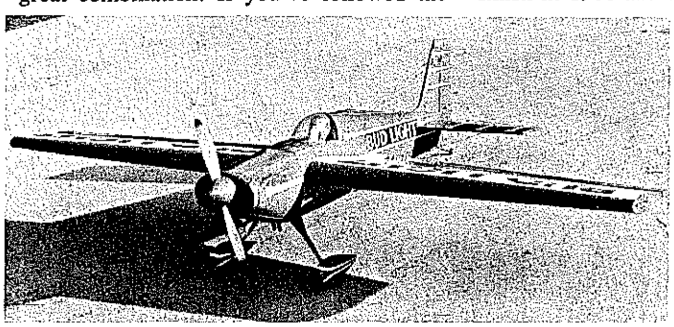
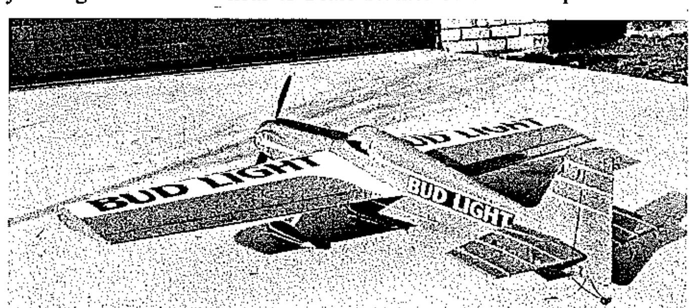
BUD LIGHT LASER

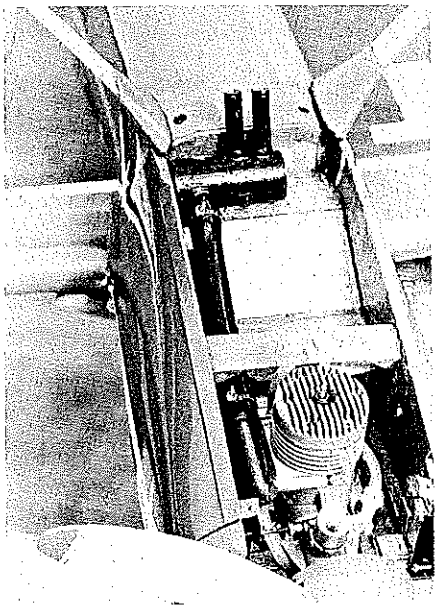
WITH CHARACTERISTIC enthusiasm, Ted Fancher offered to write an introduction for this article. And so:

"Gid Adkisson and his Laser . . . what a great combination! If you've followed the Nats results for the last couple of years, you're most likely familiar with the big, red Bud Light Special Laser as flown by Bob Whitely to a 'skin of his teeth' second-place finish in 1986 and a very strong seventh in the monster winds of Lincoln in 1987. This is clearly a semiscale Stunter which can *really* fly the pattern. Not since Al Rabe's magnificent Sea Furys and Mustangs has a near-to-Scale Stunter been so competitive at





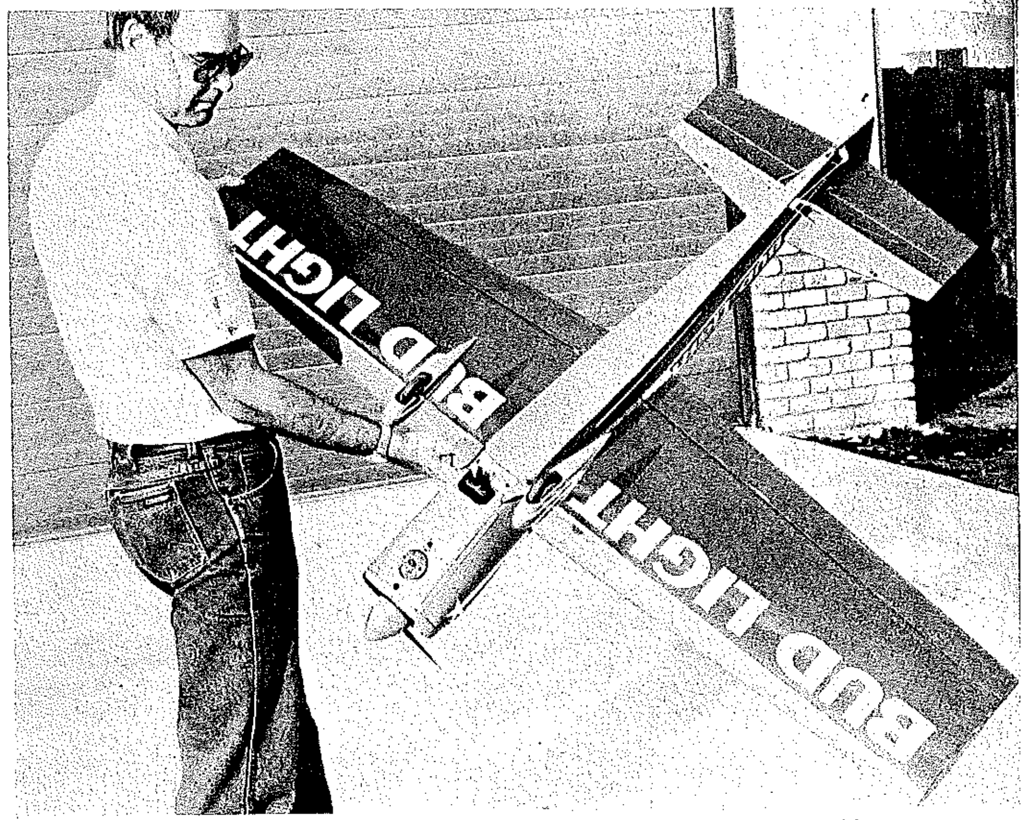
Top: Our author with his winning Bud Light Stunter. Bob Whitely beat three national champions at the 1986 Nats with the same basic design shown here to finish in 2nd place. Above Left: Functional exhaust stacks help to confine residue to the bottom of the fuselage. Our author says he prefers Top Flight 13 x 6 props but that every prop is different; a log should be kept on the performance of each one. Above Right: Gid says that, despite his best efforts, fuel has continually seeped in during heavy use. Conseqently, this will probably be his last two-piece airplane.



