Lil' Eaglet

by Bob Aberle W2GPP

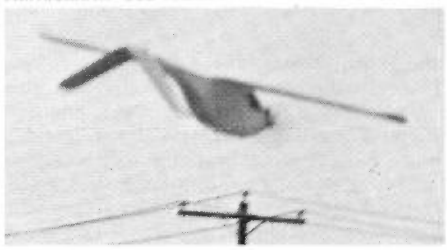
We've got lightweight digital proportionals and the Cox .010 is a powerhouse. Here's the ship for them.

During the past year several R/C manufacturers have introduced new lines of *sub*miniature radio systems. The major breakthrough in this new generation of micro R/C equipment is the Dunham D5 servo mechanics and case which utilize a new 12 mm electric motor. As of this writing two manufacturers are actually producing these small radio systems. One is the Mathes Electronics Co. of Lake Havasu City, Arizona (this system will be reviewed shortly in FLYING MODELS). The other is the Cannon Super-Mini system which has already been reviewed in the January 1977 issue of this magazine. In addition, assembled Dunham D5 servos can be purchased from Litco Systems, P.O. Box 90, East Hanover, New Jersey 07936. And if you are real ambitious you could even build your own D5 servo from a kit offered by D. & D. Electronic Specialists, P.O. Box 2102, Lake Havasu City, Arizona 86403. In the next year I predict even more R/C manufacturers will enter the subminiature field.

What kind of radio system weight are we talking about? Well, for design purposes let's say a shade under 4 ounces for two channel digital proportional control using the new compact 100 mah batteries. The type of model airplane that can be designed around such a radio system offers many new advantages worth considering. Model engines .049 and smaller use very little fuel. Construction time may require only several nights instead of several months. The planes themselves involve very little material. For example, one roll of Super MonoKote or Solarfilm could cover a half dozen or more models of this size. The occasional crashes result in little damage which can easily be repaired. Flying fields can be reduced in size to the point where local school yard sized clearings or baseball fields will suffice. There is even the possibility of indoor R/C flying according to Ron Shean in a recent RC Modeler article. Think of it, flying R/C in your shirt sleeves while there is snow outside on the ground. Of course there are also several disadvantages which must be considered. First of all the tiny airplanes do require some additional patience on the part of the builder, especially when it comes time to install the radio system. Also because of the small size these models can be a little difficult to fly, requiring some previous flying experience. Above all have your eyes checked. Your vision must be at its best to keep up with such small models. I personally think the advantages outweigh the disadvantages. Experience gained in the next year or so will even improve this situation. We are now just starting to hear about all kinds of new ½A R/C competition. Events such as ½A Stand-Off Scale, ½A Pattern, Quickie 200 and 100 racing and more. Competition is always the best stimulant.

It was with all of this in mind that I decided to see just how small I could design and build a *practical* R/C model powered by the smallest commercially available engine, the Cox TD .010. I must admit I relied quite strongly on my experience gained last year with my little Cannonball (July 1976 Flying Models) which was powered by a Cox TD .020. The Cannonball had a 125 sq. in. wing and weighed approximately 12 ounces. To my surprise the

