



FEI BAO JETS

Velox XL Assembly Manual

VELOX

By Fei Bao Jets



Written by Curtis Mattikow
In collaboration with R/C Jet Models

DISCLAIMER:

THIS IS NOT A TOY. This is a high-performance miniature aircraft, capable of high speeds and damage to life, limb, and property. The manufacturer and its distributors cannot control how you assemble this model, what equipment you use to fit it out, or how you fly it, and can assume no liability whatsoever for any damages that may occur when you fly your aircraft. By assembling this model, you are agreeing to indemnify and hold blameless the manufacturer and/or his agents from any and all torts and liability associated with the use of this product. Please inspect all parts before beginning assembly. If any parts appear to be suspect, contact your dealer or the manufacturer for repair or replacement BEFORE you begin. Once you have assembled the aircraft, you are the pilot in command and assume any and all responsibility for the use of the model and any damages that might occur by flying or attempting to fly this aircraft.

R/C model jets require a high level of skill in both their assembly and their flying. If you do not feel confident in either your building or flying skills, PLEASE seek assistance from more experienced modelers. It is a wise idea, no matter what level of skills you possess, to have a second experienced modeler go over your installation after assembly. A second set of eyes may spot a problem you have missed. If you have not flown a model like this before, it is HIGHLY recommended that you get an experienced turbine pilot to do your maiden flight. Very often, the first few seconds of a maiden flight are critical until the aircraft is trimmed out, and having an experienced pilot at the controls can make the difference between a wrecked aircraft and one that enjoys many hundreds of flights. Be sure to select a suitable field for flying...take the time to find a large paved runway if at all possible, especially for test flights, until you feel comfortable getting the aircraft in and out of smaller grass fields.

BEFORE YOU BEGIN:

Keep this in mind as you proceed:

Look at EVERY assembly step you finish, and ask yourself:

"Is this going to crash my airplane?"

A chain is only as strong as its weakest link, and this is a high-performance aircraft that will be very intolerant of sloppy assembly techniques. Even the smallest component is important and can cause the loss of your airplane, so take the time to do things right. Or REdo them if they are wrong. Careful work will result in a long-lasting plane that gives you years of pleasure, one loose component could result in the complete loss of the aircraft and all the components inside it, and someone can even get hurt. So pause every once in a while when building it and double-check your workmanship.

A. Introduction:

You have chosen a model that represents the pinnacle of ARF technology. While there is not a lot of building to do, there is enough to keep you busy for a few evenings.

Even if you have assembled maybe other ARF jets, we highly recommend following our assembly sequence and procedures anyway.

Chances are it will save you a lot of time, prevent you from running down dead ends, and perhaps

remind you of a few small things that might end up saving your aircraft.

We have tried to arrange a construction sequence that will allow you to keep moving forward, rather than standing around waiting for glue to dry before you can proceed to the next step.

Just because the model is almost completely built does not mean you can rush through the final assembly.

You need to employ fine craftsmanship every step of the way, turbine models are critical. Keep this in mind with everything you do, every part you install...look at the work you just did, evaluate it critically, and ask yourself "is this going to potentially crash my airplane?" If there is any doubt about the work you have done, back up, and re-do it properly.

B. Adhesives:

The correct adhesive to use for all procedures is Loctite Hysol 9462. This is a very strong white epoxy that is thixotropic. "Thixotropic" means it does not run at all, but stays only where you put it. It is infinitely superior to regular epoxy, even slow-setting epoxy, for our purposes, because of this characteristic.

Regular epoxy will run downhill with gravity as it dries, taking it away from where it is supposed to be. A good example is in the hinges...using regular epoxy, a good portion of the glue will migrate down away from the hinge into the inside of the wing as it dries, and you won't even know it is happening. Hysol stays where you put it.

The downside of Hysol is it takes overnight to dry properly, but we have tried to arrange things to keep you busy while waiting for glue to dry.

We also highly recommend that you only use a proper Hysol dispensing gun, and only the long-type mixing nozzles.

