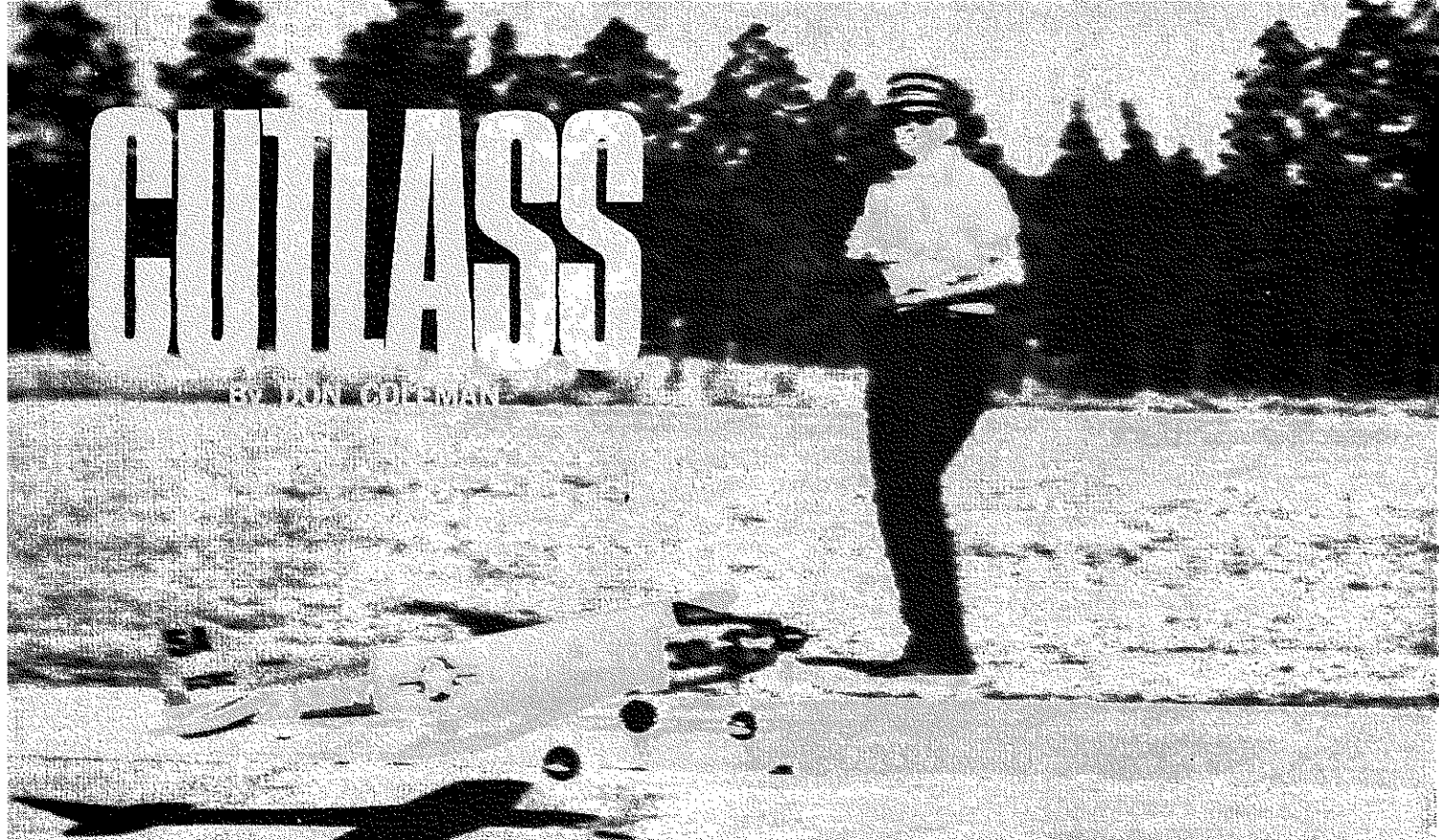


# CUTLASS



Nose high, slowed down to a walk, Cutlass splits the landing circle for maximum landing and perfection points; Pro-Line moves control surfaces.

• The Cutlass is the result of an attempt to produce an airplane more nearly suited to large, graceful, and smooth maneuvers of the FAI pattern. After altering throws and CG locations of relatively successful AMA pattern type designs on hand, it was determined that this still left a little to be desired. With existing competition here in the South, I needed to gain every edge pos-

sible. Today top competitors are all excellent flyers, good "engine men," un-equalled builders and very contest orientated individuals. Today's radios are reliable and follow transmitter commands perfectly (in my case, many times too perfectly). With these facts in mind, it became apparent that the only area available in which to gain an advantage was in airplane design.

