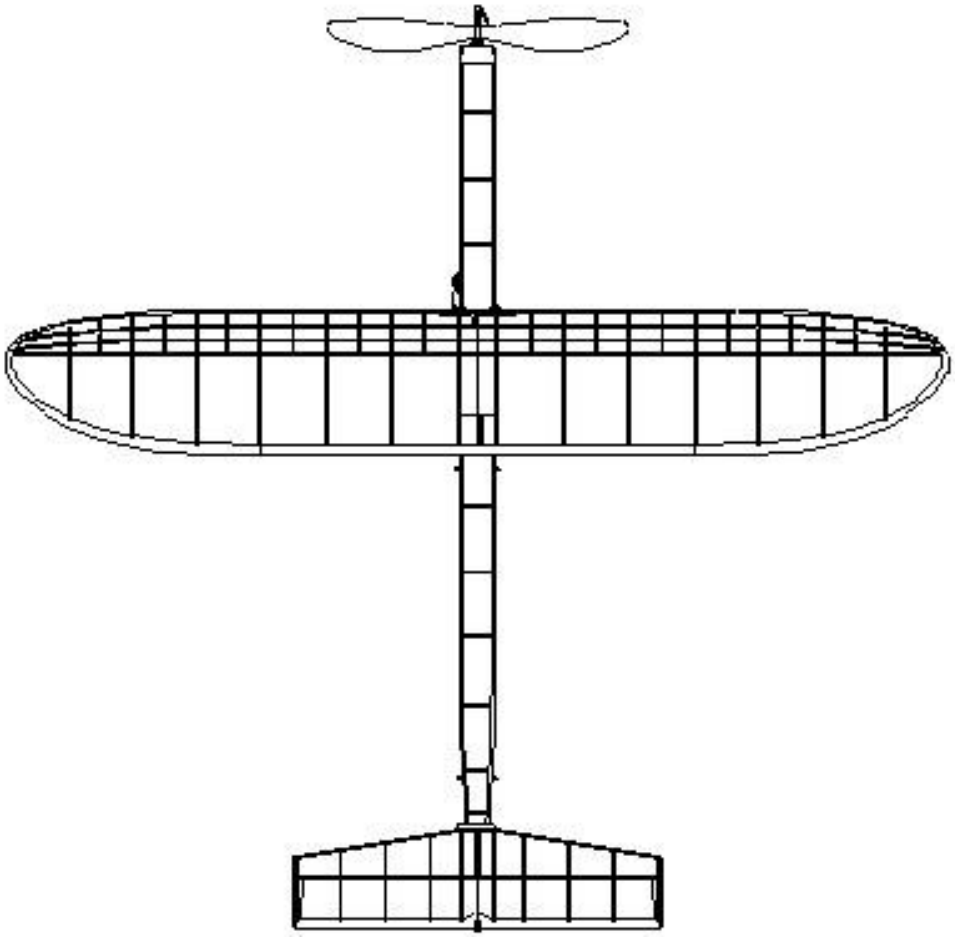

SUPER 'Y'

Construction Manual

Kit No. CBMD-004

CB Model Designs

www.cbmodeldesigns.com

Congratulations on your decision to purchase this kit! Every effort has gone into making the Super 'Y' one of the lightest high performance P-30 designs available. Each kit has been assembled from select wood for a light airframe that can meet the minimum 40 gram weight for this event. It is an excellent transition model for free flight competition and just plain fun sport flying. Super 'Y' is a derivative of the Yardstick model and has been optimized for P-30 and Small Mulvihill events.

Adhesive and general assembly process recommendations
Cyanoacrylate adhesive (CA in this instruction) is should be used with discretion and caution. Assembly of the basic structures is best achieved with aliphatic resin (carpenters) glue or cellulose cement (Duco, Testors, Ambroid, etc.). Use of these types of adhesive offer the best chance for minor adjustment during assembly, and minimizes the chance of adhering the structure to the plan or building board by thin glue wicking through pin holes in the parchment paper covering the plan. This in turn reduces the chance of part damage when removing a structure assembly from the plan when complete. All parts should be pre-assembled dry before any bonding occurs to check for proper location and fit. Proceed carefully and take your time with the assembly process.

Please read these instructions thoroughly in conjunction with study of the kit drawing before starting construction. A set of construction photo documentation PDF files are available as a free download from our website www.cbmodeldesigns.com within the Super 'Y' product page to supplement this instruction and the kit drawing.