The short nozzles do not mix this glue enough, and only a thin nozzle and gun will let you fill the hinge and control horn holes properly with glue, you can't do it mixing your Hysol on a flat surface and trying to get the glue in the proper place by a brush or stick.

You can buy a complete Hysol setup with a gun, nozzles, and two cartridges of glue from your dealer for approximately \$60.

Consider it a great investment, the glue is the best you will use. One cartridge is plenty to assemble your Velox.

C. WORKING WITH PNEUMATIC SYSTEMS:

The Velox XL uses pneumatic brakes and retracts. If you follow a few tips, you should have very reliable, leak-free operation. Neatness counts.

All airlines should be secured to the airframe to keep them from flopping around or getting kinked. Use tie wraps for this.

The other very important thing is to cut off the end of each airline dead square before installing it on the nipple.

This is VITAL. You can either purchase a professional tubing cutter from your dealer (they are approximately \$10), or you can make up a little jig to hold the airline and keep a sharp, new razor blade perfectly upright as you cut.

F E I B A O V E L O X X L

Either one works, just ensure that all ends of all airlines are cut off dead square. Make sure all airlines are pushed ALL THE WAY onto their nipples.

They should not need to be secured otherwise, but you can add fine wire safety wraps if you like. Make sure all left and right matching airlines are the same length, particularly the brake lines, or you will get uneven retraction or braking action.

It's worth taking the time to get everything pneumatic right the first time, as having your landing gear fail to retract is not THAT bad, but having it fail to deploy can really ruin you day and the paint on the bottom of your model.

1. Using a sharp knife, trim off the ends of the white nose gear steering tubes, to clear the radio tray so you can remove it.

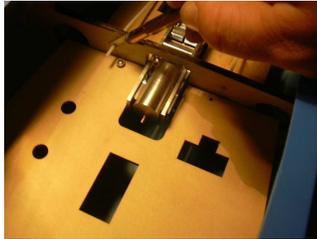


Figure 1

2. Remove the two screws holding the radio tray in and remove the tray.

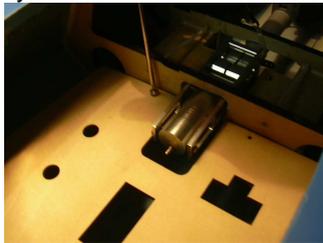


Figure 2

3. Sand and paint the tray if you like and set it aside to dry.

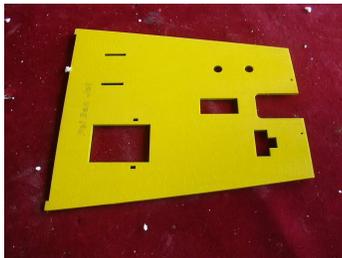


Figure 3

4. Cut the tie-wrap holding the nose gear in place for transportation.

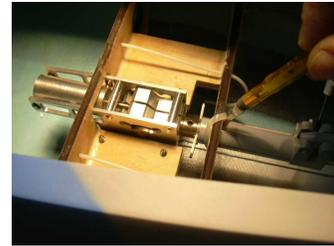


Figure 4

5. Add airline to the rear nipple of the nose gear.

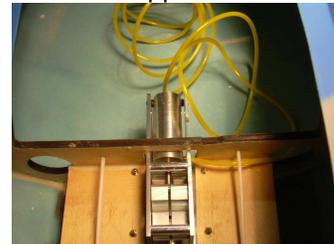


Figure 5

6. Using hemostats add tubing to the side nipple of the nose gear and route as shown. It greatly helps to color-code your airlines.

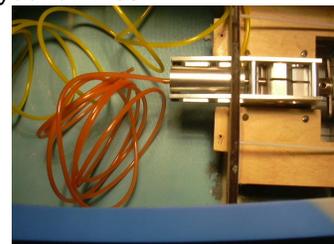


Figure 6

7. Cut off these tubes, leaving about six inches of slack in the radio compartment, and add a y connector to each. Tape them to the floor out of the way.