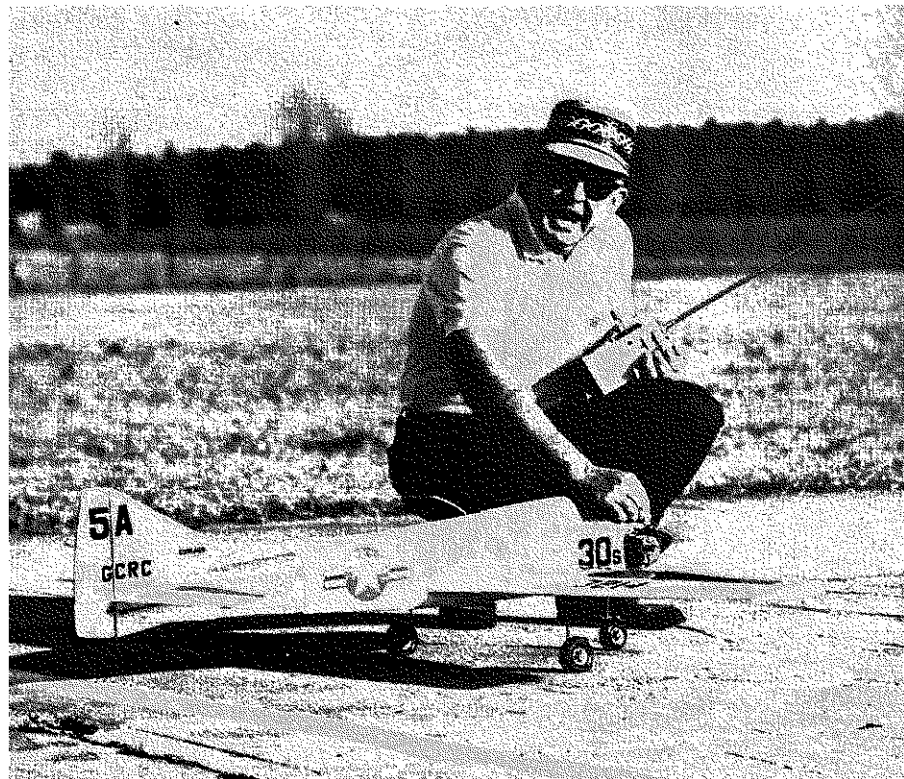
Through sheer luck or stupidity or both, Cutlass is not the last modification of several years of testing, making minor design changes and retesting. Prototype was test flown in November 1969 and had its first competition trial at the Tangerine Internationals in Winter Park (Fla.) in December '69. Considering the competition present and lack of practice opportunities prior to contest, its performance was commendable. Only modifications anticipated are minor ones to permit installation of retractable gear.

Although Cutlass was designed primarily for FAI competition, it is an easy airplane to fly and exhibits no bad characteristics other than moving quite rapidly (if this can be considered bad). It is very honest in its response, while being extremely smooth. In spite of its full bore speed (which I suspect will be noticeably reduced with advent of summer-time heat and humidity) it may be slowed down to a walk for landing. With my frequent misjudgment necessitating application of the final approach "stretcher," I have made many "nose very high, full-up elevator" landings with no wing dropping tendencies. Even with its seven lb. weight and 22 oz. wing loading, sink rate is not too fast. I might add here that it is now being flown with a Silencaire muffler. At our present 40-70 degree temperature range, the power has not been reduced measurably.

#### *Design Characteristics*

Unless a new design were to be a

My first maneuver will be, adjust the needle valve; Don prepares for another winning flight.





An "almost mid-wing" designed for the FAI pattern while still retaining full AMA capability; this southern beauty is one ship to beat in forthcoming Master's Tournament to select U.S. FAI team.

Cutlass follows the trend toward plenty of lateral area with much of it forward of CG to improve knife edge; U.S. Navy paint scheme impressive.