Wing Assembly
Review the laser part number sheet before starting to understand the part arrangements and numbers. Mark any items that look like they would be confusing to sort due to similar size and shape. Start wing construction by covering the construction drawing with parchment paper to prevent parts from sticking during assembly. The use of balsa strips 1/8" thick x ¼" or wider is suggested as boundary control to the wing plan form in the straight sections. Short blocking can be used to control the edges of the elliptical sections of the wing (see Part 1 of 3 construction detail photo file for wing construction tips).

Remove all the laser cut wing parts and organize into the pieces required to assemble each tip panel and center panel. Start by pre-shaping the TE-1 trailing edge section to a 1/16 thick aft edge while keeping the forward edge at stock thickness. Sand one side only to achieve the tapered cross section-this becomes the upper surface for the assembly. This will be further blended to the wing contour after assembly of the framework.
Cut lengths of the 1/32 x 3/16 balsa strip to make up the tip panel laminated bows for the leading edge. These do not require any soaking to form; laminate with cellulose cement for assembly-this sands quite easily during the final wing shaping. Add blocking to the plan at the rib locations to control curvature of the aft side of the bow through these points. Let all thickness accumulation go to the forward side-this gets washed out in the sanding process in the end. Apply glue evenly to the strips and stack together, then on edge against the building board and form to contour against the blocking. Use additional blocking at the forward side to oppose the aft side blocking and keep some clamping pressure on the stack during the glue cure.

You can assemble the elliptical tip trailing edge segments at the same time the leading edge bow is being assembled. Build directly on the plan for the assembly of TE-2, -3, -4 & -5, but do not glue to the leading edge bow. Both subassemblies need to remain separate until the spar and ribs are located.

After these elements are dried, dry fit the full ribs W-2, -3, -4 and spar WS-2 together. Locate this to the drawing using the spar position and rib stations-block as needed to control inboard/outboard location as well as maintaining the spar position forward and aft. Dry fit the trailing edge subassembly to the rib tails and end of spar, on top of the temporary building tabs; add blocking to maintain the projected location of the trailing edge to the plan as it is now in the rigged position for built in tip washout and off the building board surface. Note the 1/32 shim positions used to cant the trailing edge for the under camber at rib W-2 and the joint between TE-1 & -2 and the center panel rib locations. Install all ribs to seat fully into the trailing edge notching and against the shims to gain a flush fit at this joint. On the wing drawing, reference the small cross section on the wing trailing edge showing the shim set up.

Before positioning the leading edge bow, some minor sanding needs to occur on the front edge of each rib for beveling to match the contour line of the leading edge bow. After this, position the bow to the plan location and rib ends-adjust everything for best fit. Mark and cut off the inboard end of the bow to match the dihedral break line on the drawing. When satisfied all is aligned glue together. Add the leading edge sub-ribs W-1B, W-2A, W-3A. It's probably easiest to add the 1/16 square turbulator spars with the tip panel restrained against the building board. Leave some overhang at the dihedral rib location to allow scarf splicing when adding the center panel and dihedral break rib W-1C. Not bonding the spars to W-1B is suggested to allow more flex when installing W-1C later-then glue in place once the splices are made at the dihedral rib location.

Leave the tip panels in place while constructing the center panel. Trim the leading edge stock to match the dihedral joint break and touch against the ends of the tip leading edges. Check fit of the spar-add blocking to keep the center spar flush with the tip spar ends. Set the trailing edge shims at the rib locations and position TE-1 to the drawing location.

Dry fit all the main ribs to the spar WS-1. Note the (3) center ribs have notching near the back for the short sub-spar used to strengthen the WH-1 installation area. Leave W-1C ribs aside until the dihedral setting is established.

Install the spar and rib sub assembly to the drawing location and set the ribs in the trailing edge notches, etc. Check for best fit and glue together with the leading and trailing edges. Add the leading edge sub-ribs W-1B. Leave the 1/16 square spars off the center panel until the W-1C ribs are installed to avoid conflict with the tip panel spars when installing W-1C.

Remove the panel assemblies and block up to bevel the leading and trailing edge ends for the dihedral joint. Relocate the center panel back to the drawing location and block up a tip panel for the correct dihedral at the tip spar location. It's suggested to provide a reference block or tool to project the aft spar surface line to the aft spar as rigged for dihedral to maintain the straight line orientation between the three spar segments. Best fit the leading and trailing edge projections to the drawing near the dihedral joint. Refine the setup until the three joint areas are fitting properly and glue the joints. Carefully fit the W-1C rib into place onto the spar and trailing edge notch-use the 1/32 shim to maintain a flush fit of the TE-1 and W-1C rib with the tip panel trailing edge. Fit the lower edge of W-1C to the plan location and match the tilt of the spar joint-check for even front to rear alignment and glue when satisfied. Repeat the process for the opposite tip, then install the two remaining 1/16 square turbulator spars in the center panel and complete the scarf joints at the W-1C notch locations. Add the sub spar at the center and the fillers to create the slots for the wing D/T hooks WH-1 & -2.