PHOTOGRAPHY: BOB ABERLE



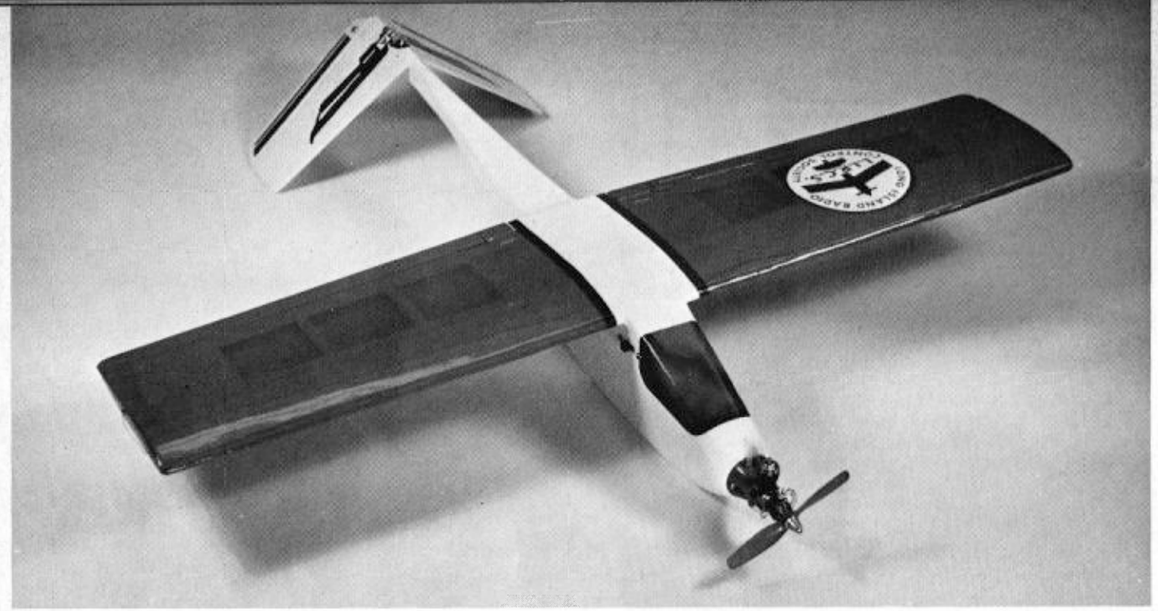
Cox TD .010, using the standard 3″ diameter Cox prop, turns up close to 27,000 rpm. As such its power is roughly equal to 75% of that produced by the TD .020. Engine experts might dispute this with me but I'm going strictly by my experience. Since the TD .010 has so much power I decided to compromise the wing area at approximately 100 sq. in. for my new design. Some might have considered 60 to 70 sq. in. more appropriate. I felt the slightly larger area would provide for smoother performance. Remember, your flying enjoyment should also be considered. If your only criteria is to build small you could make your wingspan some ridiculous number, such as 7″. But, you would be flying literally a controlled bomb. Another consideration was the wingspan. The Cannonball had a 22″ span and an aspect ratio (AR) of 3.83. It is still flying after 80 flights and two small crashes. However, I always felt that the aileron response was a little too sensitive around neutral. This causes the plane to appear a little *jumpy* or like it is constantly searching for a level attitude. A brief film prepared by Mr. George M. Myers shows this characteristic of the Cannonball quite clearly. The film itself is still being circulated to various clubs throughout the country. To achieve a more comfortable feel I chose the same 22″ wingspan as the Cannonball, which now increases the AR to 4.8. Next most important item was my design weight. To keep the wing loading reasonable (around 13 oz./sq. ft.) I decided on a total weight of 9 ounces. This works out to 4 ounces for the model itself, 4 ounces for the radio and finally ½ ounce for the TD .010 engine. I also figured on an additional growth factor of ½ ounce to cover the foam rubber padding. My actual weight ready to fly came out to exactly 8.8 ounces which I felt was perfect after initial flight testing. In fact I have no doubt that the model would fly equally as well at a full 10 ounce total weight. As I pointed out in the Cannonball article, a 4 ounce model (bare weight) can still produce a very sound structure. I still employed spruce wing spars and some spruce reinforcement in the fuselage. I even used 1/32″ plywood doublers on the inside of the fuselage. With all of this the finished structure came out a little under 4 ounces.

Now let's talk about the configuration. I wouldn't be happy unless I did something different each time on a new design. As you must be aware by now I try to use all types of tail designs to create varied appearances. I had in mind for some time the possibility of using an inverted "V" tail. Does an inverted "V" tail have any precedence in aircraft design? If you read the various full scale aircraft publications you know the answer is yes! Molt Taylor's Mini-Imp made the scene at the EAA shows several years ago. A three view and some photographs appeared on page 21 of the February 1976, Model Aviation. This plane has an inverted "V" tail and a rear mounted pusher prop. Professor Edgar Lesher designed the Teal experimental homebuilt which also utilizes this inverted tail. You can read about this plane in the Air Trails Homebuilt Aircraft, Summer 1970, page 11 (photographs and three view). I even found reference to an old Free Flight design using this "V" type of tail, called the Kewpie. I found a photo of one in the February 1956, Model Airplane News, page 13.

All of these references gave me certain confidence in the basic design approach. However, the final inspiration came from the AmEagle Corporation's, American Eaglet powered glider. This full size plane was designed by Mr. Larry Haig and was flown and displayed at the 1976 EAA Oshkosh Fly-In. I purchased an introductory data package for $3.00 (AmEagle Corp., 841 Winslow Court, Muskegon, Michigan 49441). The basic American Eaglet design employs a pod and boom fuselage. A small horsepower motor located at the rear of the pod powers this single place glider. The engine can be turned off in flight after gaining altitude. In this mode the propeller blades fold back into the airstream. My resulting design utilizes the basic pod with a semi-boom fuselage and an inverted "V" tail (as in the full size American Eaglet). For simplicity the model engine was placed up front on the nose. Because of the basic resemblance I called my model the Lil' Eaglet. In reality it is not even a Stand-Off Scale. This was not my intention. However, those truly interested in a scale powered glider project would do well to purchase the AmEagle data package.

Construction

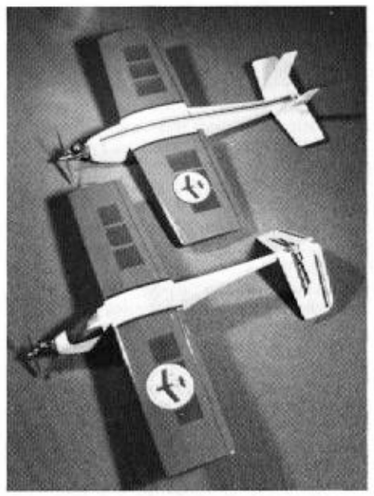
Start out by purchasing three basic sheets of balsa. Select a medium to slightly hard sheet of 1/32″x4″x36″. This will take care of all the wing sheeting, with very



A basic pod and boom fuselage design, along with an inverted V-tail. Inspired by the AmEagle Corp. American Eaglet, a full size powered glider referenced to in text. Tail style works well on .010 sized ships, but might be more prone to landing damage on larger displacement models.

