Fei Bao Jets

1/6 Scale F-5 Tiger II

Written by Paul Blanchard
In collaboration with R/C Jet Models

DISCLAIMER:

T**HIS 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 once 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 F-5 Tiger II.

C. WORKING WITH PNEUMATIC SYSTEMS:

The F-5 Tiger II 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.
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.

While the Kit is comprehensive there are additional parts required as follow:

Recommended Servo List

Ailerons (2) DS3301
Elevator (2) DS8611A
Rudder (1) DS8411SA
Flaps (2) DS8411SA
Steering (1) ST126
Retracts (2) NM48
Brakes (1) NM48
Airbrakes (1) NM48

Other Parts

BVM UAT (optional)
Fuel tank vent fitting
Festo fuel shutoff valve
Wire twist tie (optional)
Blue Loctite
Glues: Thin CA, 5 minute epoxy, 30 minute epoxy,
Aeropoxy, Zap-a-Dap-a-Goo
Electronic gear sequencer
Batteries, regulator and switch
Matchboxes, Powerbox, Smartfly EQ10 or equivalent
Servo extensions (length may vary, depending on receiver placement)

Additional Required Tools and Adhesives

- Xacto Knife, #11 Blade
- Pacer Hinge Glue (PT-55)
- 30 Minute Epoxy
- Acetone/Alcohol swabs
- Felt-tip Marker
- Pencil
- Ruler Metric and Standard
- Drill
- Drill bits
- Pen vise
- Course and Fine Sandpaper
- Thin, Medium and Think C/A
- Pliers
- Masking Tape
- Double-Sided Tape
- Rat tail file
- Velcro
- Thread Locker
- Dremel and assorted bits
- Philips screwdriver

Step 1: Installation of the main gear doors, airbrakes and air cylinders.

If the gear doors and airbrakes have not been installed, then you will need to install them. The air cylinders for the airbrakes need to be installed before the fuel tanks because of accessibility. The airbrakes & gear doors are attached with the offset hinges supplied. They are bolted into place using the small bolts and nuts supplied. Once the doors are bolted into place, make sure they operate freely. When you have free operation, use thread locker on all the nuts and bolts. Attach the air cylinders as illustrated in the photo. You can use a section of nyrod on the air cylinders as a stop to keep them from over travel and damage to the hinge. Attach the air lines to the cylinders and run them forward to the equipment tray where you will mount the valves later.