Wing sanding and shaping
Begin shaping the wing by profiling the wing tip leading edges to blend for all mismatch between the tip bow and center panel. Clean up the wing edge profile to remove any mismatches and inconsistencies. Remove the build tabs from the spars and tip panel ribs.

Make a contoured sanding block set to use for contour sanding of the wing frame-a pattern is provided to use as a template. To the contoured block surfaces bond a strip of 120 grit sandpaper the same width as the block using contact cement-make sure the sandpaper is completely seated and adhered into the upper airfoil contour block. These blocks allow sanding the spars, leading and trailing edges flush with the rib contours without creating flats or other distortions if used carefully and offers the highest quality results in the finished wing and covering.

Start the wing sanding and shaping on the underside to start. Sand the lower surface of the leading edges to be flush with the lower edges of the ribs. Inspect the lower surface of the trailing edge for flush fit to the ribs, and at the dihedral joints. As the trailing edge segments were tilted to approximate the under camber shape of the airfoil, it should take only minor sanding to improve this area if you were careful in setting all the ribs flush to the bottom surface of the trailing edges during assembly. If conditions look flush and fair, only minimal finish sanding is suggested.

Once the leading and trailing edges have been blended flush to the bottom edge rib contours, use the contoured side of the sanding block to very lightly touch up any areas of the under camber for flush condition at the lower edge of the rib and wing spar joints.

Shape the upper surface of the wing by sanding down the leading edge contours to be flush with the rib edges for the upper side. Once the leading edges are blended flush with both the upper and lower rib profiles, use the upper contour sanding block to carefully sand down the tops of the turbulator spars to level these in to the contour of the wing-it doesn't take much sanding here. Blend the tops of the trailing edges until flush with the tops of the ribs. The upper contour block can still be used to finish the top of the wing on the tip panels-be observant to where the block contour best fits a rib contour and carefully work the area to blend in all protruding edges and surfaces. Carefully work down the trailing edge through the tip to blend into the leading edge. Fine sand the wing up through 320 grit paper and seal the structure with two coats of thinned nitrate dope-be sure to seal all the lower wing rib and spar edges to provide good adhesion for the covering material.

Cover the wing with Esaki tissue or 1/2 mil mylar. After covering, slit at the wing D/T hook locations and install the hooks using cellulose cement. Form the .015 diameter wire back release stop for the forward hook and install such that the formed end is slightly straddling the hook on either side. You want to be able to slip the D/T lanyard under the wire and over the top of the hook to install, and the reverse of this to remove. The back release stop wire is there to keep the D/T line from coming off the hook during touchdown on a D/T landing. The wing will dip down briefly to flight position which can allow the lanyard to drift out of the hook slot with slack line. If this happens the wing will pop up and roll off the top of the fuselage and free to be blown about the flying field. Not desirable and preventable with the back release stop.
Glue the wire to the covering with cellulose cement and apply a small patch of tissue over this to reinforce. There is no pressure on the back release in use except when installing the lanyard and taking it off, and the installation is strong enough for this.

Horizontal stabilizer assembly
Stabilizer construction is straight forward and built flat against the building board. Take care to align the end ribs S-5 to the drawing location using blocking to ensure location on station and vertically. Reinforce SG-1 with pieces of 1/16 square balsa to prevent splitting at the stab key slots with handling during assembly. Set up the leading edge scarf splices at the center and provide blocking to maintain position to the plan during assembly. Pre-shaping of STE-1 is suggested prior to assembly to ease sanding efforts. With the leading and trailing edge pieces in position, dry fit the ribs to fit the spar location and into the trailing edge notches. There is beveling required on the front edge of the ribs to fit accurately against the leading edge. After pre-fitting the ribs, dry fit them onto the SS-1 spar, making sure they are completely installed and flush to the lower edge of the spar. Carefully install this sub assembly into the frame and position to the plan. Check for accurate fit to the plan and against the building surface before gluing in place. Install the SG-2 stiffeners at the lower edge of S-5 ribs. Add the center ribs S-1A forming the slot for DTP-1, and then the aft center rib S-1B. Leave the DTP-1 and SK-1 parts off until after covering.