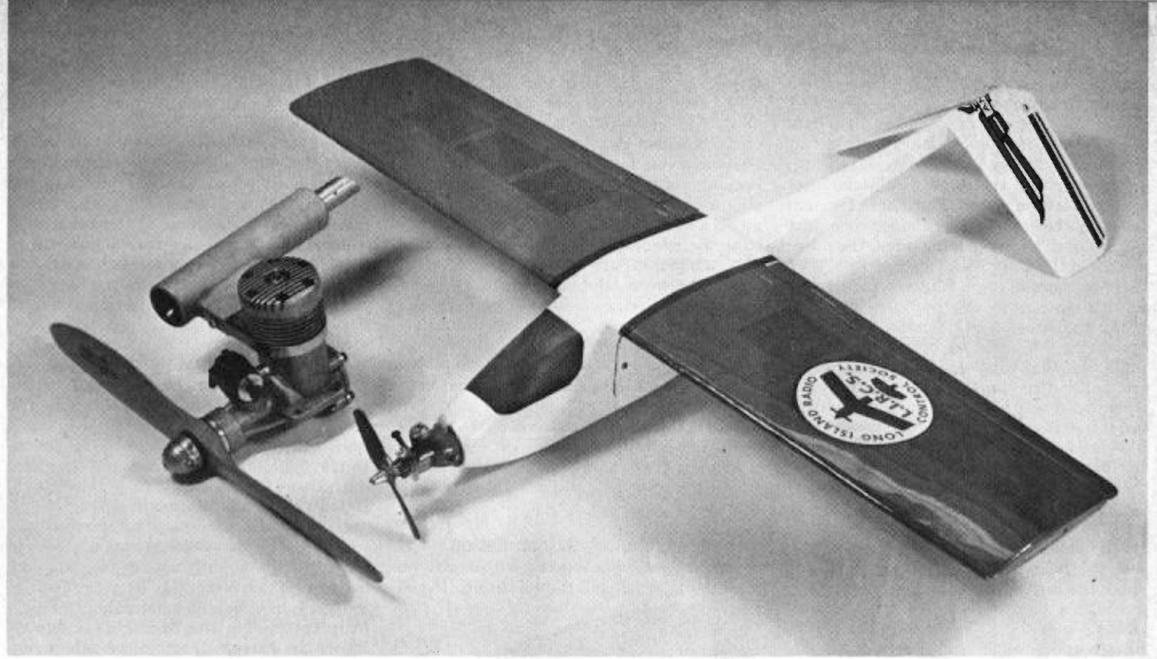
little left over. Next select a medium grade sheet of 1/16"x4"x36". Use this for the fuselage sides and also the wing ribs. Finally select a medium to soft piece of 1/32"x3" x36" for the tail and fuselage planking (top and bottom). The only other material required is some scrap 3/16" soft balsa for the fuselage longerons, several pieces of spruce, some scrap pieces of 1/32" and 1/8" plywood and the 1/8"x1/4" balsa leading and trailing edges. Depending on the size of your scrap box you could easily build this model for under $5.00.

It is most important that this little model be built exactly in the order described. If you follow these detailed instructions you shouldn't experience any difficulty. Begin with the wing. Cut out the two rib templates from 1/32" plywood. Next slice a stack of wing rib blanks (over sized pieces) from 1/16" balsa. The exact number of blanks required for one wing half is five. The entire stack is held together with two 4-40x1" machine screws. A 1/8" (.125") diameter drill will give you the proper clearance hole for these screws. Shape the blanks down to the templates with a long model knife carving blade. Finish off with a little sandpaper and mark the spar location before separating the stack. Be careful to number each rib with a small felt tipped marker or ball point pen so that they don't get out of place. Repeat this entire process so that a set of ribs are available for the other wing panel. Now make one 1/16" balsa center rib exactly the same as the plywood template. Also make two tip ribs out of 3/32" balsa using the tip templates. You are now ready for the wing assembly. I always use steel wire or drill rod as a sort of assembly jig. Two 1/8" diameter wires will do fine in this case. Slip all the ribs, in the proper order, on to the two steel wires. Suspend these wires or rods over the full size wing plans. Use wood blocks at each end to support these wires a short distance off the building board (usually just enough for the ribs to clear the board). Space all the ribs out over the plans in their correct locations. Add the 1/8"x1/4" balsa leading edge and another piece of the same material at the trailing edge. Hot Stuff or Zap will speed up the assembly process at this time. Next add the two 1/16"x3/16" (or as close to that size as you can get) spruce spars. If you have trouble locating this size spruce try the model railroad section of your local hobby shop. They usually carry a large assortment in 24" lengths. With only a 22" wingspan this isn't any problem. Proceed with the sheeting of the wing. Do the entire top first (leading edge, trailing edge, center and tips). At this point you can remove the wing assembly and flip it upside down. Now sheet the bottom areas of the wing as noted on the plans. The wing is now essentially complete. You can remove both of the steel rods at this time. Since the wing is flat (no dihedral) no center-section joining or bracing is required. The holes remaining in the ribs will be used later on for the rigging of an internal radio system antenna. More on this later.



This picture is deceiving. Bob's Cannonball in background is larger, heavier, for .020's, ran in July '76 FM. Both colorful for visibility.