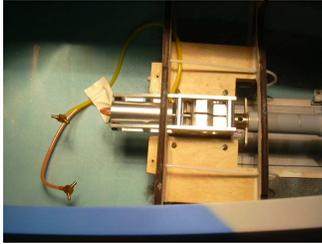


Figure 7

11. Make up an airline harness consisting of two four inch pieces of tubing, a y connector, and another length about 30 inches long.



Figure 11

8. Note that if you are using a sequencing valve that has two outputs for each function that you will not need y-connectors to connect the front and rear retracts.

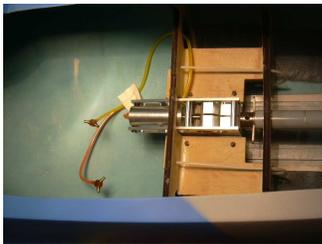


Figure 8

12. Use this to connect the upper nipples of the two main gear door cylinders.



Figure 12

9. Add two sections of airline to the nose gear door cylinder and add y-connectors. Again, y connectors not needed with valves that have dual outputs.



Figure 9

13. Swing the cylinder back into place and replace the bolt holding it to the hinge.

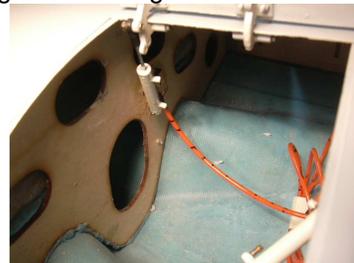


Figure 13

10. Remove the bolt holding the forward main gear door cylinder to the door hinge. This will let you swing the cylinder out and access the nipples on it.



Figure 10

14. Make up another airline harness like the first one.



Figure 14

15. Connect the two lower nipples on the door cylinders with this new harness.



Figure 15

19. Slip the retracts into place and secure with screws. Be sure to not pinch the airlines.

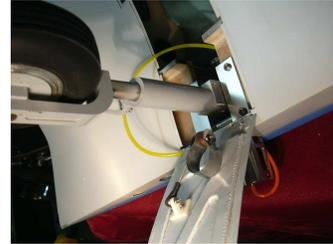


Figure 19

16. Run the lines from the rear door cylinders forward through the middle of the fuse and connect them to the front cylinder y connectors as shown.



Figure 16

20. Connect the lines from the retracts with y connectors and run line forward to the nose like you did for the door cylinders.



Figure 20

17. Use your hand pump to extend both main retracts. Check and tighten all bolts with the provided wrenches.



Figure 17

21. Connect these lines to the nose gear lines, unless you are using a valve that provides dual outputs for nose and main gears.



Figure 21

18. Add lengths of airline to the retracts. The ones to the outer nipples need to be 20 inches long, the side nipples 12 inches long.