Contour sand and finish the stabilizer using up to 320 grit sandpaper and seal with two coats of clear nitrate dope. Cover, but don't shrink until the fins are installed against S-5 ribs as the covering tension will likely bow these ribs and spoil the joint between the rib and fin.

Install the fins using the two end views on the drawing of the stabilizer. Set up reference blocks or tool to set the bottom of the stabilizer perpendicular to the fin. This can be done right over the fin projection. If you desire tissue covering on the fin it's best to do this before installation onto the stabilizer. Pin prick the tissue covering where the stabilizer rib will make contact for improved adhesion. Use cellulose glue to attach the fin to the stabilizer-hold it in position against the reference tool until the glue has dried, and repeat for the opposite fin.

Shrink the covering and install the DTP-1 post and the SK-1 plate over the slot in the trailing edge to complete the stabilizer assembly.

If covering the model with Esaki tissue, two coats of 50% thinned clear nitrate dope are recommended to seal. Apply dope to alternating bays on the wing and stabilizer, top to bottom if brushing on. As these bays dry, go back and dope the bays in between. Breaking up the application of dope into sections helps minimize warpage-fully coated wing or stab surfaces in one application are asking for problems and not recommended for brushing.

Fuselage assembly
Fuselage assembly begins with making the four longerons. Hard 3/32 square stock is segregated in the kit and intended for these sub-assemblies. Scarf splice the hard longeron stock to a softer piece of 3/32 square stock for a lower longeron. Position the spliced lower longeron stock to the plan with the full length of the hard material forward of the motor peg and a little excess at the front end for trim to match F-2A & -2B. Cutoff with excess at the tail post area for the lower longeron assemblies.

The upper longeron gets assembled with F-1 at the forward end to start. At the aft end, scarf splice at the stabilizer mount transition area only after the longeron is formed to shape against the plan. Leave some excess at the very aft end for trim at assembly of the two side frames.

The two fuselage frames are identical except for timer mounting, D/T provisions and nose block key. If you want the timer on the left side of the fuselage add TM-1 after removing the frame structure from the plan and flipping over to establish a flush fit of TM-1 against the building

board surface. Obviously, you can build for a left handed flier and install on the right hand side during the frame construction.

Add vertical and diagonal members plus all the laser parts associated with the side frames. I suggest keeping the firm balsa stock to the front end details and use the lighter stock toward the aft. Keep the blocking in place for constructing whatever side follows the first frame you built.

Assembling this slender box fuselage is easy if you locate the bottom edges of the side frames to the building board surface. Before doing anything cut a piece of the scrap margin on the 3/32 laser part sheet to the same width as F-4, with grain in the width direction. This cut piece of stock will be used to make 3/32 square and 1/16 x 3/32 pieces to be used as cross members of the fuselage having a constant width. Slice off the stock as needed for this.

Set up the side frames with F-4 in place; dry-position to best fit side to side for centerline symmetry. On one side pin blocking against the lower side frame longeron to maintain a straight line the entire length of the fuselage. Also pin some blocking against the forward edge of F-4 with some extra width to locate the two side frames to the same forward edge. Pin the 3/32 square and 1/16 x 3/32 cross member segments made from your blank against the plan locations-apply cellulose or aliphatic glue to the ends against the longeron as you install. Dry fit the opposite side frame against the forward blocking location and end of the lower cross members. Note the location for the next glue joints-remove and apply dots of cellulose or aliphatic glue where the cross members will contact and position the side frame against them. Use another piece of blocking to push against the lower longeron and provide clamping pressure to the longeron ends-allow the glue to dry.

Remove the last piece of blocking against the lower longeron to allow a 90 degree reference tool or blocking to be used to aid in installation of the upper cross members. This method involves holding the tool against the building board surface and side of the fuselage frame (bottom to top) at the location a cross member is to be installed. Use your thumb to hold the tool in position and give the side frame vertical alignment to the building board. With your index finger and the upper cross member in place, press against opposite side upper longeron toward side which is supported by the reference tool (as if pinching the two sides together, held apart by the cross member). This makes the fuselage cross section square where the cross member is getting installed. Eyeball the cross member against the lower one to judge parallelism to it and apply thin CA to glue the upper cross member to the longerons. Starting at the fuselage forward end and moving aft install each cross member as noted on the drawing. Each position takes 20 seconds or so once you understand the initial set up.
At the aft end of the fuselage pull the frames together and trim as needed to splice together per the plan projection. Use two 90 degree reference tools or blocking to bring the ends together above the drawing using the tool edges to align to the drawing planform and maintain centering. Cut pairs (top and bottom) of cross members to be installed in the fuselage tapered section. Install the upper cross members to start as done for the constant section except you will need an opposing 90 degree reference tool to support the side frames for the cross member gluing. The bottom members will be installed after the fuselage box is removed from the building board and turned over. Having made matching pairs will ensure squareness at each cross section supported by a cross member.