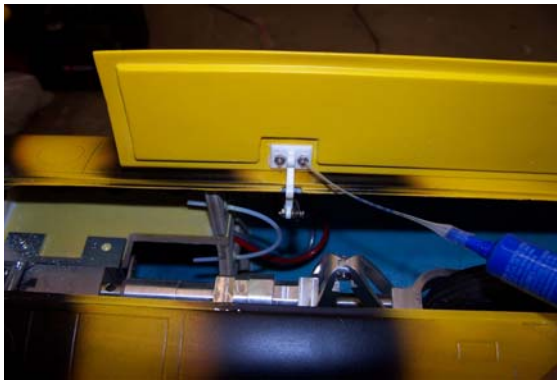


Figure 1

Figure 2

Figure 3

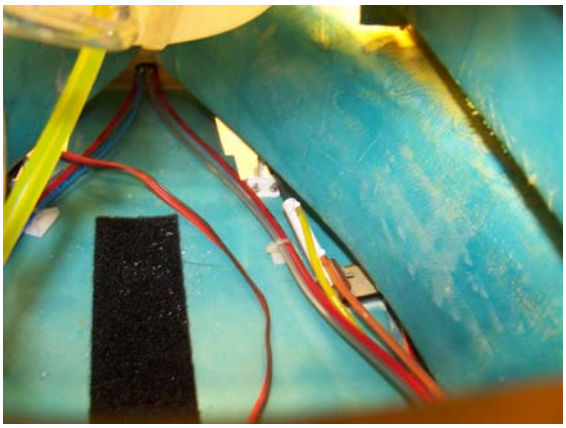


Figure 4

Figure 5

Figure 7

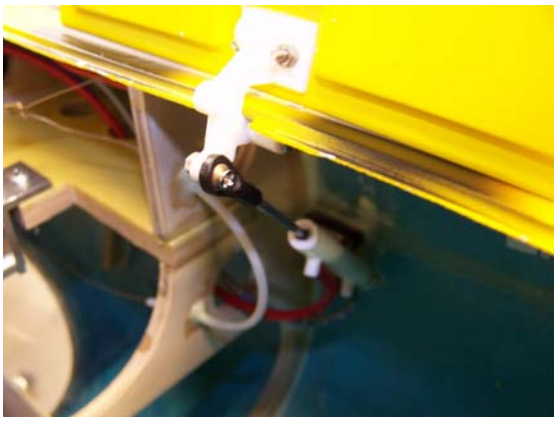


Figure 8

Figure 9

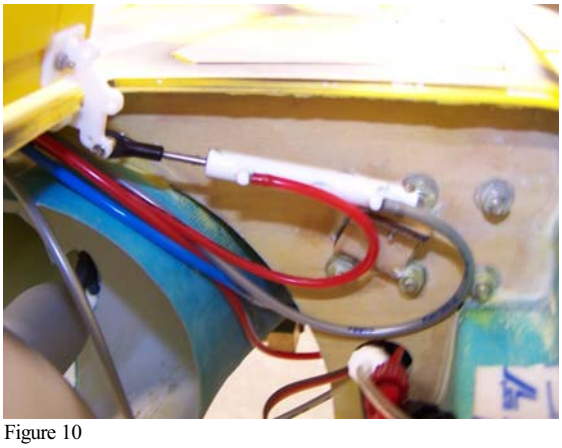


Figure 10

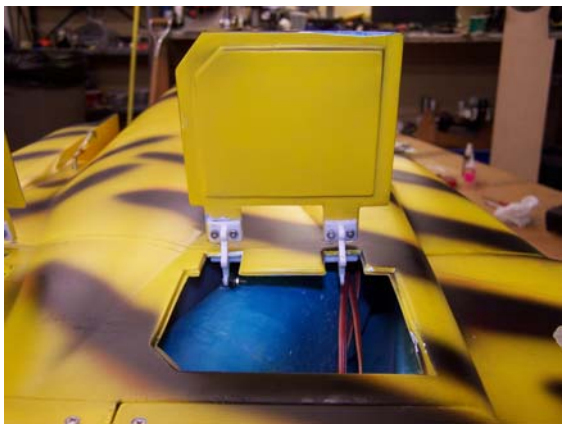


Figure 11

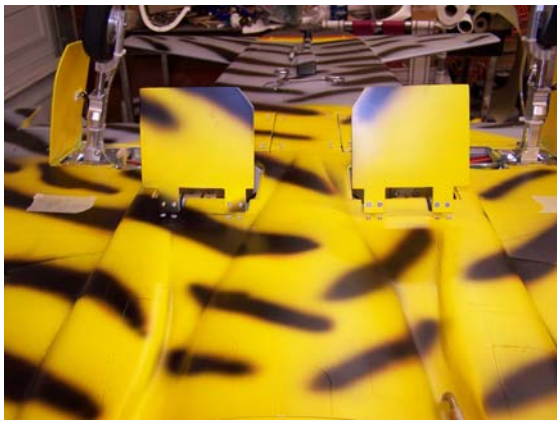


Figure 12

Step 2: Servo Installation

Install the servo extensions for the elevators and rudder. Make sure that the extensions do not come in contact with the tailpipe.

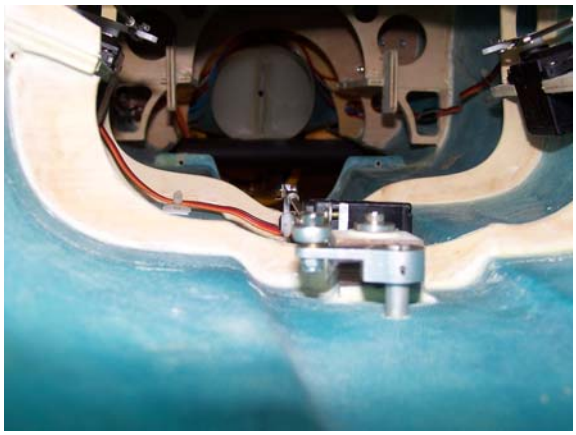


Figure 13

Step 3: Installation of the vertical fin.

Check the glue joints of the bulkheads that the vertical fin will mount to. Add glue for reinforcement if necessary. Plug the vertical fin into the top of the fuselage and check for a proper fit. Some light sanding may be required to achieve this. Once you are satisfied with the fit, bolt the fin in place using the bolts and washers supplied. Make sure to use thread locker on the bolts to keep them secure.