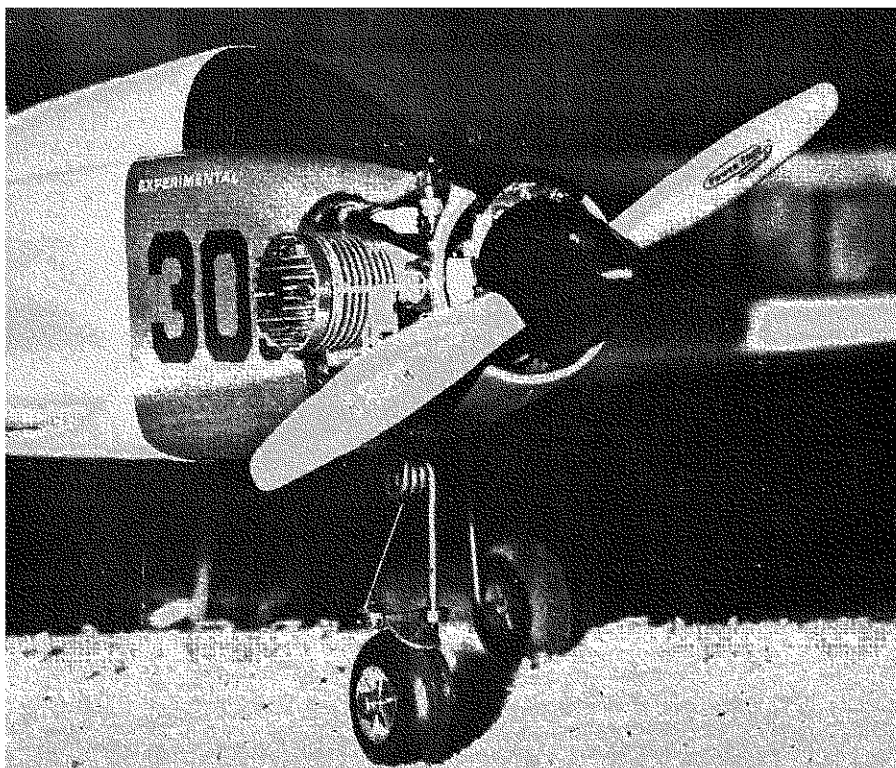
canard, a pusher, a flying wing, or some other obviously radical departure, it would be difficult to produce a new competitive machine without borrowing measurements and ideas from previous designs; Cutlass is no exception. In order to discuss design evolution, let's turn the calendar back to September '69 when I cut off a long piece of paper from the local friendly butcher's roll. After drawing a long relatively straight line to represent thrust, the first step was to determine moments. Several years experience with Citrons (interspersed with Quik-Flis, Now Orleanians, Tritons, etc.) I determined that the good old standby Citron nose moment seemed to offer the best compromise between handling characteristics and internal installations. Contrary to some, I found that very long tail moments required a lot of elevator jockeying to make nice round loops. The two airplanes I flew in 1968 and 1969 had tail moments 1½" shorter than Citron and they handled very nicely on the pitch axis and were quite capable of competing with more violent maneuvers of the AMA pattern. However, since I was striving for more smoothness, tail moment is a compromise between last years' P-51 and the good old Citron.

Next consideration was flying surface placement in relation to the thrust line. My previous airplanes had the centerline of wing and stab separated quite far from the thrust line. Supposedly, this prohibited any blanking effect on stab. New designs, such as the very fine

"Eyeball" and others, disproved this effect so now there was no reason not to bring these surfaces closer to the thrust-line. Here again Cutlass is a compromise. Common sense dictates the rolls can be more axial if the wing and stab are close to the thrust line. However, everything centered on the thrust line seemed to produce hatch problems, wing saddle and wing removal prob-

lems, long main gear problems, internal installation problems, etc. Hence, the "Cutlass" wing center line is one inch below thrust line and stab center line one inch above thrust line. This produced rolling maneuvers far superior to any other airplane I have flown. (Needless to say, I have not flown every design. This roll axis result was of my own  
*(Continued on next page)*

Frontal effect ala Triton; Veco-Lee 60; ship has flown extensively with Webra Blackhead too.



## CUTLASS . . . CONTINUED

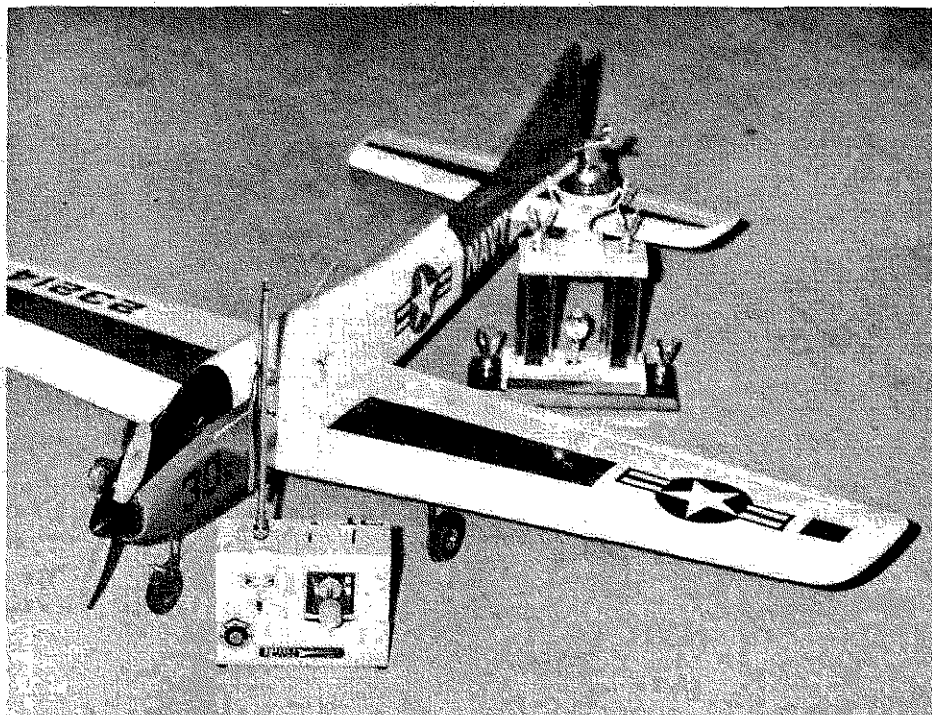
personal experience.)