The muffler is made from a section of aluminum tubing from a lawn chair. The manifold is a piece of ½-in. brass tubing affixed to a small section of Du-Bro muffler extension. All joints are glued/sealed with Plastic Steel.

the highest levels of Precision Aerobatics competition. Believe it or not, this ship may be the *best of the breed* to date.

"While Gid's name might be a little new to some of you, I predict that this situation will be short-lived. This guy can fly. When he flew his own Bud Light in Lincoln, it was only his inexperience—he lost Pattern points for his second flight on finals day—which kept him from possibly edging out Mike Rogers for the prestigious Rookie of the Year award for the highest-placing first-time qualifier. Take it from a guy who's been whipped by Gid and his Laser . . . this is a good one!"



The landing gear is a cut down and re-bent stock Halco unit, and it is held in place with two 6-32 bolts. The "Bud Light" letters are stenciled from a commercially available poster.

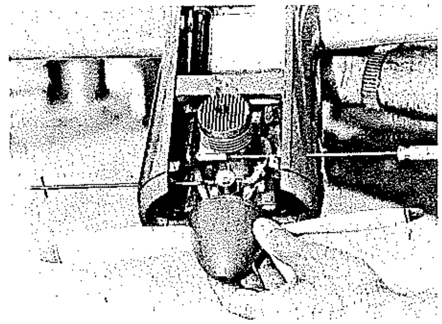
The full-size version of this Laser has more than its share of victories in aerobatics competition. Now this .60-powered semiscale version for Control Line Precision Aerobatics is on the verge of achieving the same reputation. ■Gid Adkisson

As Ted Fancher says, this Control Line Stunter is a *real* aerobatics airplane. The story of how it came into being starts with a question, one that even back in 1984 had been nagging at me for some time: "Why," I kept asking myself, "do today's Stunt planes look like space age works of art rather than piloted airplanes? Why don't we take some examples of full-size aerobatic airplanes and see if we can adapt them to our style of flying?" Insistent as the question was, though, I'm not a true pioneer at heart and was uncertain which direction to take.

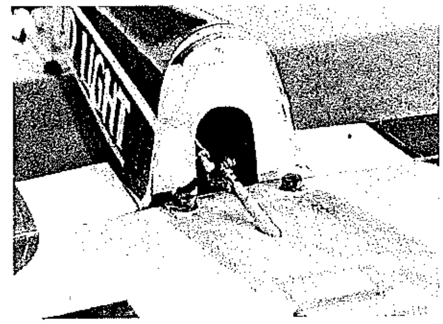
One decision that did come easily, however, was to go from the Super Tigre .46 engine to the ST .60, which has become well established as a steady, powerful, and consistent performer. I found that all the ST .60 asks is a proper ring gap and seal, and it'll give many miles of steady running.

A month after the contest season ended in 1984, I had a nice new engine, the urge to do something different, and a big question mark concerning precisely *what*. I was still mentally wandering around trying to find some direction, when I happened to stumble upon the latest issue of *Model Airplane News* featuring Leo Loudenslager's Laser 200 with the new Bud Light paint scheme. It took me all of 10 seconds to decide that this would be my next project. I acquired some three-views, dug out Ted Fancher's guidelines on designing a Stunter, and started smoking the batteries in my calculator.

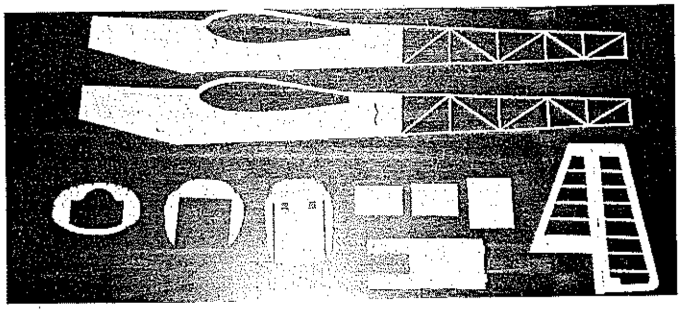
My objective was to make the airplane as scalelike as possible, while staying within the parameters of good Stunt characteristics; and the project was proceeding nicely until I was diagnosed with Hodgkin's disease. I spent most of the 1985 flying season recuperating from operations and radiation treatments, but was finally able to finish the model and get it trimmed out just before our annual California North-South Meet in Fresno. To my astonishment, I was able to beat three former National Champions and pick up the pilot's choice concours—without a doubt the highlight of my entire modeling career.