Figure 14

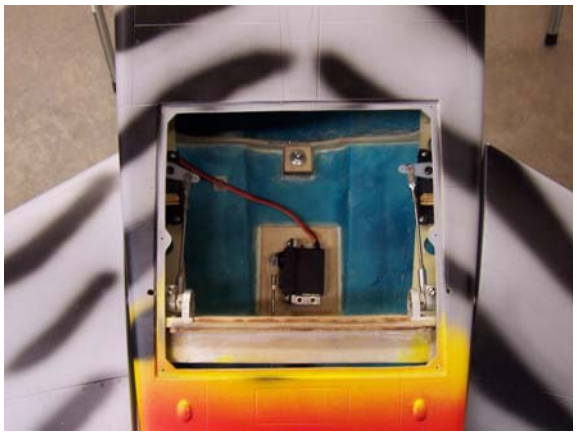


Figure 15

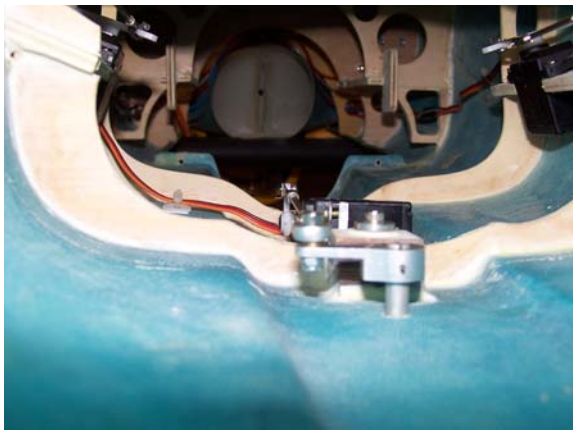


Figure 16

Step 4: Installation of the horizontal stabs and servos.

Check the glue joints of the bulkheads to which the horizontal stabs attach. Reinforce if necessary. Locate the hardware for the stabs (control arms, ball links, clevises, etc.). As a note, there is a left control arm for the left stab and a right control arm for the right stab. Balance both stabs. Slide the left stab through the left side of the fuse and through the stab bracket & control arm. Once he stab is in position, tighten the bolts on the control arm (use thread locker). Repeat the same steps for the right stab. Install both the left and right stab servos. Do not use the grommets provided with the servos as they may increase the chance of control surface flutter. Center both servos to their neutral position and attach heavy duty servo arms. Connect the linkages between the servo arm and control arm so that when the servo is in the neutral position the stabs are at zero incidence with the wings.

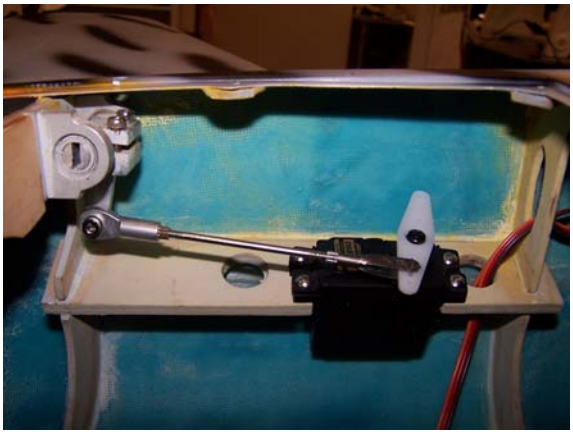
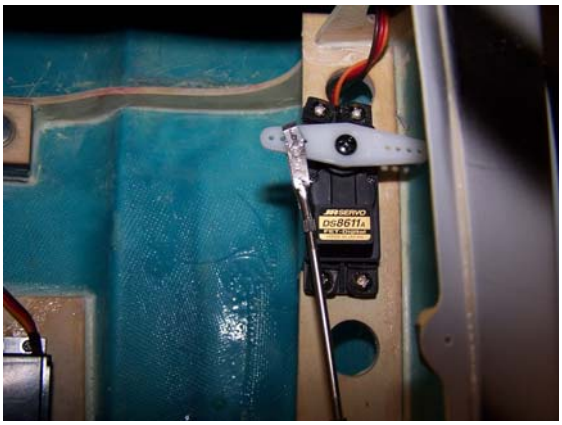