Now let's consider fuselage profile. Compared again to the trusty old Citron, experience and observation dictated more lateral area. Pure old bunch and stubborn conviction made me think that a great deal of this increased lateral area should be forward of the CG; hence the Cutlass fuselage profile and subsequent appearance was the result of trying to make these ideas look like an airplane. (Many think I didn't succeed, but after all, the primary purpose was a better flying FAI type competitive machine. Note my introductory sentence.) Side mounted engine allows muffler to nestle in close to the body and throw most of the 'junk' below the airplane. Large open ring nose was borrowed from a former Triton which is pleasing to the eye and certainly allows easy linkage and engine adjustments. Also, viewed from the port side, engine is completely hidden. Rest of fuselage side view evolved from a series of erased lines, different canopy placements, and an attempt to sculpture lines ala Detroit. Hopefully, these helped to disguise vertical height. (By now that piece of butcher paper was getting pretty well mangled.)

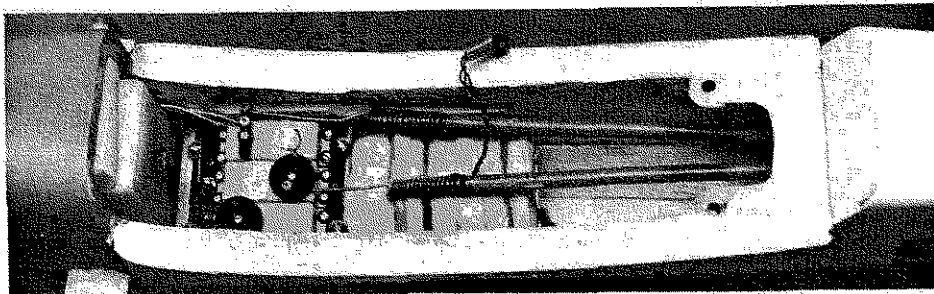
The large rudder with as much area as possible below thrust line, and placed well behind elevator hinge line, was a result of experience with last year's P-51 and P-51½. This feature makes the double stall turn on figure M a breeze. It also help spin characteristics since elevator throw is considerably reduced. Area of fixed portion of vertical stab is small, and so shaped because the movable portion is so large. After all, if you're not moving it, the movable portion acts as a fixed portion.

Stab used was identical to ones on last year's P-51 and 5-51½. I couldn't find anything particularly wrong with them. Elevator area was reduced since the FAI pattern requires more smoothness and grace.

The wing chosen was a slightly modi-



Author is an avid "single stick man" and rates Pro-Line equipment quite high; note the timer.



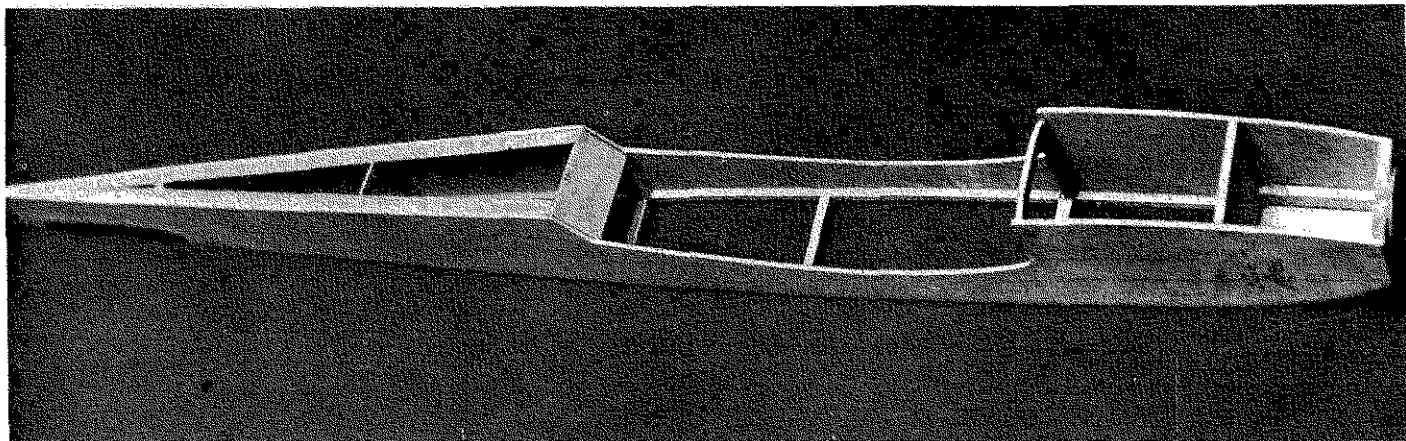
Brains of the organization; servo installation very neat. Photography by LCDR. George Dowell.