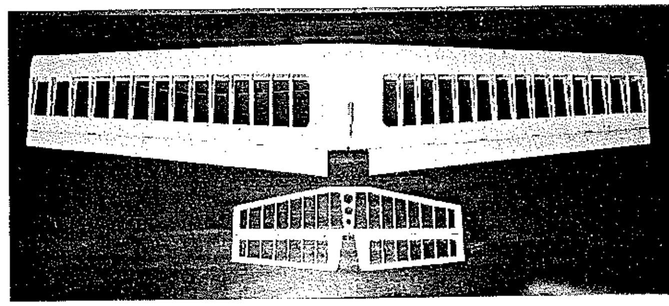


Access to the needle valve and the muffler mounting bolts is achieved through aluminum tubes through the side of the fuselage.

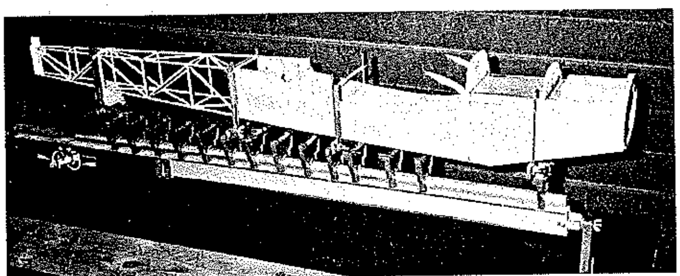


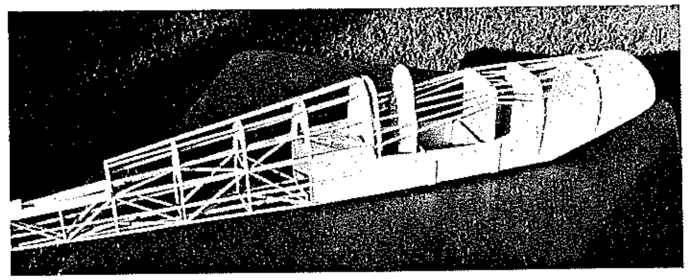
The ball-link connectors for the control hookups. With over 200 flights logged, the letters are beginning to peel off this early version.



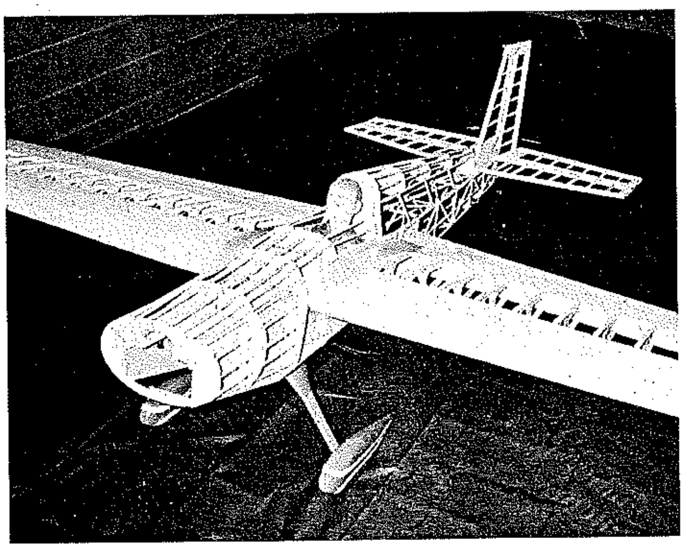


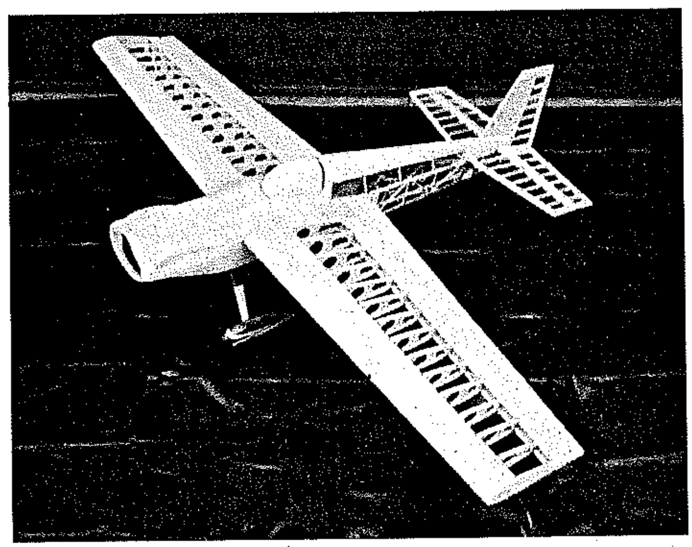
Left: The fuselage and rudder/fin components. At this point the fuselage sides are very flimsy, but the finished structure will be strong and warp resistant. Right: Wing construction is a typical D-tube. With a ready-to-cover weight of 14 oz. it's about 2 oz. lighter than a comparable foam wing. To get the accuracy required for a CL Precision Aerobatics model like this one, the wing absolutely must be built in a jig.





Left: The author says he used an A-justo-jig for the first time on this model and that it probably is the best-aligned fuselage he's ever built. Right: This is model number three still in its skeletal form. The cockpit formers will be cut down later on so that they sit on top of the wing.