Figure 18

22. Secure the airlines to the retract frames with a tie wrap on each retract. Be sure not to pinch or kink the lines.



Figure 22

23. Open the struts with the doors attached (mains)

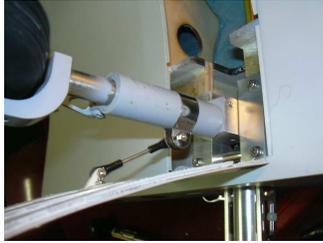


Figure 23

27. Bundle the lines in the wheel wells together for neatness using tie wraps.

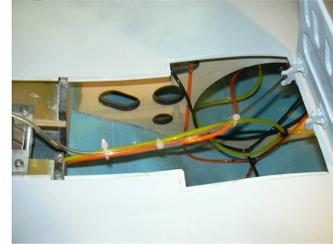


Figure 27

24. Add two 16-inch lengths of airline to the brakes and secure to the struts as shown.



Figure 24

28. Add five tie wraps around the bundle of lines going from the wheel wells to the nose.

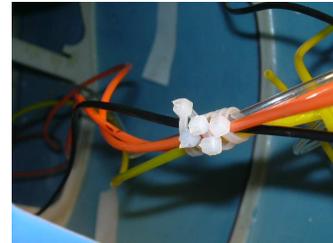


Figure 28

25. Connect the two brake lines together with a y connector and run a line forward from there to the nose.

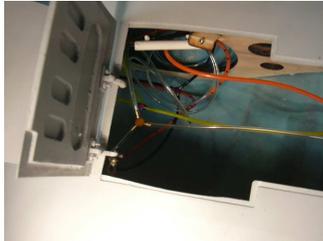


Figure 25

29. Slide those tie wraps down the bundle to leave an even spacing between them as shown.

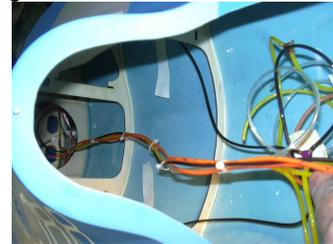


Figure 29

26. Tape the brake line out of the way to the fuselage floor for now.



Figure 26

30. Connect the two air bottles together using 16 inch lengths of line and a y connector, then add another 12 inches to the y connector.

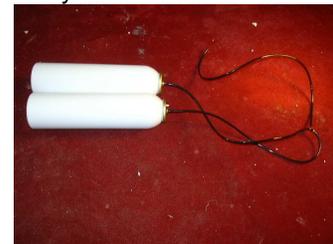


Figure 30

31. Glue the air bottles into the fuselage using silicone or epoxy.



Figure 31

32. Second air bottle on the right side of the fuselage.



Figure 32

33. Locate all the tank parts. Check the holes in the tanks and open if needed to fit the stoppers. Also blow out the insides of the tanks completely clean of all dust.



Figure 33

34. Clean up the end of each tube if needed, blow out any dust or shavings.



Figure 34

35. Assemble the stoppers as shown.



Figure 35

36. Add the clunks and lines, secure each end with a tie wrap.



Figure 36

37. Bend up the vent tubes on all three stoppers.



Figure 37

38. Install the stoppers in the tanks. Be sure to mark which lines is fuel and which are vent. Pressure tests each tank for leaks in a bucket of water or a sink.



Figure 38

39. Install the two saddle tanks. You will need to turn and rotate them to get them through the center opening in the main former.



Figure 39

40. Put silicone glue under and in front of the tanks to secure them.



Figure 40

41. These included ply plates are also for securing the tanks.



Figure 41

42. Put the plates into place and secure with a little CA glue.



Figure 42

43. Insert the main tank and fix it in place.



Figure 43

44. Prepare the control horns by roughening the bottom ends as shown for better gluing.



Figure 44

45. Drill out the hole in each horn to match the bolts on the provided links.



Figure 45

46. Mark each servo cover on the elevator, wings, and rudder. Keep the covers oriented. Remove them and put them aside.



Figure 46

47. Add a pair of servo mounts to one servo, and a link to one horn. This will be a dummy rig to establish the location of each control horn.



Figure 47

48. Use your rig, a ruler, and a marker to locate and mark where each horn will go. Be aware of the servo horn, and allow for the offset of the ball link.

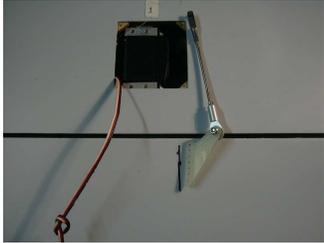


Figure 48

49. Cut a slot for each horn using a sharp exacto. It does a neater job than power tools for this, and only takes a few minutes.

