



Suggestions for the Completion of an AVA RES R/C Sailplane

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1) Introduction

- a) These suggestions are the opinions of the authors based on personal experience. They were developed independently from the manufacturer and distributor of the AVA.
- b) The AVA radio controlled model sailplane is best completed and flown by at least intermediate builders and pilots. If you are not quite there yet (or even if you are), please get advice and assistance from an experienced modeler as you proceed through the completion and flying of your AVA. These suggestions are intended to stimulate your thinking process in your quest of the ultimate completed AVA. There are always a number of ways to do everything on an R/C aircraft and ultimately the choices and responsibility are yours.
- c) The text and photos suggest some alternative arrangements for your consideration. Use your judgment and experience (and/or your advisor's) to decide your ultimate configuration.
- d) A variety of photos of different AVAs by various builders are included for your reference and consideration. Some installations are better than others.

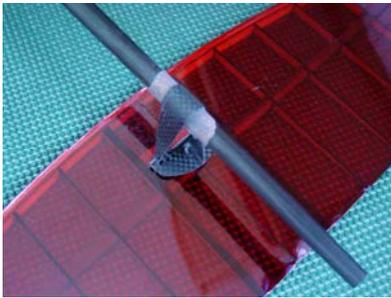


2) Epoxy fin mounts to boom

- a) Relieve stab material to allow stab to fit flat on V mount.



- b) Bolt stab to V mount.
- c) Dry-fit stab and V mount on boom.
- d) Sand inside of fin mounts (note the larger mount goes on the boom in the forward position) for a good bond and to allow positioning flush with end of boom.
- e) Dry fit fin mounts and fin onto boom and check that stab V mount can slide far enough forward on boom so that stab trailing edge clears fin by 3-4mm as it moves through it's range. Sand boom at V mount for a good bond.
- f) Sand inside of V mount for a good bond and to assure 3-4mm clearance to vertical fin.



- g) Remove stab and leave V mount loose on boom facing in the correct direction.
- h) Relieve fin material around mounting holes with a countersink to allow the mounts to fit flat on side of fin.
- i) Screw fin mounts to fin in the same arrangement they were dry fit.
- j) Double check stab V mount is on the boom loose, and in the correct direction.
- k) Mix some slow epoxy with microballons so you can work un-rushed and to prevent dripping. Epoxy fin mounts (still attached to the fin) to boom, set back of aft fin mount flush with aft end of boom.



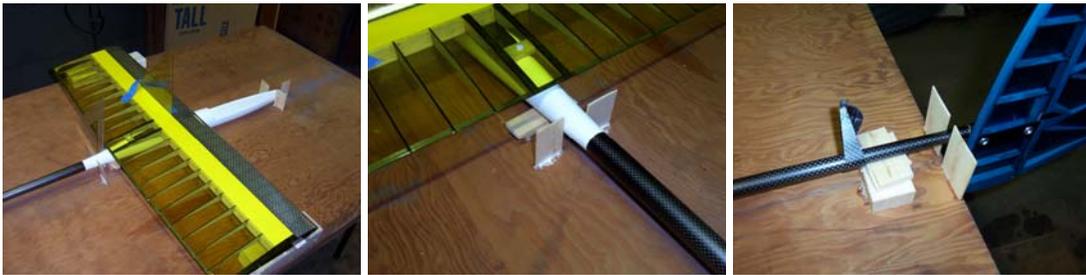
- l) Fin may be mounted on either side of boom. Rotational position of fin on boom is not important at this time, unless you want to place the boom mold seam down for appearance. Final fin rotation will be set when boom is glued to the pod.

3) Epoxy boom to pod

- a) Rough up pod stub and inside of large end of boom with sandpaper for good bond.
- b) Slightly shorten large end of boom until boom taper fits firmly onto pod stub taper without wobbling or bottoming on pod shoulder.



- c) Bolt on wing center section, checking that wing seats correctly in its saddle, and block wing level on a flat table.
- d) Set up jig blocks to maintain horizontal and vertical alignment of boom while epoxy cures. Align boom with centerline of pod in top view, and with mold line in side view.
- e) Using slow epoxy, glue boom onto pod stub. Place pod and boom into jig for alignment and rotate fin into vertical position, exactly perpendicular to wing. Be sure the fin extends toward top of wing! Secure from movement until cured.



4) Epoxy stab V mount to boom

- a) Mount stab on V mount, locate V mount on boom for 3-4mm stab-to-fin clearance. Mark V mount location on boom. Remove stab.
- b) Slide V mount slightly aft, apply slow epoxy to boom at marked position and slide V mount into position.
- c) Re-install stab on V mount, and rotate into exact alignment parallel to wing center section. Secure from movement until cured.