Figure 17

Figure 18

Figure 19



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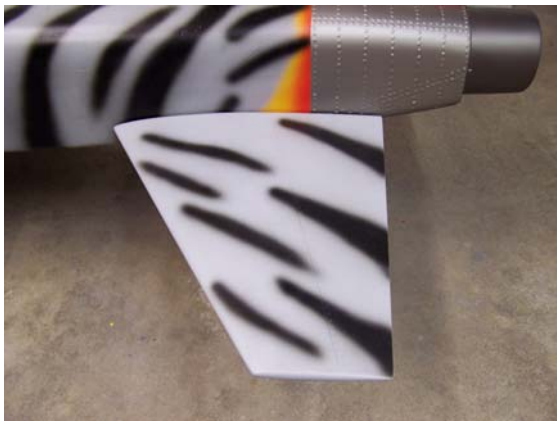
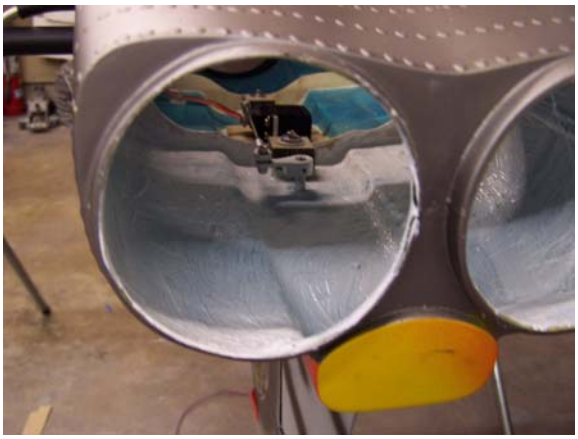


Figure 21

Step 5: Heat Shielding the rear fuselage

Because the tailpipe size, it comes very close to the top and sides of the rear fuselage. Heat will be an issue. The rear fuselage should be protected. Ceramic blanket, BVM Heat Shield and aluminum tape are excellent for this step. Line the inside of the fuselage with heat blanket. Use ca glue to tack it in place. Then cover the blanket with aluminum tape making sure to over lap each piece until the entire blanket is covered. Use the BVM Heat shield to cover any exposed parts of the fuse not covered by the blanket and tape.



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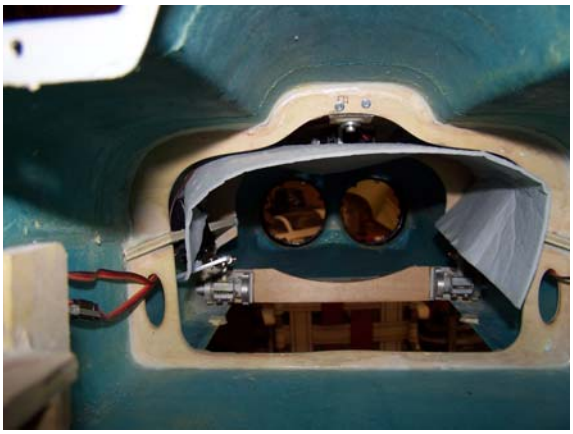


Figure 23

Figure 24

Figure 25

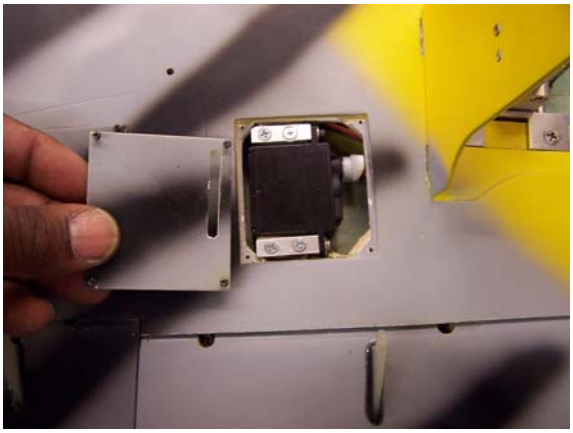
Step 6: Install the tail cones.

Install the tail cones using the screws provided. Please note that the tail cones have a taper at the back. They should be installed like the photo.

Figure 26

Step 7: Install the aileron and flap servos.

The mounts for the aileron & flap servos are in the wing. Depending on the type of servos used, the mounts may require some minor modification to accommodate them.