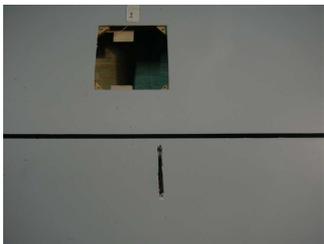


Figure 49

50. Box each slot in with tape as shown.



Figure 50

51. Coat the bottom of each horn with hysol. Make sure the holes are filled with glue.

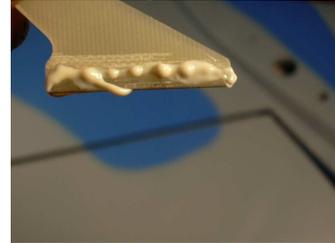


Figure 51

52. Fill the slots with hysol also. then fair the horns in with a small fillet of glue.



Figure 52

53. Smooth the fillet with your finger, then remove the tape and you will have a neat job.

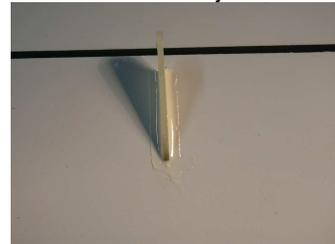


Figure 53

54. You may use tape to make sure the horns remain upright while drying. Put all these surfaces aside to dry overnight.



Figure 54

55. When the hysol is dry, you can paint the horns and fillets to match your airframe for better appearance.



Figure 55

56. By now, the silicone holding the tanks should be dry, let's get back to the fuel system. Make up a tygon harness to link the outer tanks to the center one.



Figure 56

57. Use this to connect the fuel outlets of the outer tanks to the vent of the center tank. Keep the tubing lengths to the outer tanks identical.



Figure 57

58. Make up another y harness as shown. Leave the third line long, it will need to reach forward and function as an overflow when you fill your tanks.



Figure 58

59. Use this harness to connect the vents of the outer tanks, and then tape the overflow line out of the way forward.



Figure 59

60. Now add a length of tygon to the fuel outlet of the main tank. Leave this one long enough to reach to your UAT, which will be mounted forward.

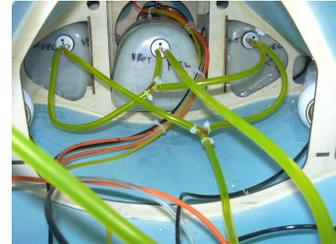


Figure 60

61. Secure all lines with tie wraps. You may find it easier to partially tighten the tie wrap on the line further out, then slide the tie wrap down the line to the tank and tighten.



Figure 61

62. Install your sequencing valve and servo and linkage to a scrap plywood mount. The UP3 valve is shown, but others such as the Jettronics or other sequencing solutions are fine.



Figure 62

63. Use velcro to install the valve on the fuselage floor. Check clearance with the radio tray and other components. Plumb the valve according to the manufacturer's instructions.



Figure 63

64. Mount the brake valve and a servo to a scrap plywood mount.



Figure 64

65. Note the use of a plywood block to space the valve upwards to keep side loads off the valve spool. Also note the use of the innermost hole on the servo to get the most accuracy.

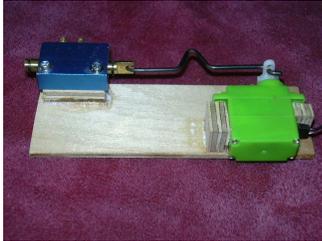


Figure 65

66. Install the brake valve assembly with velcro also. Connect the line to the brakes to the outer port of the valve (shown with clear line) and add a section of line to the other port.



Figure 66

67. Use that section of line and a y connector to connect the inputs of both the brake and sequencing valves.



Figure 67

68. Connect that to the y connector connecting the two air tanks using a short section of line.



Figure 68

69. Bisect that line, add a y connector, and add a 14 inch length of line to that.



Figure 69

70. Connect that line to your air filler valve. Fill and test your systems. Shorten and neaten and secure all airlines.

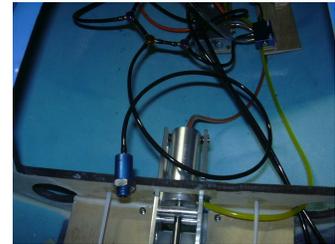


Figure 70

71. Attach a wheel collar to a 36-inch piece of string.

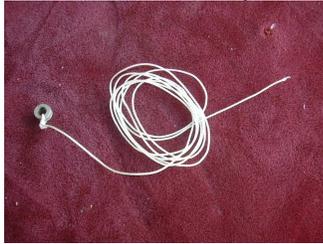


Figure 71

72. Tie the loose end of the string to a 36 inch heavy duty extension.



Figure 72

73. Use electrical tape to fair the string into the connector.



Figure 73

74. Use gravity to dangle the wheel collar and string through the boom at the holes shown.



Figure 74

75. Gently pull the extension through using the string.



Figure 75

76. Tape the extensions out of the way, and be sure to mark both ends of the extensions with the corresponding surface numbers from earlier.