Left: Alignment of formers should be double checked with a straightedge before installing stringers. Structure is really not as complex as it appears. Right: At this point it's ready for sanding. The fin, rudder, and stab are pinned in place here but are not glued on until after painting.

Two subsequent versions of my Bud Light Laser followed, each incorporating a few true-to-scale revisions while not changing the basic plan form. The last of these is the one presented here. The airplane looks awesome in the air, and it always draws a crowd at the flight line. All three have been take-apart versions (*a la* RC) and have worked well, but care must be taken to build with tight fits and a thin film of silicone to prevent fuel seepage. As for the level of building proficiency required, the wing and tail are easy, but the fuselage construction puts it out of reach of a beginner's skills.

Empennage. Constructing the tail first gives you a sense of this project's momentum. Simply build the components over the plans. I like to make the ribs a little fat, then tape a piece of 220-grit sandpaper to the workbench and sand them flush. The slot for the control horn does not need to be lined with plywood; soaking it and the tail wheel mount with cyanoacrylate (CyA) is more than sufficient. Total weight of empennage with horn should be 2½ oz.

Wings. This is a straightforward procedure. I use 1/20 or 1/16 sheeting adhered with double-sided type. I have used Ted Fancher's circular bellcrank for several years, and with the positive control it achieves I wouldn't consider going back to the old style. I machine mine out of Delrin, and use a Sig bushing with a very thin shim on top. Don't forget to cover the center section with glass cloth as shown.

When building the flaps, try sticking the bottom side to the workbench with double-sided Scotch tape to hold it down while you sand and shape to you heart's content, before gluing on the top sheet. As for the flap-to-elevator linkage, it must be detachable for the bolt-on wings. Bend a piece of thin K&S brass as shown, and solder and bolt it to the flap pushrod. A 2-56 ball link is bolted onto the tab, and the snap-on portion is attached to the elevator pushrod. Even after a great many flying sessions, the link snaps on and off as firmly as it did the first time.

Fuselage. Here's where the fun begins; construction techniques become more demanding. Lay out the longerons, sheeting, etc., and build over the plans. Attach the shelving in the nose, and mark locations of the nose formers, centerlines, and everything else that will become a part of the fuselage. Build the engine mount module out of a piece of ½-in.-sq. maple, ½-in. sheet balsa, and 1/64 ply laminated cross-grain. Resist the temptation to use anything heavier.

Trial fit the engine mounts, F-1, F-2, and

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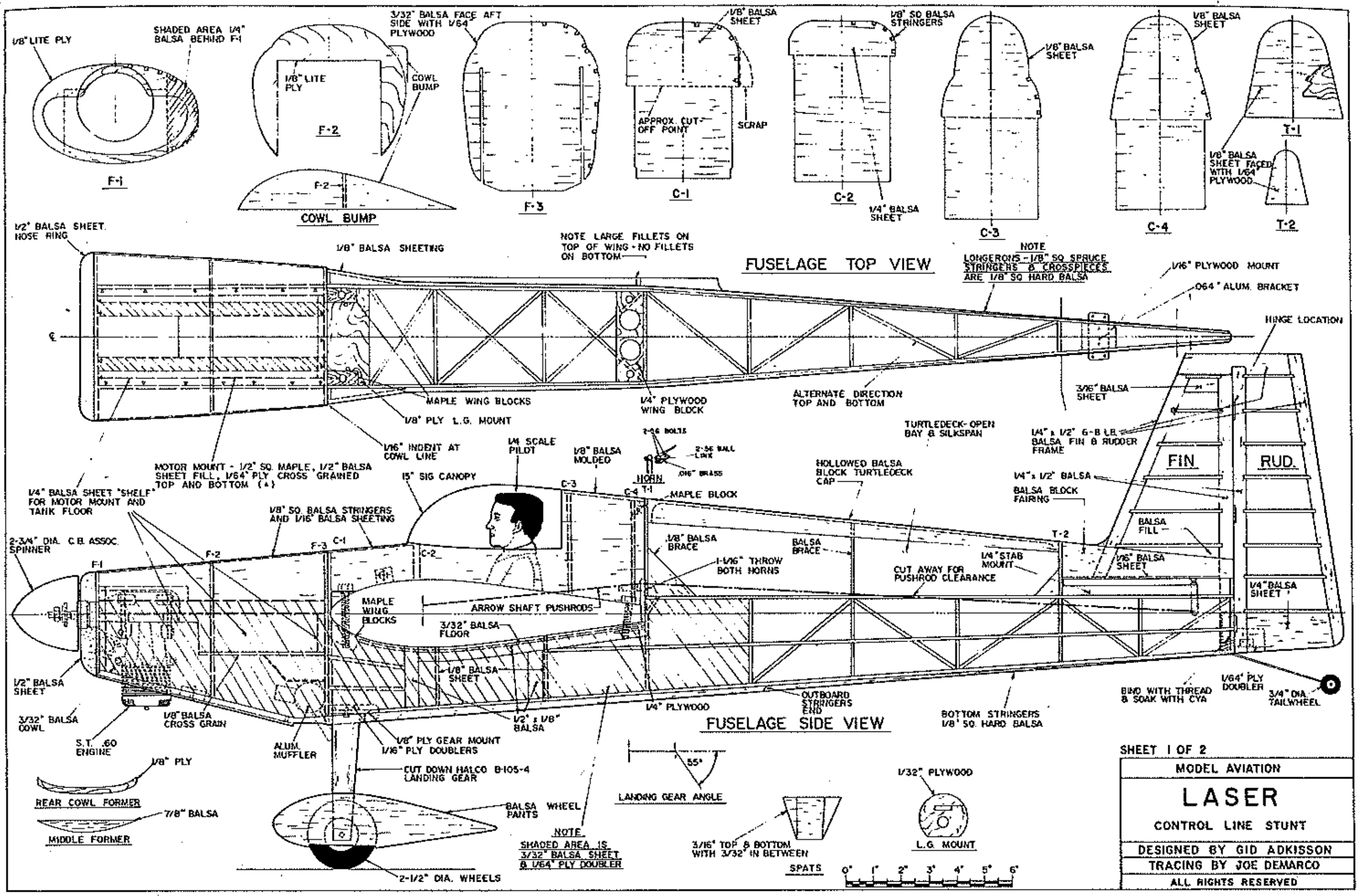