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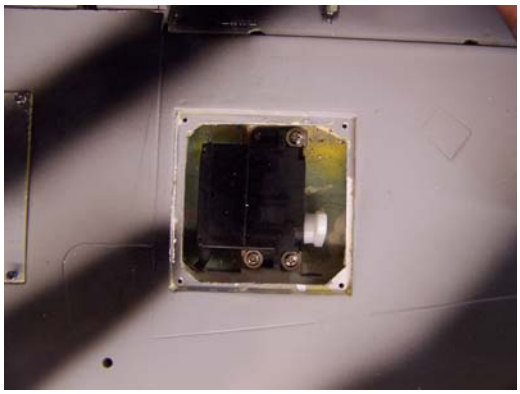

Figure 28

Figure 29

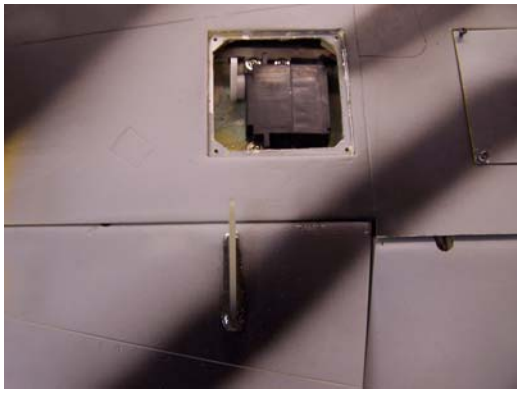

Figure 30

Figure 31

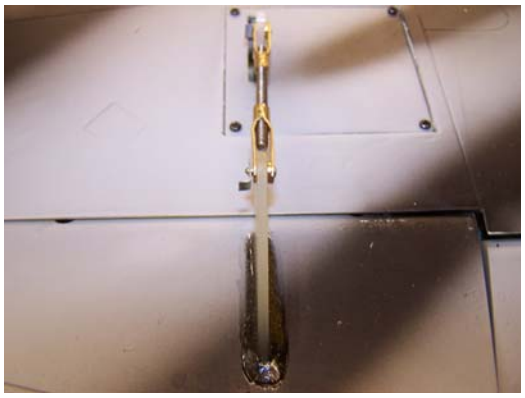

Figure 32

Step 8: Install the main landing gear.

When installing the main landing, you must first attach the air lines to the retract; leaving the line long enough to route it through the wing and out the wing root with the servo extensions. Make sure you do not kink the air line. Hold the retract against the mount to check the fit. The retract mounting flange should rest flush against the mount. While holding the retract against the mount, move the strut from the extended to the retracted position make sure it moves freely and that it retracts into the wing correctly.