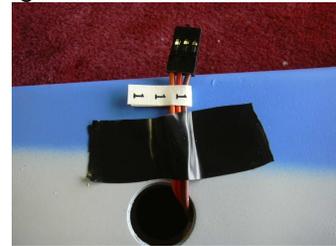


Figure 76

77. Put a second extension through for the rudder servo.



Figure 77

78. Again, labeling the extensions will save you a lot of headache later.



Figure 78

79. Repeat the process for the other boom. Note that the extensions must emerge on the inboard side of both booms.



Figure 79

80. Mark four 36-inch extensions with numbers at both ends corresponding to the appropriate servos for one side of the aircraft.



Figure 80

81. Neatly secure these four extensions together using tie wraps every six inches.



Figure 81

82. Feed this bundle into the aircraft as follows in through the hole shown in the wing root.



Figure 82

83. Through the hole in the former behind the main gear as shown.



Figure 83

84. Through the former in front of the main gear as shown, keeping the extensions above and away from the airlines.

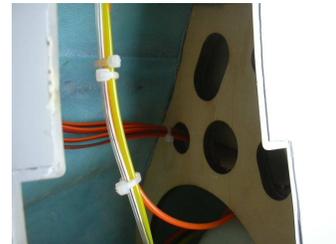


Figure 84

85. and into the forward fuselage as shown, keeping the bundle below all the air and fuel lines. Repeat this process with four extensions for the other side of the aircraft.



Figure 85

86. Install the metal mounts on the servo. Do not use servo grommets. Make sure the screws are long enough to thread well into the mounts.



Figure 86

87. Center the servo and add the horn. Be sure to size the holes in the horn for the provided Fei Bao clevises.



Figure 87

88. Tie a wheel collar to a string, and tie the string to the servo lead.



Figure 88

89. Drop the wheel collar and string through the structure and out the hole for the servo lead.

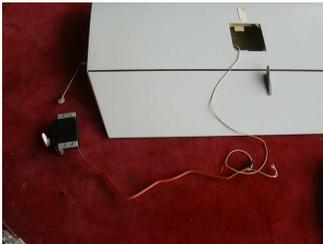


Figure 89

90. Pull the servo lead through and seat the servo on the wooden mounts in the structure. Check the wooden mounts for security, reglue if needed.



Figure 90

91. Label the servo lead with the appropriate number.



Figure 91

92. Drill pilot holes for the servo mounting screws.

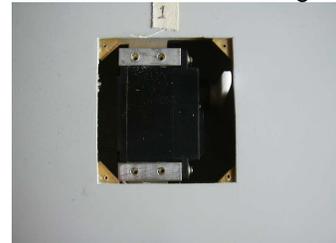


Figure 92

93. Use four kit provided self-tapping screws to secure the servo into place.

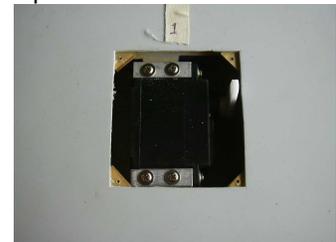


Figure 93

94. Put the properly numbered servo cover into place. Mark and cut a slot in the edge of the cover for the servo horn.



Figure 94

95. Screw the servo cover into place.



Figure 95

99. Connect the clevis at the other end, and secure it with the provided safety clip.

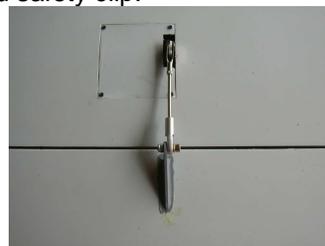


Figure 99

96. Find the control linkage closest in length and measure it against the needed distance between the centered control horn and centered servo horn.



Figure 96

100. All the other servos install similarly. Be sure to tape any extensions for safety. The aileron servos will require 12-inch servo extensions to reach to the wing root rib openings.



Figure 100

97. To shorten any linkage, leave the locknut in place, remove the clevis or ball link, and touch the threaded rod against a power sander. Bevel the shortened edge, and then unscrew the locknut to clean the threads.