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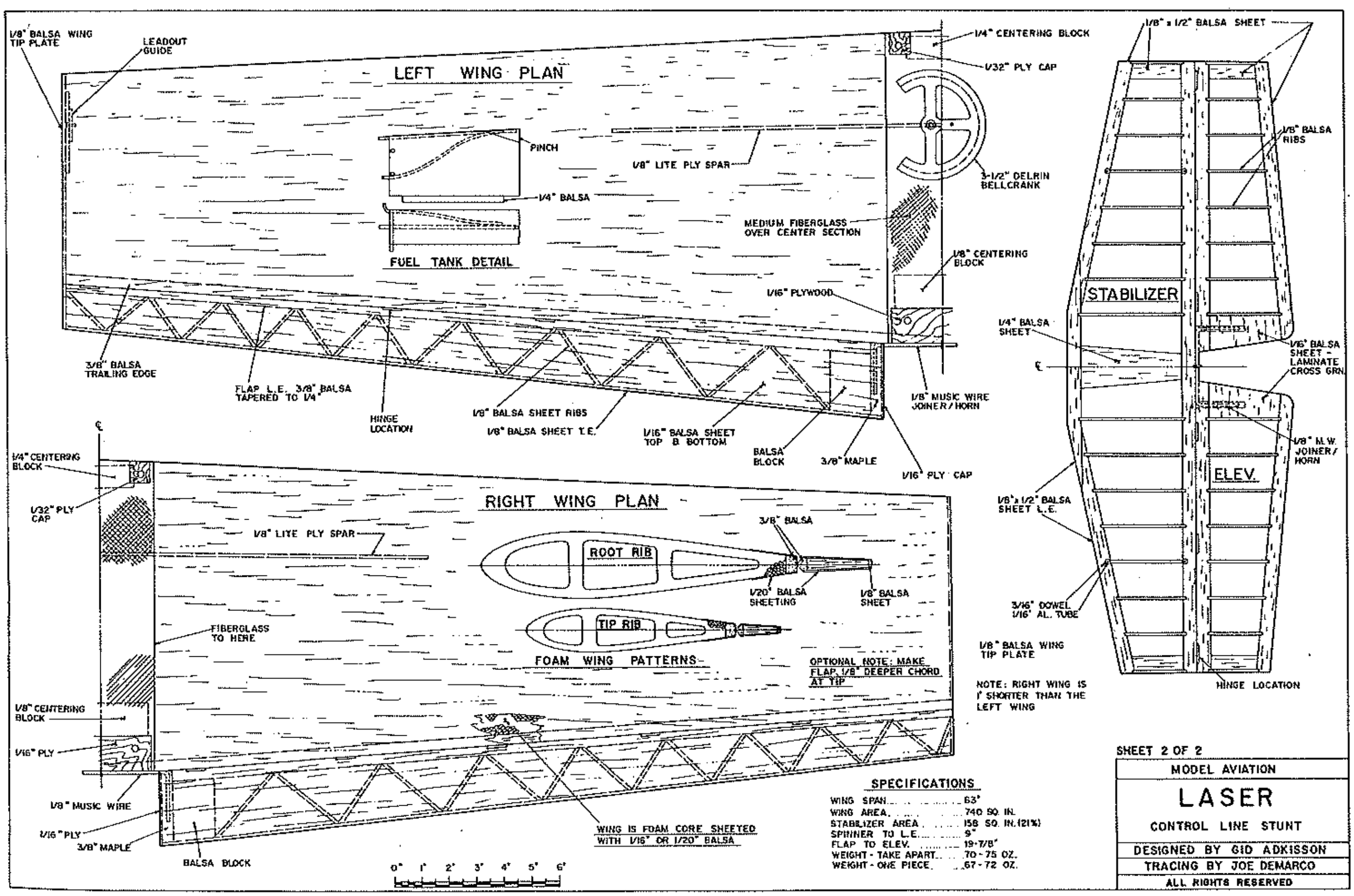

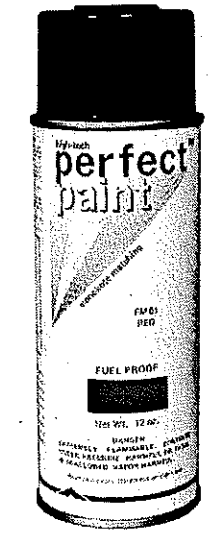

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CL Navy Carrier/Perry

Continued from page 149

A significant assumption is the amount of drag caused by the lines when compared to the drag of the model itself. I am not aware of any definitive study to evaluate the drag of a three-line control system and a typical Carrier model. The model is a significant variable in the equation, and the wide range of designs makes it difficult to make any definitive assumptions. Studies performed some years ago indicate that line drag of a three-line system probably accounts for over two-thirds of total drag. On many models the number is probably higher. That may be hard for some of you to believe, but it is substantiated by earlier studies and by analysis based on model performance.