Next item is the ailerons. I used standard 1/8"x1/2" balsa trailing edge stock for this. Cut both ailerons out to size. Mark the hinge locations and make a slot at each spot with a modeling knife. For hinges I used the 5 mil drafting mylar again. These same hinges have been in my Cannonball for over a year and have never cracked or parted. My big concern originally was that the cold weather would cause the hinges to ultimately break. The fact of the matter is that they haven't. Cut the mylar to 1/4" width strips approximately 3/4" long. Use three hinges on each aileron. Because of the small size involved you will have to make up your own aileron torque rods. I used 1/32" diameter wire inside of 1/16" I.D. brass tubing. The connections at the end of the rods were fabricated from electrical spade lugs which were silver soldered to the wire. A 1/16" diameter hole has to be drilled in each lug to accept the Goldberg Mini-Links. Because of the unusual control setup I was forced to initially construct a mockup of the forward fuselage (something you won't have to do). This enabled me to experiment with the aileron linkage until the proper lengths could be determined. The final length of each torque rod from the hinge point (brass tubing) down to the spade lug should be exactly 1 1/2". Because of the tight space it is also a good idea to prepare the two aileron pushrods at this time. I used Goldberg AP-1, 1/16" aileron pushrods. These are new in the sense that Carl has made them available with 1/16" (.062") diameter wire. Unfortunately the pushrods come with the large snap links. You will therefore have to swap these for the smaller



Mini-Snaps (Goldberg MS-2). Prepare both of these pushrods so that the distance from the Mini-Snap pin to the servo output arm is exactly 1 1/2". Make sure both pushrods are identical in length. You might as well snap the links on to the aileron torque rods at this time because it will be difficult to reach in through the radio access hatch to do this later on.

Both of my Cannon CE-8 (Dunham D5 mechanics) servos rotated in the same direction. To achieve the proper control response I was forced to invert the aileron servo as shown on the plans. The resulting long torque rod length cut down on the amount of aileron throw. Unfortunately my servos only came with a single triangular shaped output arm (a single sided adjustable arm is provided but will not enable both ailerons to be connected). To obtain more throw I had to move the aileron pushrods out further than was possible using the standard output arm. The easy solution to this was to install a larger output arm from a D&R Bantam servo, directly on top of the existing smaller Dunham arm. Two small sheet metal screws will hold this new arm in place. Now you can use the new outside holes (on both sides) to obtain the correct amount of aileron travel. If you follow this procedure you should be able to obtain approximately plus or minus 1/8" in aileron movement. This entire process is certainly easier than opening up the little servo and attempting to reverse the electric motor polarity.

Once you have the aileron torque rod assemblies all set, temporarily install the ailerons with the mylar hinges (do not cement the hinges at this time). With the ailerons in place epoxy the two pieces of brass tubing to the balsa trailing edge. The last step is to fill in the area around the brass tubing with several scrap pieces of 1/8"x1/2" trailing edge stock. Remove the ailerons and put them aside for awhile. Finish sand the entire wing with #220 and #400 paper.

You are now ready for the fuselage. First cut out two identical fuselage sides from the single sheet of 1/16" balsa. I generally make a set of templates out of tracing paper and manila folders (card stock). I first copy the outline of each part on the tracing paper. Then I rubber cement the tracing paper to the manila folders (joined together if necessary). When the cement dries I cut to the tracing paper line and the result is a template which can be saved in a file drawer for future use (especially handy for repairs later on). Spot glue (lightly) two oversized pieces of the 1/16" balsa together. Place your template on the balsa and mark the outline with a felt tipped marker (fine point variety). Cut the sides carefully to this line. Sand a little to smooth out some of the rough areas. Now carefully separate the two pieces of 1/16" balsa and you now have two identical sides. Prepare one right and one left side (not two rights please!). Cement the 3/16" balsa sheet longerons in place. Don't try to bend strips of 3/16" balsa around these curves. The sharp curves along the bottom of the fuselage would put too much stress on the wood. Also cement the spruce reinforcement strips in place. This strip runs from the forward area of the wing all the way back to the tail cone (on both sides).

Memories. Don stops by to see the newest .010 insect. Bob's 1950ish transmitter a bit huge. At top: A Veco .61 visits for size comparison.

Before going any further, cut out the radio access hatch cover from the *left* fuselage side. A full size pattern of this cover appears on the plans. Slice this out carefully since you want to end up with a good fit later on. Cut out two fuselage doublers. I used 1/32" plywood which is easy to obtain. If you have access to 1/64" thick plywood by all means use it, it will save a little extra weight. Before cementing the ply doublers in position you must also cut out an opening for the radio access hatch (left side doubler only). Follow the plans closely at this point. The opening in the plywood doubler is approximately 1/16" smaller all around than the opening you just made in the balsa fuselage side. Cement both ply doublers to the balsa sides (on the inside, of course). Use 5-minute epoxy for this. Make sure that the left side doubler is positioned so that it aligns with the opening cut out of the balsa side. If you did this right there should be a plywood lip or ledge equally spaced all around. The access hatch cover will go directly up against this plywood lip. You could also at this time cement the cut out piece of the plywood doubler to the inside of the balsa hatch cover. This will form a balsa/plywood sandwich with a lot more strength.

Cut out the 1/8" plywood firewall. Drill for the TD .010 engine and attach it using 2-56 screws with blind mounting nuts. Put some 5-minute epoxy on these nuts but be careful not to get any on the threads.