Figure 97

101. Add a nose gear steering servo to your radio tray.



Figure 101

98. Bolt the link into place. Tighten fully, and then loosen only until you get free movement.



Figure 98

102. Add radio switches to the tray.



Figure 102

103. Install your UAT to the tray using tie wraps as shown.

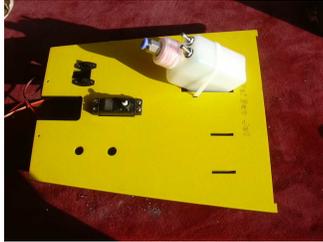


Figure 103

104. Fit the tray into the fuse. Note all servo leads are run to the top of the tray, and that the air fill valve goes through the hole as shown and gets its locknut on the top of the tray.



Figure 104

105. Plumb the feed line from the main center tank to the input of your UAT.

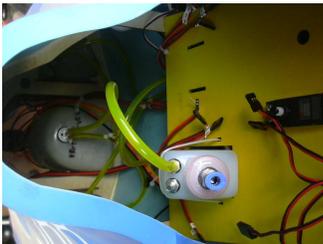


Figure 105

106. Add a fill line to the correct port of your UAT and plug it with the provided fuel plug.



Figure 106

107. Test fit your engine to the mounts. Get it as far forward as possible for balance, modify the mounts if needed.

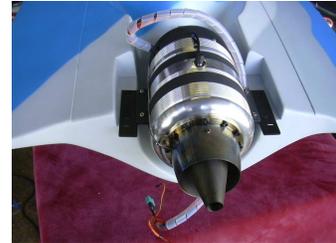


Figure 107

108. Mark around the starter motor where it hits the forward end of the engine bay.



Figure 108

109. Mark a circle at the correct spot big enough for the starter bullet to go through with ample clearance.



Figure 109

110. Cut the marked hole and check the fit of the starter through the hole.



Figure 110

111. Slit some airline tubing and CA it around the edges of the hole to give it a smooth edge.

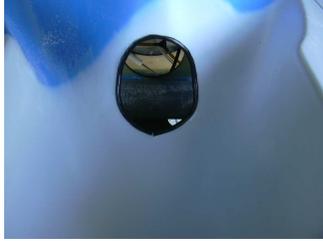


Figure 111

112. Slide the engine into place and mark as required for holes for fuel, gas, and electrical lines.

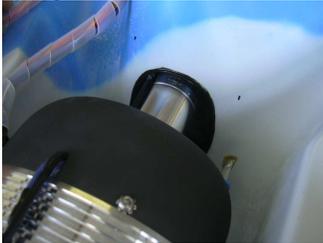


Figure 112

113. Cut these holes and line them with slit airline or rubber grommets to keep the lines from being abraded.



Figure 113

114. Carefully align the engine and mark the mounting holes.



Figure 114

115. Drill pilot holes for the engine mounting screws. Be sure not to drill too far and come out the bottom of the fuselage.



Figure 115

116. Mount the engine using screws and washers. Vacuum the engine bay carefully to remove any debris.

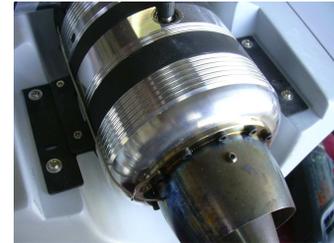


Figure 116

117. There are many options for setting up your electronics. The best way is to make a second tray to go behind the cockpit.



Figure 117

118. Make up a plywood tray as shown, approx. 125mm deep, 180mm at the rear edge, and 155 at the front. Test fit it into the fuse.



Figure 118

119. Plan how you want to install your ECU, solenoids, and fuel shut off on this tray. Be aware of the need to plug your data terminal in, and the need to get to the manual shutoff valve.



Figure 119

120. Make up mounts as required, and holes for fuel lines and wires.



Figure 120

121. Put a small plywood block at each forward bottom corner to mount the tray. The center ply block is a mount for the fuel shut off.



Figure 121

122. Sand the tray and paint it.



Figure 122

123. Plumb and wire the equipment according to your engine manual. Note you may need lines long enough to reach the engine in the rear of the model.