After the fuselage box assembly is complete and sanded, install the stab platform, incidence adjustment screw insert and filler block F-12 (4- piece sub-assembly). Sand everything flush where required. Construct the nose block assembly and fit to the fuselage-sand all edges flush to the sides, top and bottom of the fuselage.

Apply two coats of clear nitrate dope to the inside areas of the structure as well as the outside to preserve the model from rubber lube in use. Cover the fuselage with ½ mil mylar or esaki tissue. Orient the tissue grain to vertical on the fuselage sides, and perpendicular to the sides for top and bottom surfaces for the stiffest result.

Dethermalizer system installation

Start by pre-threading the timer mounting plate TM-1 using the viscous timer mounting screws at the pilot holes in the part. Do this before installing the plate on the model, as hard pressure installing these screws is likely to collapse the side frame in that area if not careful. Run the screws in and a few times to break-in the holes in for low pressure installation later. Remove the screws and glue the mounting plate TM-1 to match the hole location in F-6.

Install the D/T trip wire assembly next per the plan location. Use of cellulose glue is recommended to minimize chances of fouling the tube with glue for easy movement of the trip wire. Make some fillers to support the pivot tube from scrap 1/16 thick balsa and glue in place. I taper these into the sides of the fuselage to remove a little weight and clean up the look of the installation.

Make a D/T lanyard alignment turn around sub-assembly from two pieces of 1/32 x 3/32 basswood. Radius the end of each piece and then glue one on top of the other with the radiused ends staggered about 1/32 to help trap the D/T lanyard. After the glue has dried trim this to the length and taper the thickness as shown on the drawing. Install at the plan location-having three turn around points on the wing D/T lanyard offers strong purchase for the wing hold down (the fwd/aft wing dowels and the alignment turn around just installed).

There are two small fairleads for the wing D/T lanyard that should be installed just aft of the last wing dowel hole in F-7. These are there to prevent loss of the wing in flight should the D/T action allow the lanyard to jump the ends of the wing dowels used to provide the turn around to the wing hook WH-2 the lanyard passes through. These are easily constructed from a small sub-assembly made from scrap 1/32 balsa sheet using a piece of .032 diameter wire to create a square hole through it. To a base side of 1/32 balsa sheet, apply two strips of 1/32 balsa against the wire and glue just the wood in place. Remove the wire and add a cover sheet of 1/32 balsa. Sand this stack to the cross section shown on the drawing and apply thin CA to the end grain to harden and improve strength. Slice off two pieces to the length required and install on either side of the fuselage as shown on the drawing. Note-I have yet to see the D/T lanyard jump the wing dowels in flight and force the load onto the fairleads to retain the wing, but glue these into place well to make sure they are not easily knocked off.

On the right side of the fuselage install the 3/32 outside diameter aluminum tube segment and associated fillers for the wing D/T lanyard retainer. Install the two wing hold down dowels-on the front dowel I use small segments of vinyl plastic tubing that is common to air actuated retract systems for R/C models. I just happen to have this in my shop and it fits nicely on the dowels-you can use anything similar-in fact, slice a length of masking tape about 3/32 wide and wrap around the dowel ends to build up a collar. This is intended to trap the D/T line on the dowel when the timer releases. I have not tried to fly the model without this and so far it's been 100% effective in keeping the lanyard in place when the timer releases in flight. Once on the ground it does not prevent slack line from coming off the dowels so be careful to reset the line around the dowel ends when resetting the timer for the next flight.

Construct the wing D/T lanyard per the drawing-try to keep the loop end to the timer arm close to the length shown. Any longer and the spring runs a chance of interference with the alignment

turnaround when tensioning the system. Install the lanyard working from the loop applied over the timer barrel to anchor and feed forward through the left side fairlead, across the top of the fuselage and aft through the right side fairlead to the 3/32 diameter aluminum retainer tube and through this to start. Cut off the end of a toothpick to act as the anchor plug for the lanyard by pinching the thread against the tube when installed. This will still allow lanyard tensioning adjustment at any time by loosening slightly and pulling the thread and then re-seating when set.