Remove the engine from the firewall. Now you are ready for the assembly. Remember, no formers are used on the final product. To help in the assembly I made two temporary formers out of 1/16" balsa. Both formers were of the same width (see fuselage top view on plans). Place both formers between the two fuselage sides, one just in front of the wing leading edge, the other just aft of the wing trailing edge. Spot glue these formers *lightly*. Align the two sides so that they are exactly parallel. Now epoxy the firewall in position. Apply the 3/32" balsa top sheeting between the firewall and the wing leading edge (cross grained). Also supply approximately 3" of 3/32" sheeting along the fuselage bottom from the firewall rearward. As soon as the glue dries remove the forward temporary former. At this point you will attach the completed wing to the fuselage using 5-minute epoxy. Make sure those aileron pushrods are facing forward or you will surely have trouble later on. Proceed with the 3/32" balsa bottom sheeting until you reach the area of the other temporary former. Now remove that former as well. Again when the glue dries pull the two sides together at the tail. I actually clamped the sides together in the entire area that accepts the "V" tail. Use plenty of epoxy at this high stress area. This is a good time to install the outer Gold N' Rod for the elevator control. This rod will exit out the bottom of the fuselage towards the rear. The forward portion should run all the way up to the mid point of the wing. Epoxy this rod in place. Now finish all the remaining 3/32" balsa fuselage planking (cross grained). Rough carve and then finish sand the entire fuselage. Round all the edges and sand the forward section into the round firewall.

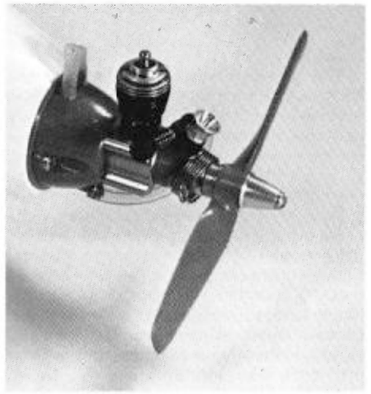
Put the wing/fuselage assembly aside for a moment. Cut out the "V" tail from 3/32" balsa. Notice the spruce inserts in both stab tips for obvious reasons. Bevel the center edges of the stab halves and then join at the proper angle with epoxy cement. Cut the slots for the 5 mil mylar hinges. Prefit the hinges at this time. For control horns I still buy Goldberg 1/2A bellcrank kits (BCH-1) which includes one neat little horn in each package. For 25 cents it's still not a bad buy, but I sure have a lot of bellcranks lying around my shop. (I wish Carl would make these horns available separately!) Attach both horns in place temporarily. The actual elevator hook-up is easy. Use one Du Bro (#111) threaded coupler. Cut off the coupler about 1/8" before the threads, then make a small slot in the solid end with a Dremel grinding wheel. Bend a small piece (approximately 1" in length) of 1/32" diameter wire at 90 degrees and solder this wire into the slot in the coupler. Thread the coupler into the inner Gold N' Rod and you are all set. No binding occured with this arrangement. Best of all it is real light in weight. Disconnect the elevator and linkage at this point. Install the "V" tail to the fuselage and align it carefully. Spot it in position with Zap, then follow with 5-minute epoxy. That really completes the model structure.

Finishing

The fuselage and tail were painted while the wing received a plastic film covering. I started by applying two coats of K&B primer to the fuselage and tail. Sand between each coat of primer with #320 paper (dry). This was followed with two coats of K&B Super Poxy white. For the small area involved I got away with using the regular spray catalyst. It works reasonably well with a brush so long as you don't go back over the same area. I wasn't about to spray indoors (it is zero degrees outside at this moment) after all the recent warnings concerning epoxy paints. The wing and ailerons were covered with Super MonoKote transparent red which unfortunately these days is more opaque than transparent. The junction between the MonoKote and the paint was covered with 1/4" wide Bridi trim tape (in blue). I've found this red, white and blue color scheme very visible which is an important consideration on these small models. Remember, if you can't see it, you can't fly it (wasn't that awful!).

Control Surface Installation

At this point you must permanently install the ailerons and the elevators. If you already pre-fitted the surfaces, as described earlier, the final job is easy. Insert the 5 mil mylar hinges into both ailerons (three on each side). Leave approximately 3/8" protruding. Apply Hot Stuff or Zap at the hinge line (not too much!). Let dry for several minutes (to make sure). Now insert a small piece of wax paper between the aileron torque rod and the wing trailing edge. This will prevent the glue from jamming the aileron. Apply 5-minute epoxy to the torque rod wire, then quickly insert the wire into the hole in the aileron. At the same time you will also have to insert all three mylar hinges in their respective slots. Push the aileron all the way up so that a minimum gap exists between the aileron and the wing trailing edge. Now apply Hot Stuff again at the hinge line and let it dry. Remove the wax paper and you have a free moving aileron. Repeat this process for the other aileron.