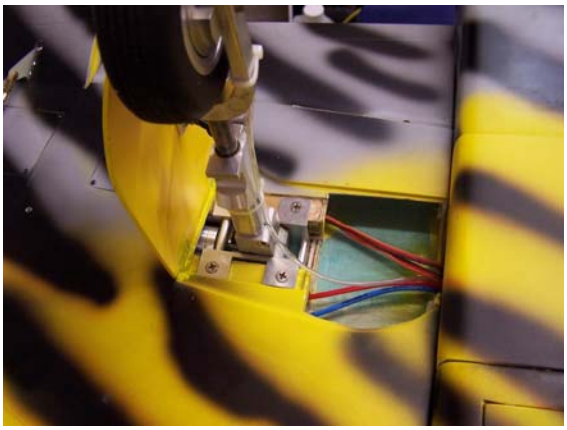

Figure 33

Figure 34

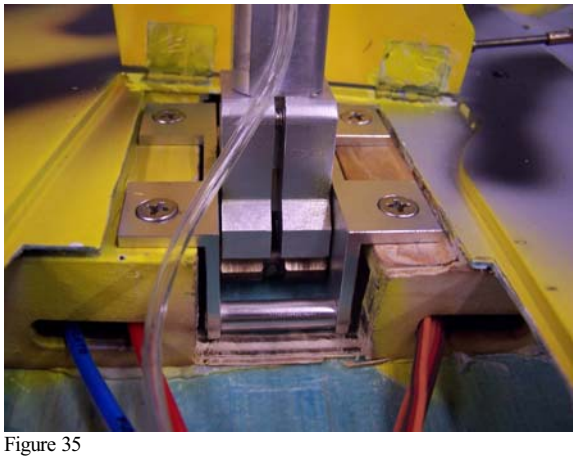

Figure 35

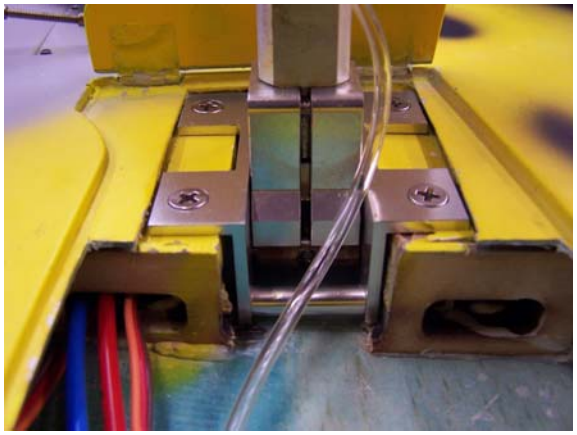

Figure 36

Step 9: Attach the outer gear door to the struts.

Once the landing gear is installed in the wing, you will attach the outer gear door to the strut. This is done using the hardware supplied. Make sure to use thread locker on all bolts. Once the door is attached, operate the strut from the extended to the retracted position to make sure the door does not bind and closes properly. It may take some adjusting to get proper operation.

Figure 37

Figure 38

Step 10: Check the wings fit and mounts.

Plug the wings into the mounts and check the fit against the fuselage. Make sure the flaps move freely without rubbing the fuselage sides. Make sure the struts, wheels & brakes enter the fuselage without any problems. Install quick disconnects on the air lines for the retracts and brakes where the lines enter the fuselage. Make sure the brackets the wing spars plug into are secure on the bulkheads and that the bulkheads are secure also. Reinforce if necessary.

Step 11: Fuel tank installation.

Plumb the fuel tanks using large brass tubing and large flexible tygon. Be sure to use a large & heavy clunk like the ones from Dubro. After the internal plumbing for the tanks has been completed, the tanks should be leak tested. You will need to install a vent for the tank. This can be done by epoxying a small piece of brass tubing through the fuselage. You may elect to bend the brass tubing forward into the air stream to provide positive pressure in flight for better fuel flow(note picture #3). After the tanks have been leak tested and no leaks are found and the vent has been installed, the tanks are ready to install in the fuselage. The large tank is installed first between the intakes with the smaller tank on top. Velcro is used to secure the tank in place and also makes it easier to remove the tanks should they need service. The tubing between the tanks should be installed so that the large tank empties first and the small tank second. A header tank or UAT should be used to trap any air bubbles that could get to the engine and cause a flame out. it can be easily located in the equipment tray area.

Figure 39

Figure 40


Figure 41

Step 12: Install the nose section.

Install the nose using the (6) bolts supplied. Make sure the bolts are tight and use thread locker.


Figure 42


Figure 43

Step 13: Install the nose gear.

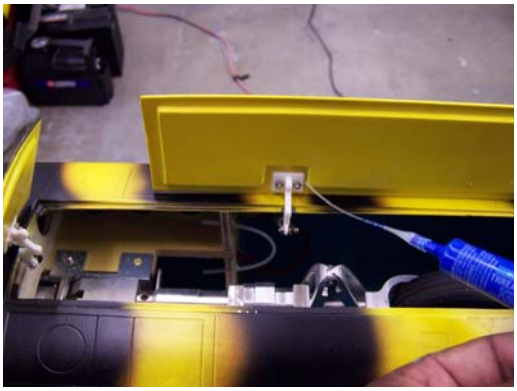

Figure 44

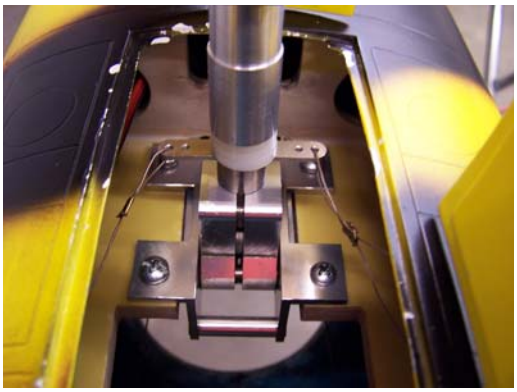

Figure 45

Figure 46

Figure 47


Figure 48

Step 14: Tail pipe and engine installation.