fied Triton wing. I really liked its characteristics. My experience with Jim Kirkland's design was very pleasant. You can see from all this design discussion that Cutlass is a result of mass plagiarism. I'm guilty and admit it, but am still quite proud of the result. I hope you will be, too.

### Construction Hints

Construction is very basic, so I will point out only possible pitfalls. Firewall location may have to be altered to suit

your choice of engines and mounts. Bottom corners of the firewall can best be contoured after all filler blocks are glued in place. Choice of fuel tank and position is optional. I have found, however, contrary to experience with upright and canted engines, that side mounted engines require center of tank to be even with thrust line. I don't know why, but if center of tank is a little below thrustline, it will go rich when  
(continued on page 64)



Basic fuselage structure reveals a project well within the capability of any experienced builder; note main structure attached to ¼" x ¼" crutch.

## Round and Round

(continued from page 62)

unwrap the engine and fire it up. The scream will attract everyone. Launch straight up and start wringing her out. Now—never make a level lap or they'll see you're only going 90. Put on the wildest show of maneuvering and low pullouts ever seen by man or beast. Upon landing wrap the prop and engine tightly. #2 model should be of identical shape, decoration and color. This one needs a screaming full race mill—ST 40 or K&B 40. No problem, you're not in competition with it. It should be capable of reasonably tight maneuvers, but don't do too many. Use an 8-9, 8-9½ or 8-10 wood prop and .014 dia. solid lines about 54' long. Run the beast on all the nitro she'll stand and make your flight in the groove at about 20 feet, whipping slightly. Give them enough seven lap periods to get a good honest clocking. Again, after landing, wrap it up and hide it. On this one you could start off with a stretched narrow streamer which will blow off in about three laps. Just after it blows away break into a loop or two, so any clockings are broken up. After the rest of the flyers are convinced that you can run 140 mph and fly circles around a drunken hummingbird, half your matches are won. Don't worry, tho, someone will miss your show and clean you in the second lap. Good try, champ. If you haven't tried a 9-6 prop and a little brew—40-50% in your combat mill, do so—with a streamer. Might interest you.

### Tips

1. Borrowed from the San Jose "Fish-wraper"—To clean the encrusted gunk out of old dope bottles, fill them brim full with genuine tap-water. Let this stand overnight, preferably where if it gets knocked over, it splashes on something waterproof. Next day, dump the water and wipe out the jar with a clear rag. Apparently the stuff is fuel proof a little, but not waterproof when applied to glass. Anyhoo, John Donaldson tried Ed Jacobs' idea as told to Marv Wentz and it worked. (Us too—Ed.)

2. Soldering need not be a mystery if a few steps are religiously followed: (a) CLEAN—the metal to be soldered by sanding with 320 to 400 Wetordry paper; the soldering tip with a damp rag or sponge. (b) FLUX—Dig around for Kester Soldering Paste (Blue can, no Part Number) or a good liquid flux. Electrical connections are the ONLY joints that demand rosin core solder and this, only be-

cause of corrosion. (c) HEAT—just enough. An ideal modeler's iron is the Ungar Pencil Type handle with candelabra base tips. Get their Iron-Plated tip unit #1239—37½ watt or the equivalent in a 47½ watt. These are called Hi-Heat. The irons heat quickly and have enough recovery to walk through a tank-soldering job without slowing down. Stay away from the instant-heat transformer type irons. The tip doesn't have enough mass to carry heat to the work without glowing red and vaporizing the flux. You want just enough temperature to melt the solder quickly without overheating. (d) Spread a thin coat of flux on the exact area you want to solder. Form joints with clearance and gaps no larger than 1/64 inch, preferably .003-.010 clearance. Clamp or otherwise restrain the mating parts and make a good mechanical joint before soldering. Lead-tin solders are just as soft after they are melted as before—Clear? (e) Pick up a blob of solder on the iron and place it on the joint. Heat the metal until IT melts the solder. DO NOT melt solder on the iron and expect it to bond the joint. (f) Flow on only enough solder to fill or cover the joint. Allow it to cool and check it. If you get excess solder or blobs or such-like, reheat the joint and quickly wipe the excess with a clean cloth. (g) Last — wipe the excess solder from the iron tip with a damp cloth or sponge. Do not flip it on the floor, walls or ankles like I do. When soldering wire landing gear struts, first wrap the joint tightly with a fine (#26 or so) copper or brass wire. Then solder and wipe clean. Washers as wheel keepers should be separated from the wheel by a piece of cardboard or sand paper pushed over the axle. Simply rip it off after the job is done. (h) Carefully clean away flux by wiping, washing in a mild baking soda solution and then a shot of 3-in-1 oil. Solder flux eventually aids moisture, air and temperature in corroding solderable metals. OK, now get in there and get hot.