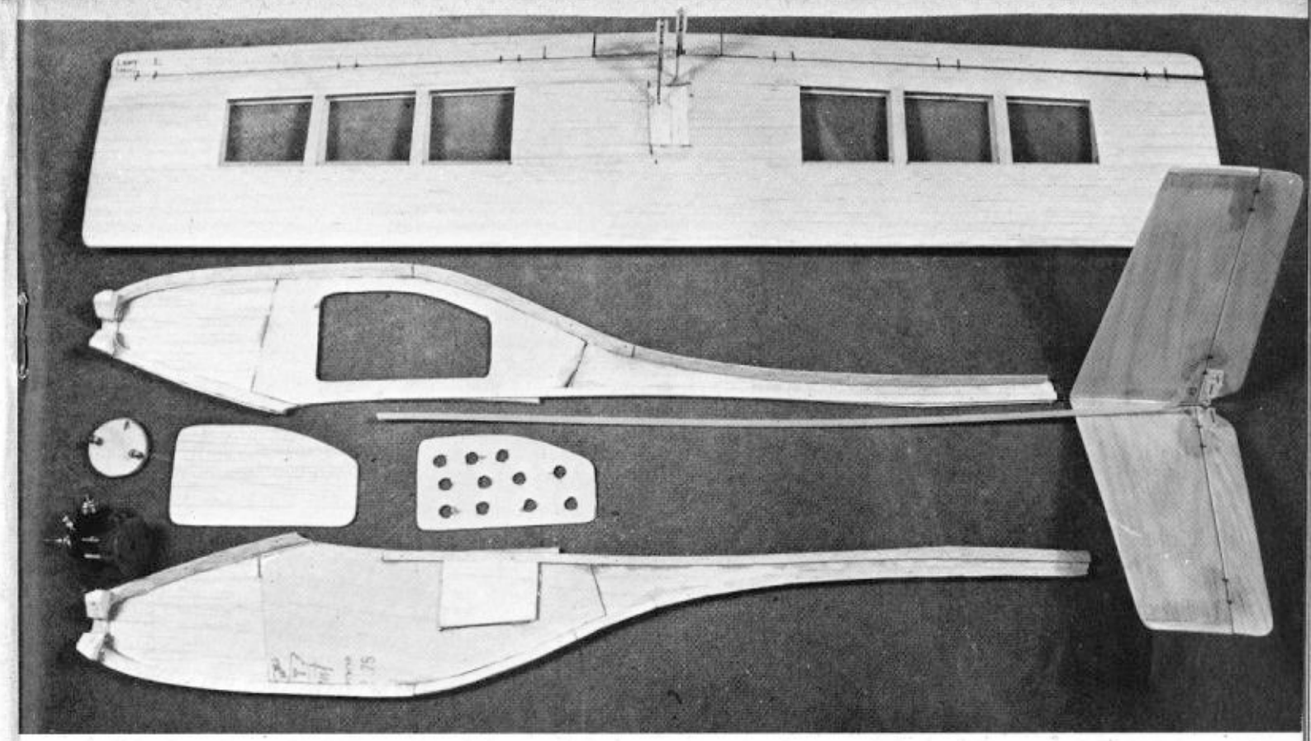
Tubing on tank prevents syphoning. You must put a pin hole in it. Cox TD .010 and 3" dia. prop.

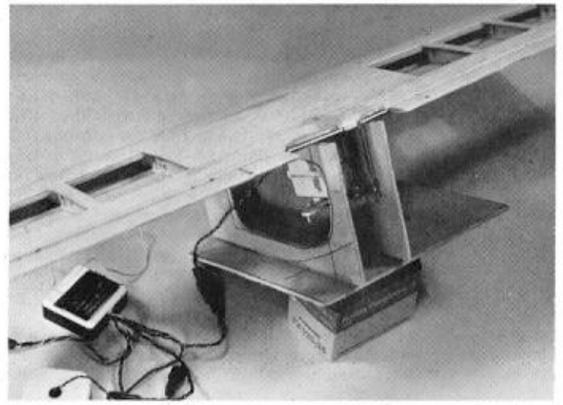
The "V" tail elevator installation is even easier. First thread your tail coupler into the inner Gold N' Rod. Slip this rod in position so that the other end protrudes into the forward area of the R/C compartment. Insert the 5 mil mylar hinges into each elevator (two on each). Apply Hot Stuff and let it dry. Next install the elevator to the stab (both sides) and while doing this insert the 1/32" diameter wire into each control horn. Close the gap between the two surfaces and again apply Hot Stuff. Fore and aft movement of the inner control rod should produce free movement of the elevators. Make sure both elevators are at neutral position. If not the only way you can adjust this is by moving the location of the control horns.