Pull the timer lanyard slightly taut (tension spring extended approx. 1/8") after applying the thread against the alignment turn around and over the top of the aft wing hold down dowel, under the front dowel and install the anchor plug to start the timer tension setup. Install the wing as indicated for flight-pass the lanyard through the front wing hook WH-2; the system is now ready to be adjusted for spring tension and run time for the timer.

Position the timer arm slightly forward of the vertical position (arm on barrel rotated to the upper side/12 O'Clock orientation) and place the lanyard loop over the arm to apply tension for the rotary action. At this position the timer should be turning almost imperceptibly but release the spring. Adjust tension for faster or slower rotary motion by pulling or loosening the tension in the lanyard. You can do this by gently pulling against the tube plug until an acceptable speed is obtained. Try and get the longest run time you can from one full turn of the timer if you plan to do serious contest work, as a mere two minutes run time will not be competitive with this model. Once you have bench tested the setup for reliability you can secure the tube plug with a dot of cellulose cement. This will allow softening with acetone if needed to allow re-calibration later. I also suggest a small dot of cement be applied to anchor the excess lanyard tail in case the plug is loose or falls out the lanyard will not simply pull through under tension and be lost in flight, etc.

The stab D/T line is installed next. Tie one end of the thread provided around a 3/16" diameter object to form a loop. Trim off the excess thread from the knot and slip the loop off the forming object. Apply thin CA to the formed area-this will saturate and solidify to maintain the shape of the loop. This forms the ring that will attach the D/T line to the D/T post (DTP-1) on the stabilizer.

Install the stabilizer onto the stab platform with a tensioning dental band for the pop-up motion. Feed the unfinished end of the D/T line through the small hole drilled at the end of the fuselage; slip the short 1/16" diameter aluminum tube onto the D/T line to act as the stop for D/T release. Place the timer spring lanyard of the stem of the timer to tension the spring and lanyard as set for flight with the trip wire leg under the lanyard. String the loose end of the D/T line through a 5/8 diameter medium pull dental band and then shorten the line with the band placed on the short end of the trip wire as shown on the drawing. Pull the thread end aft to apply tension to the band and draw the stab down against the top of the incidence adjustment screw. Note the location where the line turns through the tensioning band as this is where you need to tie a second loop and harden with CA as done for the stab connection end. Make a small pencil mark on the fuselage side for reference. Remove the band and tie the end of the lanyard around a 1/8" diameter wire to form the loop and knot loosely. Pull the lanyard taught and work the wire with loop to be adjacent to the pencil mark made earlier and tighten the knot to hold the location of the loop. Carefully slip the wire out of the loop and apply thin CA to harden into an oval shape and secure the knot. Tie on the dental band by looping back through itself around the lanyard loop to secure to the lanyard end. This band will require replacement with use as the dental band eventually softens and will allow drift up of the stab ever so slightly.

Allow the stab to deploy to the D/T position. Keeping slight tension in the D/T line, slide the 1/16 stop tube up the line until it is against the front end of the guide tube. Lightly crimp the

forward end of the stop tube to anchor it to the D/T line. Pull forward to move the stop tube away from the guide hole and apply a drop of thin CA to the tube and line to secure. Test the operation of the D/T system to confirm consistent operation.

Final considerations are keys for the horizontal stabilizer to the stab platform and wing keys against the fuselage. Clear covering from the slots in the stab SG-1 and cellulose cement the basswood keys in lightly. Cellulose is useful in that it can be softened with acetone to de-bond and remove the part. If the stab needs recovering after a period of use it is easy to remove the stab keys using this method. The same trick can be applied to remove the DTP-1 post to make the upper covering easy to re-apply.

Align the wing to center on the fuselage symmetrically. Glue grain split 1/8"diameter x ¼" long dowel keys aligned forward aft and one edge touching the upper longerons onto the underside of the wing trailing edge. Hard 3/32 square balsa approximately ¾" long can be set on end against the upper longerons by gluing just under the leading edge-note the wing filler in this area shown on the plan to support key installation. Taper one side of the stock going the length to a feather edge before gluing on to the wing on either side of the fuselage. After the glue has dried you can sand the hard corner off the leading edge side to fair this in a bit and make a neat looking installation. Don't reduce the contact area with the fuselage longeron in the sanding process. Consider that wing keys may need to be removed to adjust for wing skew during flight trimming steps and don't make them destructive to remove.