### Just Right, Right?

Brian Donaldson has the proper feel for setting up a control system, according to his Dad, John. Caught checking controls on his new Baby Flite Streak, Brian was heard to mutter "Enough up for wing-overs . . . and enough down for crashes." Ya' know, I think he's right.

## Cutlass

(continued from page 28)

inverted.

If you should consider retract gear, a Kraft-Hayes 11 oz. tank mounted side-

ways centered on thrust line will give enough space for retract gear under the tank. Of course, this will necessitate a new vent for the tank.

Relationship between elevator, rudder pushrods and aileron control horns is somewhat critical. Following plans here will be helpful. This will have aileron control horns straddling elevator pushrod with rudder pushrod running to outside of port aileron control horn.

Only other thought on body construction is to fill in unused space in fuel tank compartment with soft, punky, sheet balsa. Also fill in area between wing saddle and crutch top longeron with ¼" sheet balsa. All this thick punky balsa has a purpose in soaking up engine vibration and will make your Cutlass as heavy as mine. Seriously, soaking up vibration is extremely good for the radio. My seven lb. weight is not due to the punky balsa filler sheets or external finish. It is due to some mistakes I made (which I don't care to confess at this time). I'm sure that by following plans and with careful selection of wood it can be built within a 6½ lb. range.

Wing and stab are straight forward balsa covered foam. The entire set up is 0-0 with a little right thrust.