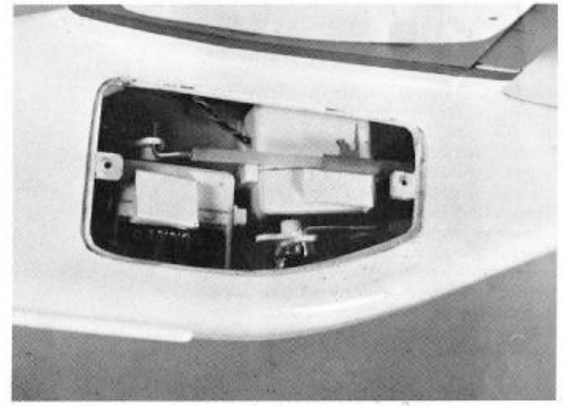
Radio Installation

I found this to be the most tedious job of the entire project. The prototype Lil' Eaglet used a Cannon Super Mini radio system. This system employs the miniature Dunham D5 servo mechanics and these are the only servos which will fit in this design. If you choose the Mathes Electronics system it will be necessary to increase the width of the fuselage by approximately 1/4" to fit the slightly larger receiver and battery pack. Wrap the battery pack in 1/8" thick lightweight foam rubber or poly foam as used in the packaging industry. Insert the battery through the side access hatch opening and push it all the way forward until it rests against the firewall. Cut a slot just forward of the wing leading edge and install the switch. Now wrap the receiver in some more foam rubber and insert it into position directly behind the battery pack. The antenna wire will be inserted into a small cut out in the bottom wing sheeting near the forward jig wire holes. Insert a piece of inner Gold N' Rod from the wing tip until it just appears in the center-section opening just described. Insert the antenna wire inside the rod and feed it all the way out to the tip. Withdraw the rod and pull the remainder of the antenna out the tip. You will still have about 9" of antenna hanging out the wing. Take the inner Gold N' Rod and insert it from the opposite wing tip into the *rear* jig wire holes. Pass it all the way through the wing so that it protrudes out the opposite side. Now stuff the remaining antenna into the rod and then pull the rod out the other side. You now have a complete internal antenna which is suspended around the inside of the wing structure. I have used this technique on all my planes with great success.

Now for the servos. Both servos are actually attached with double sided (1/8") mounting tape to the right side of the fuselage. Because of the extended servo output arm added to the aileron servo it was necessary to glue a piece of 3/32" balsa to the right fuselage side to act as a spacer. The combination of this balsa plus the 1/8" mounting tape will provide the proper clearance. By the way it is most important to *seal the surface* where the mounting tape is applied. If you were to put this tape on bare unfinished balsa, the servo would fall off within an hour. So please wipe a little 5-minute epoxy over the area to seal it. Do this to the plywood doubler for the elevator servo as well. Cut out two strips of mounting tape and place it on the correct side of the aileron servo. Carefully move the servo into position. Reach in through the access hatch opening and insert both aileron pushrods into their appropriate holes in the servo output arm. Remember, the aileron servo will be upside down.