Flight trimming-glide phase

Install a 10 gram motor using the aft motor peg location. Establish glide trim using this position as the baseline for trim flights. Assemble the model and adjust the incidence screw until the stabilizer is neutral incidence. Use cellulose cement to attach a 1/32" thick shim to the right side of the stab platform such that when the stab is pulled down to flight position it is tilted with the right tip up about 1/8" higher than the left, as viewed from the rear of the model. Taper the shim to make sure the contact with the bottom of the stab is at the edge of the stab platform.

If possible, find a shallow hill from which you can launch the model for test glides. Do this under calm conditions for best results. The objective is to observe the glide path for stalling or diving, and also to obtain a right hand glide circle. Hand wind some turns in the motor to give the prop some revs as the glide starts and get the prop up to free wheel speed. Launch the model gently-wings level. Observe the glide characteristics; fast glide/diving, pitching up repeatedly in a series of shallow stalls, or it may be just perfect looking. Adjust the stab up or down using incidence screw until the glide is flat (level looking forward to aft airplane orientation), slow and steady and turning to the right as it settles to the ground. Observe the right hand turn during the glide; this should be roughly 30 feet in diameter. If it is a tight spiral, remove some of the stab tilt by shaving or sanding off some of the shim. If there is little or no turn, add more shim to increase the stab tilt. Make sure the stab will still pop-up completely with the stab tilt in effect, and that the stab keys are engaged with the stab platform. If the model seems out of range of adjustment with the incidence screw and the wing located per drawing (nominal position), move the wing dowels forward one hole and re-mount the wing in a more forward positon if the model has a dominant diving tendency and all incidence is removed from the stab (leading edge down/trailing edge up). Likewise, if the model stalls in spite of adding incidence in the stab (leading edge up/trailing edge down) move the wing dowels aft one hole and try again.

Make sure the glide is safe and consistent before moving on to power flight trimming. If you built the model as shown on the drawing there should be no need to add ballast for center of gravity adjustment, especially with wing adjustment range forward and aft from the nominal position.

Flight trimming-power phase
Before first powered flights add some down and right thrust by adjusting the three Gizmo prop bearing adjustment screws to cant the prop shaft into this attitude. This will be fine adjusted as you go, but will prevent damage to the model from deep power stalling on the first flight attempts.

Hand wind the motor to about 300 turns. Set the D/T timer for short duration (20 seconds or so) and gently launch the model, wings level. Observe for a right hand shallow climbing turn. If there is no turn, you need to increase the right thrust in the bearing. If the model pitches up into a stall, more down thrust is needed. Make these adjustments until the model climbs evenly (no stalling) and to the right, using the same amount of power each time. Again the turn needs to be roughly 30 feet in diameter at low power. Adjust thrust angle until the model becomes predictable and safe under low power. Now begin lower power flight using a torque meter to make observations about power in the motor and the effect on climb trim. Stretch wind to 2.5 to 3 in/oz torque and launch. The model should still be fairly shallow in climb, but with much more duration. Again observe the climb characteristics for turn and stall-adjust thrust angles slightly if necessary. Also watch for the glide transition and glide pattern that follows. The model should transition to a slow floating glide with a right hand turn pattern. It may be necessary to adjust the stab incidence slightly to obtain a good glide after the power runs down. You know you are in the sweet spot when the model glides with a very slight tendency to nose up when encountering minor turbulence-it gives the appearance of wanting to 'sniff' or climb slightly with the slightest buffeting.

Continue to add more torque on subsequent test flights. Fine adjust the thrust angle to control the climb characteristics. The target is to obtain the maximum climb performance profile for the model. Too steep and the power is wasted on overcoming the drag of the high angle of attack. Too shallow and fast is obviously not going to offer duration gains from altitude. The model should be climbing slightly faster than glide speed to be on a good climb performance profile. At higher power the turn may tighten somewhat, but this can help on a steep climb during the power burst to prevent stalling and is desirable. If the model banks heavily to the right under high power and does not climb, you need to remove right thrust until the steep angle flattens out and the model climbs in the turn. You can also try skewing the wing to have the left wing tip further aft than the right which increases the wash-in effect on the right wing and will help lift the right wing in the climb. It can be said that it simply adjusts the angle of the fuselage to introduce left turn when this is done but whatever position you want to take it's a useful technique to help control things during the climb phase. Don't set the wing keys if you plan to try this-once a satisfactory adjustment is achieved you can add them to maintain the skew setting. Make markings of the nominal wing position so you have reference to where you started on the wing position as you introduce skew-make little changes at a time to determine the effect of it. Add stab tilt to improve the glide turn after wing skew is established to restore the glide circle if needed.

This model has been flown in torque ranges of 3 to 10 in/oz with no problems within the trim setting once established.