5) Install rudder horn

- a) Determine desired routing of pushrods (in or outside boom) and establish the side, position and length of rudder horn for your installation. (As a rule of thumb, a line between pushrod hole in horn and rudder hinge line should be perpendicular to approaching pushrod).
- b) Slot rudder for horn and epoxy horn into rudder.

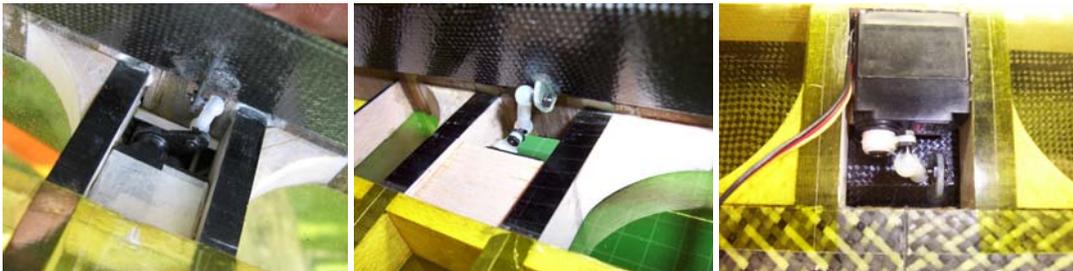


6) Epoxy-fill nosecone tip

- The intent is to transfer landing loads from the nose cone onto the fuselage by filling the gap between the nose cone and pod to allow the transfer of energy.
- Remove nose cone from pod and apply a thin but thorough coat of auto wax to nose of pod as a bond breaker.
- Mix some fast epoxy and fill the inside tip of the nose cone with just enough to fill the space between the nose cone and the front end of the pod. Don't use too much epoxy. If the epoxy squishes over the lip of the inner pod and hardens, the nose cone might not come off!
- Slip the nosecone into its seated position, squishing the wet epoxy. Stand the fuselage on its nose.
- Monitor the curing waste epoxy until it just starts to firm up. Immediately remove the nose cone before it completely hardens.

7) Install spoiler servo

- The spoiler linkage can be installed with a wire and plastic tube linkage or other arrangement to suit your sensibilities.
- One popular idea is to epoxy a small horn into a slot in the bottom of the spoiler blade and connect to the servo with a short ball link pushrod.



- To mount the spoiler servo, feel free to remove the bottom covering in the center bay below the spoiler blade and install a balsa or plywood floor to mount the servo.
- One contest-winning AVA pilot suggests setting up the linkage to allow spoiler blade movement from fully closed to 22mm open at the trailing edge with full movement of the transmitter control (usually the throttle stick). Also suggested is a gap seal at the trailing edge of the spoiler blade.

8) Mock-up locations of equipment, and determine balance

- Tape radio equipment, nose cone, pushrods, clevises, any landing skids, etc. in tentative position and install center section and tips. At this point, anything that weighs anything and is not on the center of gravity (CG) should be installed or temporarily hung on your AVA.



- b) For starters, the suggested CG position is 96mm aft of the leading edge of the wing with the tow hook at, or slightly forward of the CG. Decide what is right for you.
- c) Establish your desired CG position. Mark CG all around fuselage, perpendicular to mould line, with pencil.
- d) Test-balance your AVA at the CG, relocating heavy equipment as necessary until satisfied.
- e) Mark all equipment locations for up-coming installation.

9) Install tow hook

- a) Cut oval opening in bottom of pod on the centerline and located fore and aft so your chosen hook location is midway in the adjustability range of the tow hook.
- b) With the tow hook fully assembled and the serrations of the upper part (hook) and lower part (body) properly engaged, mark the forward end of the body for reference.
- c) Remove the hook and adjusting screw from the body. Be sure the forward end of the tow hook body is forward in the fuselage and epoxy the tow hook body to the bottom inside of the pod with the metal lip of the oval opening protruding through the hole cut in the pod. Secure from movement until cured.
- d) Re-install hook and adjusting screw.



10) Make cutouts and install equipment

- a) Cut equipment openings in pod deck, reinforcing any narrow or weak areas between items with scrap Kevlar or wood glued under the deck.
- b) Assure that there is adequate room for wiring without pulling or binding and that any screws penetrating the deck cannot damage wiring.
- c) The exact layout of equipment is again a matter of personal choice, so suit yourself, but plan ahead for pushrod routing, ballast removal, access to receiver crystal, access to switch and charging jack, ability to add/remove nose weight, clearance from nosecone and aircraft balance.
- d) Plug everything in and secure all equipment from movement, keeping in mind those dork landings.