The Navy Carrier rules mandate the use of three-line control systems in the Profile event, so this discussion is limited to Class I and II models. Class I rules require three .015-in.-dia. lines, two .020-in. lines, or one .026-in.-dia. line. In class II the sizes are .018 in., .024 in., and .033 in., respectively.

A quick look at the cross-sectional area of the lines gives an idea of drag differences. Including Reynolds number effects caused by the changing sizes results in numbers which approximate a 15% reduction in line drag by going to two lines, and a 45% reduction by going to a single line.

If line drag is reduced 15% and line drag accounts for two-thirds of total drag, then for a given speed, total drag reduction would be 10%. A 10% reduction in drag doesn't produce a 10% increase in speed, however. Drag changes as the square of speed, but that still isn't the answer unless the model is powered by a constant-thrust jet engine. Because our models' piston engines are essentially constant-power machines, performance increases are related to the cube of speed.

(POWER = DRAG x VELOCITY)

The bottom line is that a change to two lines from three will result in an increase in top speed of from 2% to 4% depending on the model. That results in an increase in score of from two points (high-drag model capable of about 320 points with a three-line control system) to about eight points (average model capable of a 380-point flight).

The real advantage comes from using a monoline system. Monoline has the potential to increase scores by 20 points or more, assuming that low-speed performance can be maintained. Unfortunately (or fortunately, depending on your point of view), throttle control with a monoline system presents some significant technological hurdles, and low-speed flight is not likely to be as slow or as reliable as with normal three-line control.

Is it worth it? You'll have to make your own decision on that question.

Non-Scale models. I've received some letters about the comments I made some months ago about Yak-9 and P-51 profile kits and their suitability for Carrier competition. These letters have made me want to discuss the issue again. While the Yak-9 prototype doesn't qualify as a carrier-based aircraft, there is nothing in the rules which prohibits its use in Carrier competition. The Yak-9 becomes a good Bell Airabonita with a little modification, and that is the way I would recommend using it.

The prototype restrictions (made actual carrier takeoffs and landings or designated as a carrier aircraft) apply only to the bonus points section of the rules. Any model meeting the basic specifications of the event can be used in competition regardless of whether or not it represents a qualifying prototype aircraft—it may not receive bonus points, however. Although the 100-point bonus in Class I and Class II is too significant to ignore, many models have been flown effectively in Profile Carrier without the 10 scale bonus points.

Laser/Atkisson

Continued from page 68

F-3, and make sure they all fit together properly. Tack glue appropriate scraps onto the front of the engine mounts, drill the mounting holes, and install the blind nuts. I don't use any engine offset.

Build a jig, slip F-2 and F-3 into place temporarily, and glue in the crosspieces, maintaining alignment as you go. You should become intimate with a right triangle during this phase. Raise the front of the fuselage to let F-3 fit fully into place, ensure alignment, and glue F-1, F-2, and F-3 into place. Glue in the wing mounting blocks and ¼-in. stab mounting. Align the wing and drill mounting holes. Bolt the engine into place, and, using an incidence meter, shim as needed to make sure the engine, wing, and stab are at zero settings. Install the flap to the elevator pushrod, and leave it in place.

Remove the wing, and slide C-1 through C-4 into place. Check the alignment with a straightedge, then install stringers in the nose, cockpit, and rear fuselage. Sheet the

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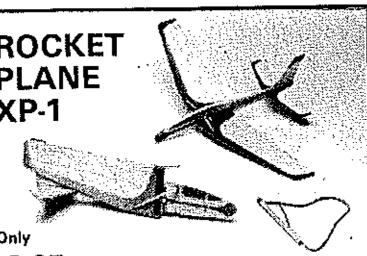