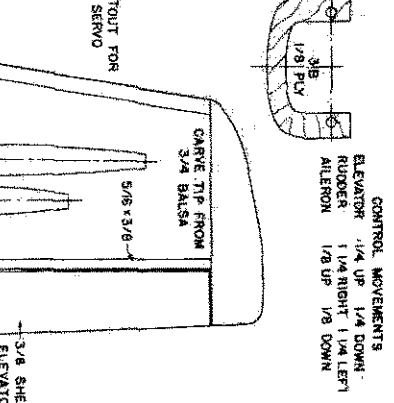
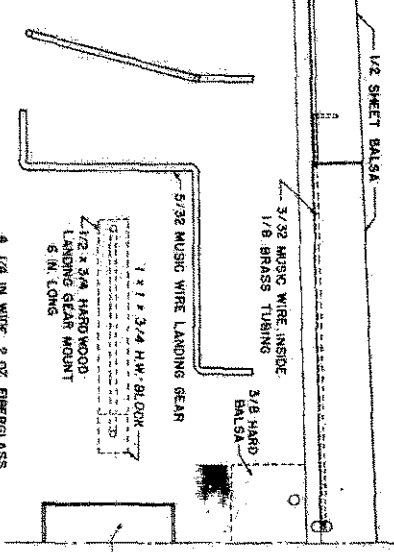
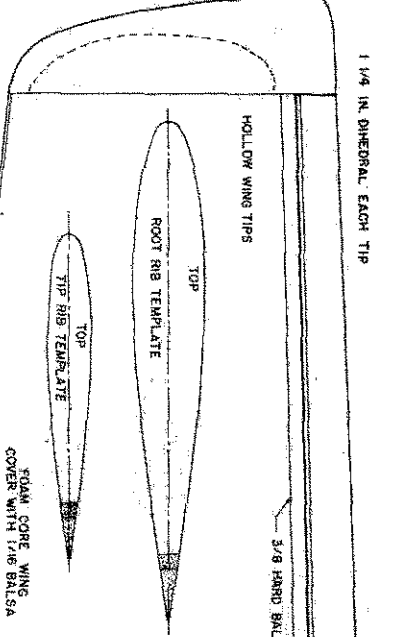
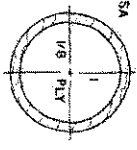
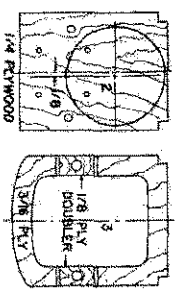
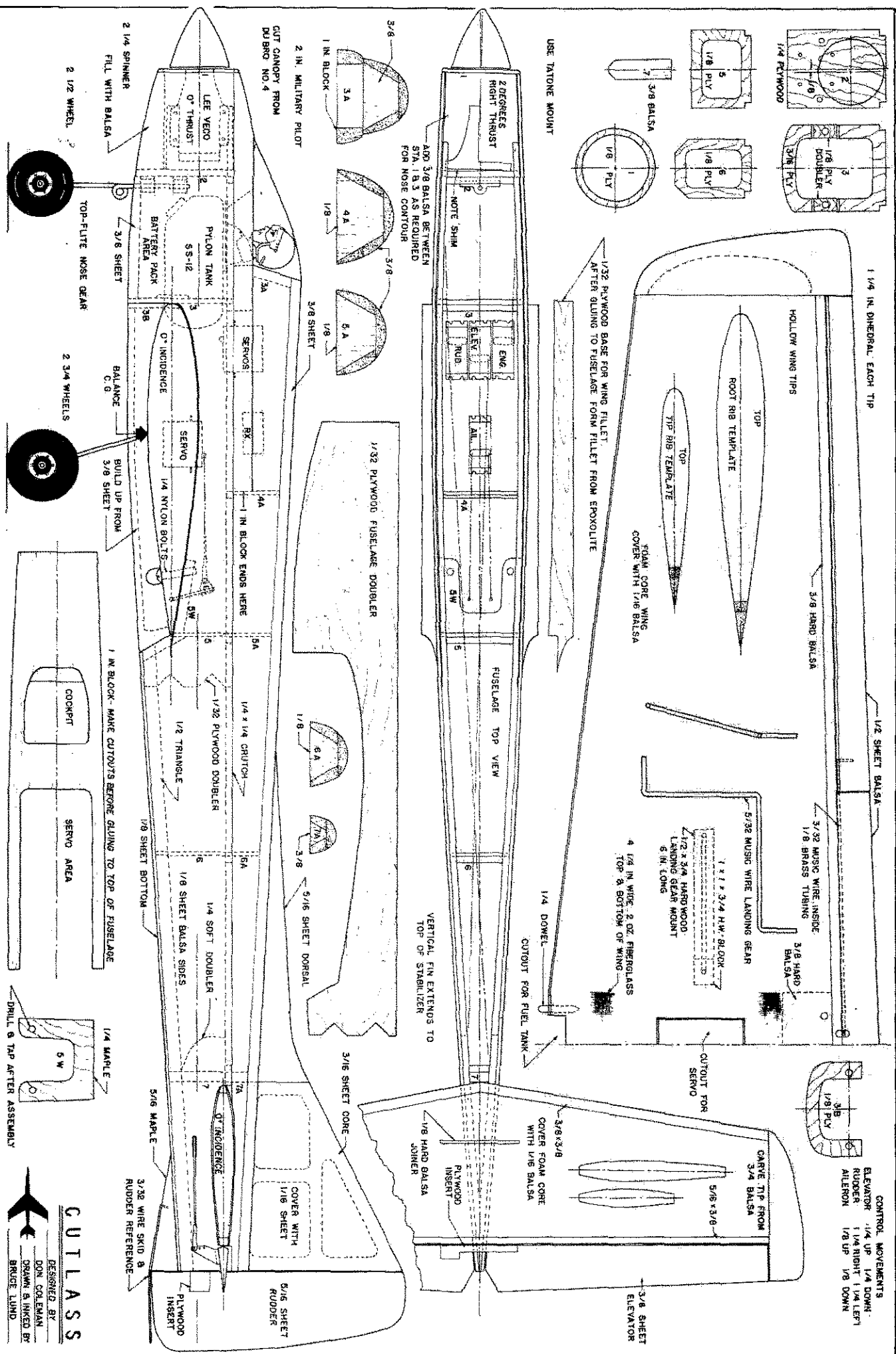
Finish: The Cutlass prototype was a first attempt with a new finish method using two new products called Skyloft and Flex-all. These materials were developed and tested by Ron Chidgey and me and are available from Southern R/C Products, 527 Pecan St., Citronelle, Ala. 36522. Flex-all is a plasticizer for acrylic lacquer and primer and butyrate dope. Skyloft is a continuous filament spunbonded nylon that looks like silkspan but has unbelievable strength coupled with very little weight. Its greatest asset is its extreme fillability.

For an old easy-does-it man, it took some soul searching to go back to a dope base finish; however those in attendance at the Tangerine Internats will agree that the effort apparently paid off. The final results may not be any better than my best easy-does-it results, but the external finish is much more chip resistant and durable. I used Aero Gloss clear dope treated with Flex-all and thinned with a fast drying acrylic lacquer thinner (Martin-Seynour 3099). Acrylic primer and acrylic paint used was also Martin-Seynour treated with Flex-all. Final mist coat of acrylic paint used was thinned with Martin-Seynour 3095 thinner. Flex-all in acrylic, in addition to absolutely preventing cracks and crazes, aids in gloss retention. It is never necessary to rub out and wax after this procedure unless you make mistakes in masking.