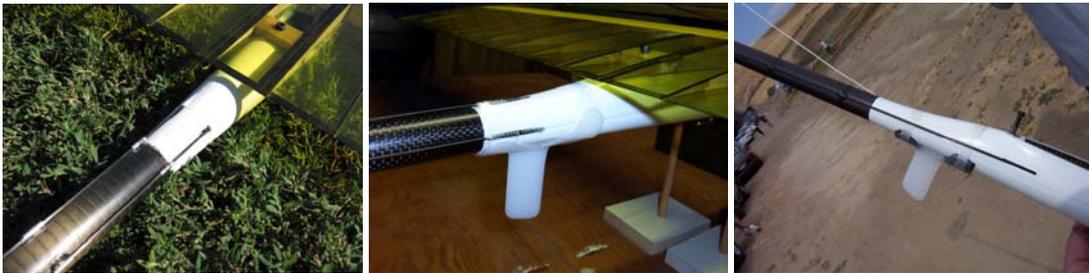


11) Determine pushrod routings and exits

- a) Pushrods will normally be routed from the servo in the pod nose, through the bulkhead ahead of the wing and continue aft through the pod. They will then either continue inside the boom with the rudder exiting the aft end of the boom and the elevator exiting through a slot in the top of the boom, or exit the pod ahead of the boom and continue along the outside of the boom to the control horns. If a ballast tube is planned (recommended), keep the pushrods outboard in the pod to leave room for the ballast tube on the centerline.



- b) The exact routing is a matter of personal choice, so give it some thought and locate openings and routings to suit your sensibilities. Just make sure to follow good-practice principals such as keeping pushrods as straight as possible, firmly supporting them at close intervals along their length, approaching horns and servo arms perpendicular to a line between the pushrod hole and the pivot point, adequate horn and servo arm length and of course smooth minimum-drag operation.



- c) Hook up pushrods with your favorite connectors and verify full freedom of movement and adjustability. If using threaded brass connectors, be sure to clean the cavity in which the carbon rod will be epoxied with some alcohol or other solvent/cleaner/degreaser.

12) Ballast tube

- a) If you're using a ballast tube, cut a hole in the forward bulkhead and slip tube in to contact bottom inside of pod at the aft end. Place tube so center of ballast is centered on CG. Create an end cap for the bottom end of tube and a secure but easily removable system of retaining the ballast at the open end. Glue tube in with flexible/removable type glue such as *ZAP A-DAP-A GOO II*. Make this all strong enough to take the large inertial loads of the ballast in those dork landings.
- b) You might want to wait on installing the ballast tube until your final contest-trim CG is established to ensure that the ballast will be centered at the CG.

13) Landing Arrestors

- a) Again a matter of personal choice and the rules of the contests you intend to enter. A glued and taped-on nylon skeg at the aft end of the pod and a glassed-on circuit board nose tooth have been used successfully and are illustrated in the photos.



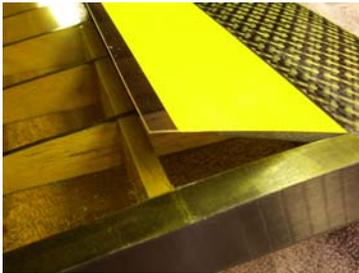
14) Antenna

- a) One radio manufacturer (as well as common sense) suggests that the antenna not be concealed in or masked by carbon fiber structures.
- b) A simple external antenna with minimal length inside the pod might be the safest solution.
- c) Whatever antenna routing you choose, be sure to do a thorough range check before flying as you would with any other model.



15) Spoiler Gap Seal

- a) The trailing edge of the spoiler blade should have a gap seal installed.
- b) Spoiler gap seal can be made from drafting Mylar and double stick tape or purchased ready to use.
- c) Secure the tape side of the gap seal to the top of the spoiler blade trailing edge and allow the un-taped side to hang out over the top surface of the wing.



16) Set-up and flying

- a) Balance your AVA at your chosen CG, shifting equipment if possible, or adding nose or tail weight until satisfied.
- b) Our now-famous contest-winning AVA pilot suggests the following control set-up, but suit yourself:
 - i) Set elevator neutral trim so trailing edge aligns with the first fin rib up from the boom (about 1.5 degrees decalage).
 - ii) Set elevator for 15mm up and 15mm down from neutral, measured at the trailing edge.
 - iii) Set rudder to move 40mm each side of center measured at the trailing edge, at the widest chord.
 - iv) Verify that the spoiler moves from fully closed (without servo buzzing) to 22mm open with full transmitter control travel.
 - v) Mix in about 6mm up elevator compensation with full 22mm spoiler deployment.
- c) Set tow hook full forward in its travel for initial flights. Then move back to suit.
- d) Do a thorough range check before flying.
- e) Check all controls for correct direction of movement.
- f) Check all controls for correct direction of movement, again.
- g) Hand toss to check initial trim. Adjust balance and/or trim, and spoiler throw/compensation until satisfied. If your field is small, be ready to turn around before landing. These babies can really float!
- h) Launch and enjoy!

17) Comments

- a) Your additions, corrections, comments and questions are welcome. Please post on the AVA board within the Pilots Forum on <http://www.rcsoaring.com>

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