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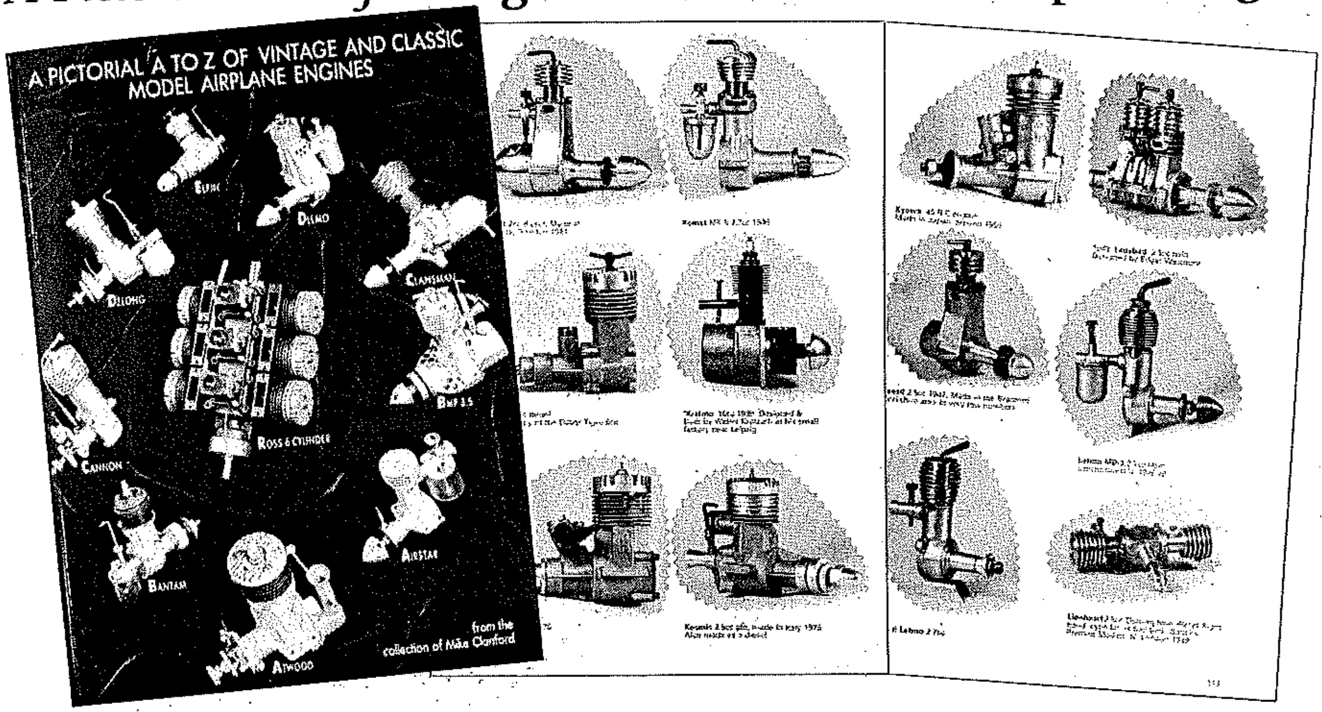

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nose and cockpit with 1/16 balsa. Install the turtledeck top using a hollowed block or rolled sheet; this corresponds to the turtledeck construction in the prototype. Glue on 1/8-in. hard balsa stringers as shown, tapering to 1/16 thickness at the tail. Make sure you use hard balsa on the bottom, as this area takes quite a beating.

Cover the nose and cockpit with sheeting and glass cloth. Cut and bend the Halco landing gear as shown. Make the wheel pants out of balsa, and epoxy onto the gear with 1/32 ply. (Epoxy throughout is Duro plastic steel, available at auto parts or hardware stores.) I have mounted wheel pants this way for a long time with no problems. The fuselage should weigh about 10 oz., the cockpit 2 oz., and the landing gear with Dave Brown wheels should come out 5 oz.

Muffler and needle valve. The muffler in this Laser is unique, but still easy to construct. The manifold is a small piece of Du-Bro muffler extension epoxied onto a piece of ½-in. brass tubing. Close up the end of the tubing, and cut out the exhaust hole.

The muffler itself is made with a piece of aluminum from a lawn chair, capped at both ends. The stacks are made from very thin aluminum, available at a hardware store—the type you would use on the ducting for your dryer. Two pieces are wrapped around a small X-Acto knife handle and epoxied at the seam. A 1/8-in. brass tube pressure tap is soldered onto the manifold, with the pressure line running over (under?) the crankcase. The manifold and muffler are connected with a piece of ½-in. neoprene tubing.

The needle valve is of standard ST variety, cut off and slotted with a Dremel emery disc. A short piece of 1/32 wire is then soldered into the slot. For access to the needle, I slotted a piece of 1/8-in. brass tubing about 8 in. long, and soldered a piece of music wire through the other end. The brass slips through a piece of aluminum tubing which is installed while sheeting the nose.

Access to the 4-40 muffler mounting bolts is arranged in the same fashion. To ensure alignment, remove the spraybar from the venturi and bolt the engine in place on 1/16 aluminum pads, with drill bits in the spraybar and muffler holes. Use your fingers (and some patience) to drill through the side and sheeting, then finish by gluing in the aluminum tubing. Use a pencil eraser to choke the engine.

Finishing. I use silkspan-and-nitrate-dope for a base, and Super Poxy for the finishing coats. To get the proper shade of red, mix three parts orange and two parts red. Since the red has very little covering power, prime it with a base coat of silver. The blue is three parts blue and one part black.

To get the authentic template for the Bud Light, obtain a poster with 3-in. letters. Reduce it 5% for the wings, and for the fuselage reduce it to a height of 1⅜ in. My method has been to cut the letters out of MonoKote trim and seal them with Super Poxy, but with heavy use they always seem to peel in spots, so my next Laser will be masked with frisket and sprayed.

Since this model is almost quarter-scale, a quarter-scale DGA pilot (with narrowed shoulders) is a good fit.