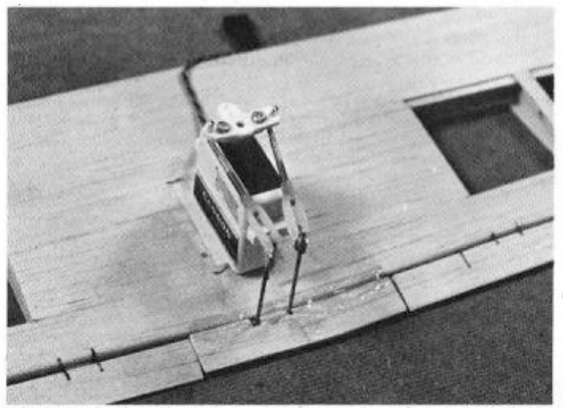


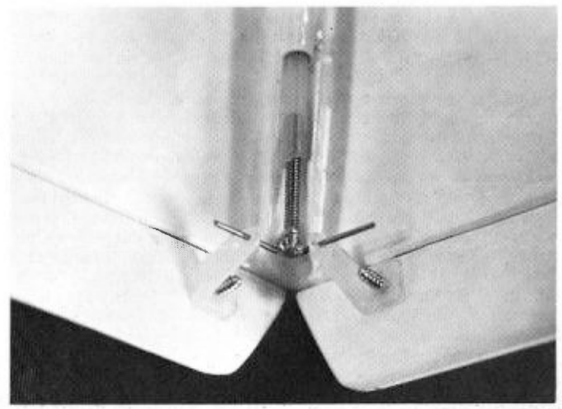


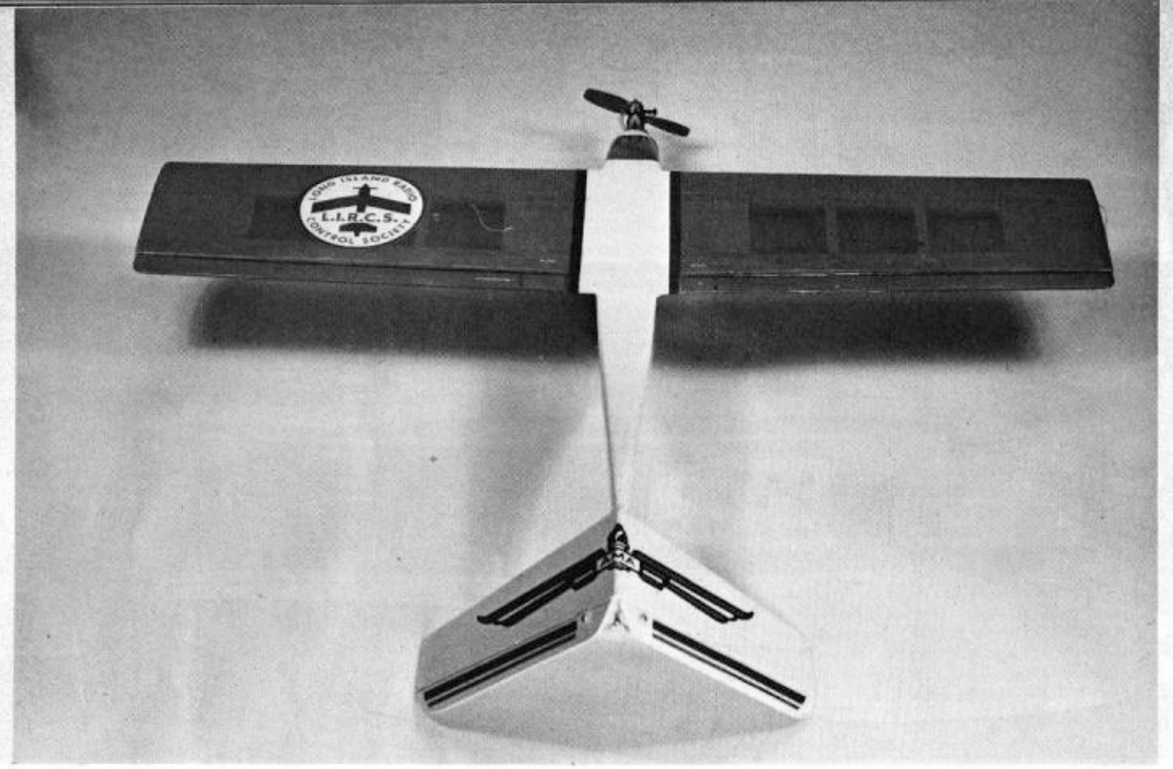


Mock-up of the fuselage was built first to prove out aileron linkages. **At top:** Eaglet's sub-assemblies, three sheets of balsa. Constructs fast. **Below:** D&R Bantam output arm to increase throw. Servo not positioned.

Aileron servo inverted, Gold N' Rod connects to elevator. It all fits. **Beneath:** Neat V-tailed coupling arrangement. Du Bro threaded coupler and 1/32" dia. wire soldered in place. Horns from Goldberg's 1/2A bellcrank.







Before pressing the aileron servo in place move it fore and aft until both ailerons are at exact neutral. Now press down firmly and the servo is set in place. Cut the inner Gold N' Rod for the elevator to the correct length. Insert a threaded 1/16" diameter rod into it, then bend the end of this rod at 90 degrees. Place two strips of mounting tape on the elevator servo. This servo mounts in the upright position. Insert it into position and also move it fore and aft until the elevators are at neutral position. Now press the tape firmly. Connect the two servo cables and don't forget to leave the battery connection plug close to the access cover opening. Then all you will have to do is reach in and pull this cable out for charging. The hatch cover itself is held in place with two #2x1/4" sheet metal screws which were anchored into scrap pieces of 1/8" hardwood. As described my model balanced exactly as shown on the plans. Don't allow the C.G. to go further aft of this position. If it does add weight to the nose *before* your first flight.

Flying

This model was completed in early February. Despite our cold northeast weather I was able to get a few check flights to basically verify the design. Our first flight session was held in 35 degree temperatures with gusty winds ranging from 15 to 20 mph. Needless to say a plane as small as this does not perform too well in strong winds. I would recommend nothing over 10 mph, at least for a start. The little Cox TD .010 refused to start on the spring starter but did finally start (and quite easily at that) with the new Astro Flight Mini-Starter. Using George Aldrich 50% nitro Magnum fuel I was only able to obtain about 1½ minute engine runs. The only alternative to obtain a longer run would be to install a small pen bladder pressure tank, possibly letting it hang off the side of the fuselage. With an electric starter it is quite practical to run pressure this way. It's worth the extra effort if you get real serious with this size engine. It would be nice if some accessory manufacturer would offer a series of enlarged tanks for the TD .010 and .020. I also understand that the new Davis Diesel Development TD engine diesel conversion heads will enable considerably longer engine runs than could be expected with regular glow fuel. Power is claimed to be comparable. Those interested might contact Mr. Bob Davis at Box 141, Milford, Conn. 06460.

Temperature was around 30 or 35, winds 15 to 20, stronger in gusts. A little much for both man and machine. .010 types are wind sensitive.

On my first hand launch the Lil' Eaglet dropped off to the right and pitched down. It took considerable left aileron and up elevator to correct the plane back to level flight, so be very alert on that first flight. Trimming the plane was easy. Flight performance was much the same as the Cannonball. Speed was at least comparable (estimated at 48 to 52 mph). Remember, the Eaglet is a lot more streamlined. The strong gusty winds gave me considerable trouble in flight. It looked like someone was literally slapping the plane around in the sky. Under these wind conditions flying is definitely not an enjoyable experience. Control response was very snappy. During these first flights I had approximately +/− 3/32" to 1/8" aileron throw and +/− 1/8" to 5/32" elevator throw. This should be a good starting point.

The Lil' Eaglet is definitely a high performance model and should not be considered by a new or inexperienced flyer. Even if you are a reasonably good .60 pattern flyer you might be wise to let a friend with ½A experience fly this model on the first flight. Remember, when you hand launch this model you are committed to a full power flight without the ability to throttle back the engine, so you must stay with it. Under some conditions that 1½ minute engine run can seem like an eternity.

Conclusions

I truly believe that this is about the smallest *practical* model that could be designed around the Cox TD .010 engine. Quite honestly the power of these little engines is considerably more than you would expect. In the future I would look for designs to evolve with somewhat larger wing areas, as this would yield a plane more suited for the average sport or intermediate flyer. If you are really interested in these small .010 or .020 powered designs please write us at FLYING MODELS. How about an .010 powered trainer or even a slow flying Stand-Off Scale? What would you like to see next?