The finish method consists of the following layers:

1. Two coats of dope on the bare wood—brushed.
2. One coat of thinned dope to seal the Skyloft to the wood-brushed.
3. Three coats of dope to fill the Skyloft—brushed (How's that for quick filling!)
4. One or two thin coats of acrylic primer depending on how active you were with the sandpaper; sprayed.
5. Two, three or four coats of acrylic lacquer to obtain complete coverage; sprayed.
6. That's it—you're through.

Unless you get carried away with the spray gun, this will rapidly produce a very light smooth and glossy and extremely durable finish. For those who wish more detail, please write Southern R/C Products and we will be happy to send our Skyloft instruction sheet.



**CONTROL MOVEMENTS**  
 ELEVATOR 1/4 UP 1/4 DOWN  
 RUDDER 1/4 RIGHT 1/4 LEFT  
 AILERON 1/8 UP 1/8 DOWN

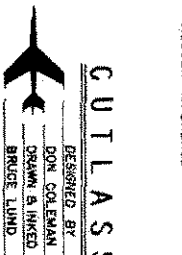
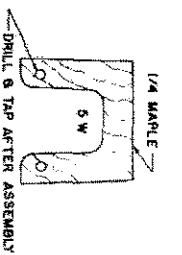
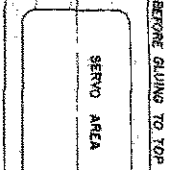
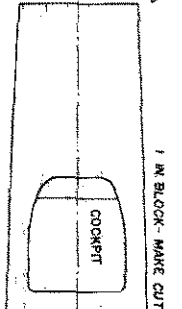
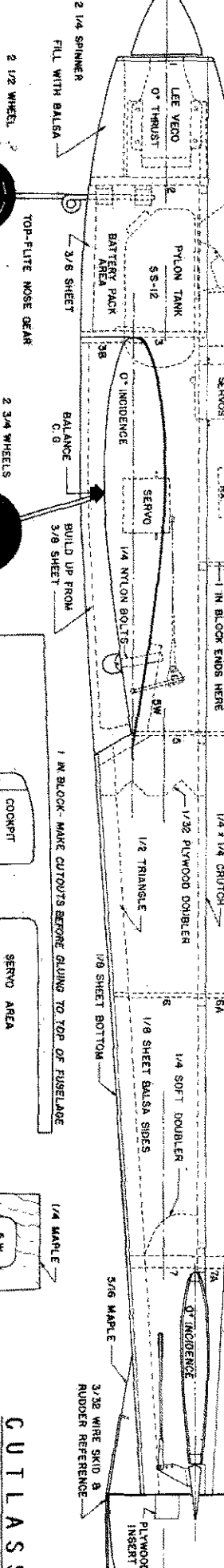
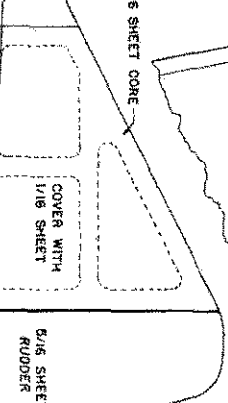
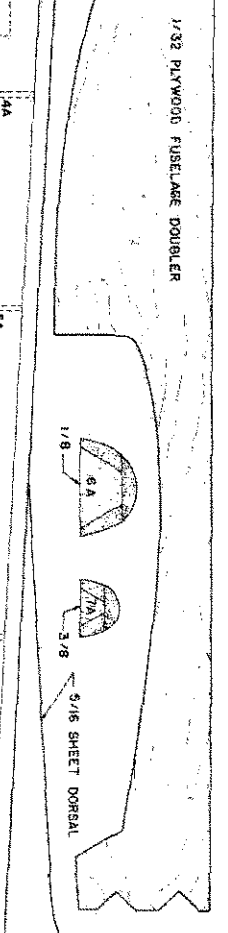
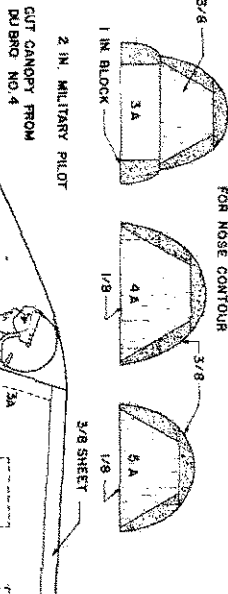
USE TATONE MOUNT

ADD 3/8 Balsa BETWEEN STA. 1, 2, 3 AS REQUIRED FOR NOSE CONTOUR

1/32 PLYWOOD BASE FOR WING FILLET AFTER GLUING TO FUSELAGE FORM FILLET FROM EPOXYLITE

VERTICAL FIN EXTENDS TO TOP OF STABILIZER

1/4 DOWEL CUTOFF FOR FUEL TANK



**CUTLASS**

DESIGNED BY DON COLEMAN  
 DRAWN & INKED BY BRUCE LUND