Again, I've seen the full-size Bud Light Laser, and it's a very small airplane. Even when the model is close to a generous quarter-scale like this one, the brace wires can be 1/32 music wire; or, instead, you can feed .018 flying wire through all the attach points and back to the starting point.

Flying. I have yet to get one of these airplanes below 70 oz., but that doesn't seem to dampen the Laser's flying prowess. I use 15%-nitro fuel, a 13 x 6 Top Flite Super M propeller with the blades thinned down, and 65-ft. lines. The lead-outs stay pretty far forward. The rudder is very effective, and only a small amount of offset is necessary. The airplane pulls hard and appears to fly more slowly than it does because of its size.

My Bud Light Laser wasn't created in splendid isolation, and I want to acknowledge those who've been involved. First, let me mention my gratitude to Ted Fancher for his help and influence over the years. (This design goes against some of his wing and power loading ideas, and I think he's a little baffled by the way it flies.) Thanks also go to Bob Whitely for taking this same basic Laser design and winning second place at the 1986 Nats. Last but not least, I am grateful for my fellow Clovis Control

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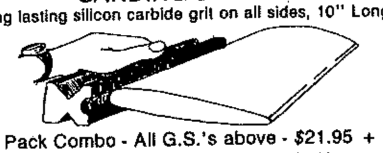

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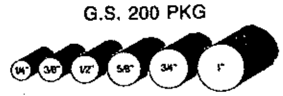

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Line Club members who have helped me with the design, construction, engines, coaching, and on into the night! Unquestionably, half the enjoyment of this hobby comes from the friendships and camaraderie of people who share your interest and enthusiasm.

I hope you get as much pleasure out of building and flying your Laser as I have. Being competitive in Control Line Stunt and doing it with a Scale model is double the fun.

FF Duration/Murphy

Continued from page 73

ferred to columns which promote RC activities, as these types of models should no longer be classified as Free Flight in the true sense of the term.

This is not to say that the radio has no place in Free Flight—far from it. At present there are a number of radio-activated model retrieval systems that are commercially available in a wide range of prices from $20 up to more sophisticated systems which top out at about $500. Most of these systems permit ease of model location in the thickest of cornfields or the tallest of trees, and while this in turn may not be a total remedy, if one can satisfactorily retrieve his model it is some consolation for using subpar flying sites.

As long as a model is unaffected by any type of RC control during the powered or gliding portion of an official flight, then I would not think it should matter if the contestant brought his model down with a blast from a 12-gauge shotgun if it pleased him.

Yes, I read where FAI permitted a contestant to utilize an RC-actuated engine cutoff at last summer's World Champs. It is not for me to comment as to whether this is good or bad. Remember, FAI events are obviously super-high-tech, and an RC-actuated fuel cutoff just adds to the long list of sophisticated gadgetry which continues to evolve from this competition program.

I am not one to suppress technology; however, at this point in time I vote "no way!" for use of such concepts in our domestic AMA competition, which supposedly beats its chest in support of amateurism and entry-level novice competition.

Therefore, it is my opinion that as long as the official timer is timing the flight of a model, there should not be any type of RC permitted. When the timer walks away, then—and only then—should one be permitted to drag out radios, firearms, or the pet Golden Retriever in efforts to facilitate the recapture of the model.

Longtime pen pal Lyman Armstrong (Yuba City, CA) swamped me with about two dozen photographs and a dissertation on the recent antics of the Stockton GMA (Gas Model Association). Some of his photos appear in this issue. Lyman and I joined in protest a few years ago when Rand McNally nominated Yuba City as its worst city in the U.S., and Anderson City, IN placed tenth. RM received so much flak over that poll that I think they reverted back to selling maps after that. Whaddathey know—right, Lyman?

Finishing touches. By the time you read this, those winter building projects you started last New Year's Day should be nearing completion, so it might be appropriate to review possible approaches to some of the final steps in the completion of that new model.

Let's kick it off with a comment received from Joe Wagner of Wilmington, PA. Joe sez, in referring to the curved-windshield discussion I ran in the February column, that he makes his curved windshields out of transparent plastic two-liter pop bottles. He claims the material is fuel-proof, nicely precurved, and can be further reformed to any compound shape within reason by heating it in hot water—plus the fact that it is more reliable than commercial butyrate sheet. There you go—and you get a blue chip for recycling another item which would otherwise be headed for the city dump.

Filling in those little dents, gouges, depressions, etc. in balsawood prior to doping the framework of a model receives lots of help from a number of methods and products. The ageless procedure of adding talcum to dope will give good results if the amount of dope is limited to only enough to make the mixture the consistency of thick mud. However, I have more recently quit using this procedure, since the thick dope seemingly takes forever to dry thoroughly enough to permit satisfactory sanding, plus the mixture will often shrink enough to require additional applications.

I now get more satisfactory results using inexpensive plaster-wall fillers such as Franklin's Spacklebond or DAP's Fast'n Final Spackling. These can be found at most of your local discount department stores in their home improvement areas. I find they only require the initial fill, as the compounds do not shrink or crack, and dry hard and fast in no time—plus, they are sandable. Good stuff!

The only drawback to these products is that they dry white, and balsa is more of a skin color. For color-doped models this is of no consequence, but if you are to cover your model with thin silk or some other transparent covering material, those blotches of white may be undesirable in appearance. I recently mentioned this to Jerry Fowler during a telephone conversation, and he