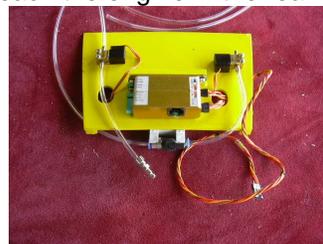


Figure 123

124. Install the tray with two screws as shown. You may want to glue two small blocks to the former to support the rear of the tray. Connect the engine electrical to the ECU.



Figure 124

125. Install your fuel pump and connect it to the UAT.

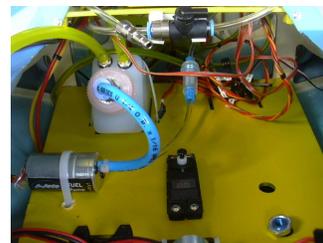


Figure 125

126. Run the fuel and gas lines into the engine.



Figure 126

127. Test fit the engine cover and mark it if need be to clear the glow plug.



Figure 127

128. Cut a hole for the glow plug.



Figure 128

129. 129. Secure the engine cover with six screws. Try to get the screws at the plywood formers, rather than just fiberglass.



Figure 129

130. Feed one end of the steering cable through each of the steering cable guide tubes from the top and out the bottom of the tubes.



Figure 130

131. Crimp the ends of the steering cables to the outer holes on the steering tiller on the nose gear.



Figure 131

132. Bisect the steering cable into two pieces and secure it to the servo with two ez connectors. Make them taut but not too tight. There should be no slop, but no tension, either.

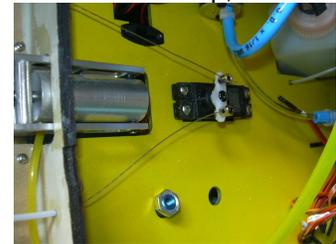


Figure 132

133. Insert the wing tube. Mark it on both sides to make sure it is equal.

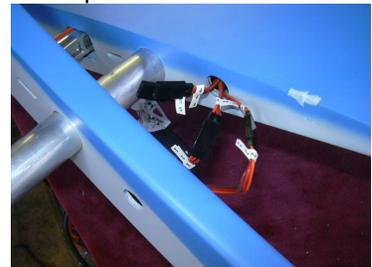


Figure 133

134. Slide one boom partly into position and make the connections to the rudder and elevator servos



Figure 134

135. Slide the boom all the way into place and stick the flap and aileron connectors through to the outside.



Figure 135

136. Secure the booms into place with these bolts.



Figure 136

139. Those bolts secure the stab.



Figure 139

140. Make sure you use the provided washers and tighten these bolts firmly.



Figure 140

137. Make the connections for the elevator servos.



Figure 137

138. Insert the stabs between the booms.



Figure 138

Congratulations, you have completed construction on your

Velox. See the Pilots Notes for balance and control throws.



Technical data:

Weight with the super bee and two 1800max RC NiCads and full UAT is 28.5 Lbs.

CG is 7 1/4" back from the wing root (not the boom root) it's nice and safety for the first flight. There is room to move it back if you like more aerobatic performance, but make changes gradually. Balance with full UAT and landing gear up. The main tanks, is slight forward of the CG, balance with the main tanks empty. You may find a click or two of trim needed as the fuel runs off during flight.

Control Trows

These are good place to start. Feel free to ad more trow for more aerobatic capability after the first flight.

- Aileron:**
20mm up and down
- Elevator:**
25mm up and down
- Rudders:**
20mm right and left
- Flaps:**
35 mm down

Some things to be aware of...

FEI BAO VELOX XL

You may want an up-elevator mix with flap application, as the nose pitches down. You may also want some additional up-elevator throw available with full flaps, as you may not have enough elevator to flare with full flaps. A "landing" mix will reduce the pilot workload. These settings, flap-to-elevator, will change if you move the CG back. You can also increase the rudder throw, but be sure the rudders do not contact the elevator at full throw.

Credits:

Written by Curtis Mattikow

Test Pilot: Curtis Mattikow

Maiden at Floyd Bennett Field