Now try some powered flights using the forward motor peg location. This position is to facilitate a 10 gram motor that is shortened into a thicker cross section for higher torque. The center of gravity will shift forward significantly when changing motor peg locations. As the model is already trimmed for power and glide at the aft peg location, the easiest way to deal with the center of gravity shift is to add a ballast weight at the end of the tail post. Use a small ball of clay (about 1 gram) applied to the top of the longerons, under the stab and in front of the

incidence screw. Check the balance point and perform some test glides to verify the trim settings are still correct to what was demonstrated earlier. Add or remove ballast to fine tune the glide angle to what it was like with the motor at the rear peg location.

Power flights can then be undertaken-use lower power and short D/T on the first one to make sure nothing is upset by the new motor location. Then start power trials using the maximum torque level you tested on the longer motor. Watch for excessive right turn as the power increases-some of the right thrust may need to come out, and down thrust increased to handle the additional energy. These will be very small changes-make them carefully.
After adjusting the model with clay ballast, remove and save after the flying session. In a contest, you will need to re-install if you decide to change motor strategy to suit conditions.

Learn all you can about the performance potential of your model by experimenting with various motor sizes using 10 grams in each case. Long power cruise (1:40 has been demonstrated fairly consistently and often 2.0 minutes is easily obtained) can be had on a 4 X 1/8 SuperSport motor. This motor can only take about 3.5-4 in/oz. of torque and does not offer a robust climb. It will allow a long hunt for lift, and in light conditions will often yield max time easily without the model getting very far off the ground. If any lift is contacted the model will climb for quite some time under power and towering height can often be achieved in this manner. Similarly, a 6 x 3/32 SuperSport motor will offer a long cruise (1:25 consistently) and better climb performance. This motor can take up to 6 in/oz. of torque consistently.

Use the forward motor peg location for 6 X 1/8 , 8 X 3/32 and 12 X 1/16 motors and high torque ranges. You don't have the motor run duration (40-45 seconds typically), but you will gain altitude rapidly. This type of motor is probably best suited to turbulent conditions when you need to get high above the ground quickly into smoother air.

As you gain knowledge about power potential the various motors configurations offer I suggest keeping a log book on the airplane and motor configurations to refer to for contest work. Also note the torque applied and the run times observed to provide a consistent and doubt free base line when in competition.

Make sure the motor is prepped with rubber lube-I like a product from NAPA Auto Supply known as 'SIL GLIDE" as it has a grease-like texture that doesn't have as much spatter as typical rubber lube of thinner consistency-look in the grease and rubber preservative section. The use of an oversize tube on the tail end of the motor is suggested to allow the motor end to wobble on the motor peg for uniform unloading of the motor and distributes motor knots evenly. Use 5/16" OD X .014 wall aluminum tubing, 3/8" long for this purpose. A ¾" diameter blast tube will fit into the model and is recommended.

Care should be taken to store the model out of light and in a reasonably constant temperature location with low humidity-a fully enclosed box container is recommended. The tissue covering can eventually ruin the framework with continued exposure to heat and humidity, and sunlight will deteriorate colors and strength quickly. At contests, always test fly first to be sure new warps haven't crept into the model during storage and impacted your trim settings.

With care this model can be built under the minimum 40 gram weight required for the P-30 class in competition. The model is also competitive in the Small Mulvihill event which allows up to 20 grams motor weight. One of the prototypes won the 2016 AMA NATS Small Mulvihill event using a 16 gram motor and the standard GizmoGeezer prop assembly furnished with the full kit. A folding prop set up is also allowed in Small Mulvihill and this option should be explored for

maximum performance.
Purchase a small digital scale to weigh your airplane and also for weighing out 10 gram motor stock if you do not already have one-this is money well spent. I also highly recommend a torque meter that operates up to 20 inch ounces be obtained as counting turns does not offer a very high degree of reliability or power consistency in practice.

Super 'Y' Build weights (based on prototype No. 4 construction)

Wing frame sanded, no dope:	7.9 grams
Wing covered with Esaki tissue, ready to fly:	11.5 grams
Horizontal Stab frame sanded, no dope or fins installed:	2.2 grams
Horizontal stab covered with Esaki tissue, ready to fly:	4.6 grams
Fuselage frame with nose block, sanded, no dope:	8.2 grams
Fuselage covered, ready to fly, less nose block/prop:	12.8 grams
Nose block with GizmoGeezer prop assembly:	10.1 grams
Completely assembled model, less rubber motor, ready to fly:	39.2 grams

Happy Flying!