The tail pipe is installed the the engine hatch opening. Pay close attention to the pipe mounting tabs at the front of the pipe. The pipe should be installed with the tabs toward the top of the fuselage. The tabs will mount to the bulkheads at the rear of the engine hatch (see picture #1). The rear of pipe should be inside of the tail cones 1/4" to 3/8" (see picture #3) for a cooler running installation. Install the engine with the tail cone 1/2" to 1" from the bell mouth of the pipe. Depending on the engine you choose to power your F-5, spacers may be need to raise the centerline of the engine.

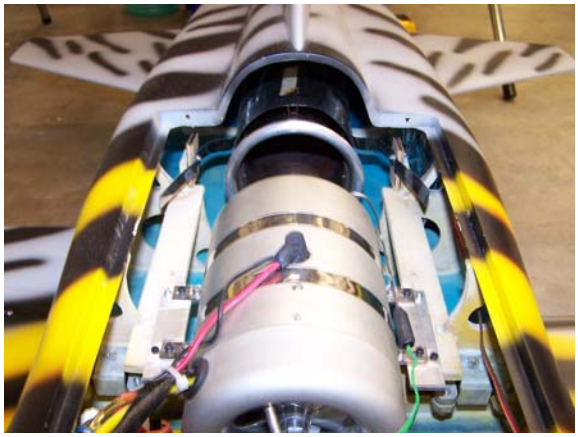
Figure 49

Figure 50

Figure 51

Figure 52

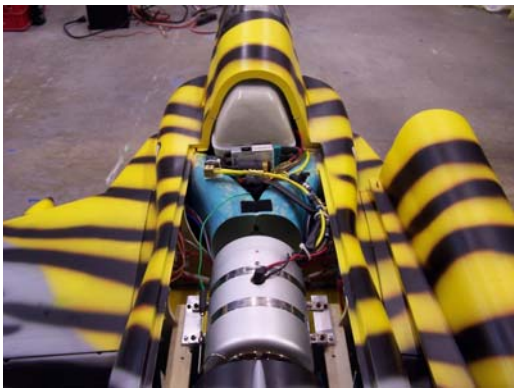

Figure 53

15: Equipment tray installation.

The equipment tray will hold the servos and valves for the retracts, brakes, air brakes, nose wheel steering, etc. The type/brand of equipment and personal preference, will dictate the location on the equipment tray. Center of gravity needs to be taken in consideration when placing equipment on the tray. The tray is held in place with four servo screws.

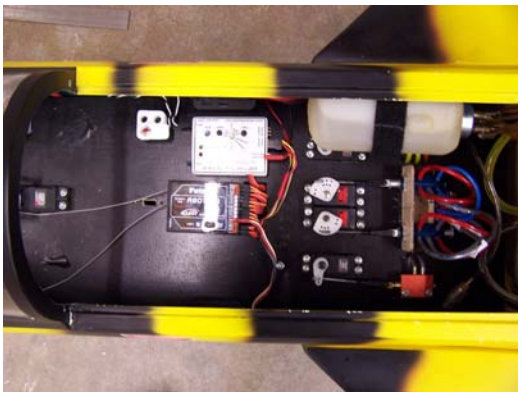

Figure 54

16: Nose wheel steering.

A pull pull setup is for the nose wheel steering. Plastic tubing, used as cable guides, are pre-installed. Take the cable and feed it through the plastic tubing.
Attach the cable to the steering arm of the nose gear using the crimp connectors supplied. Attach the other end of the cable to the eye bolt & clevis at the nose wheel steering servo arm. Fine tune the connections until you have a centered nose wheel and the proper amount of tension on the cables.

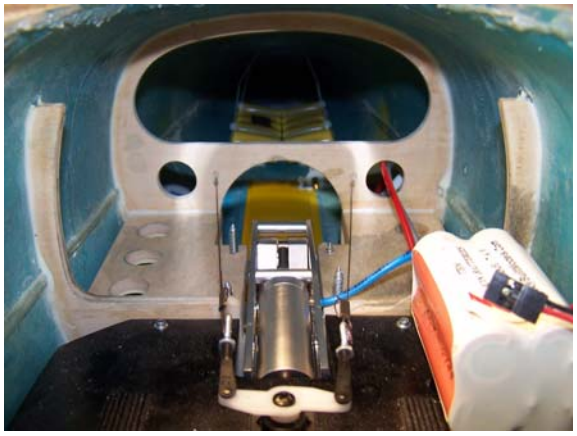
Figure 55

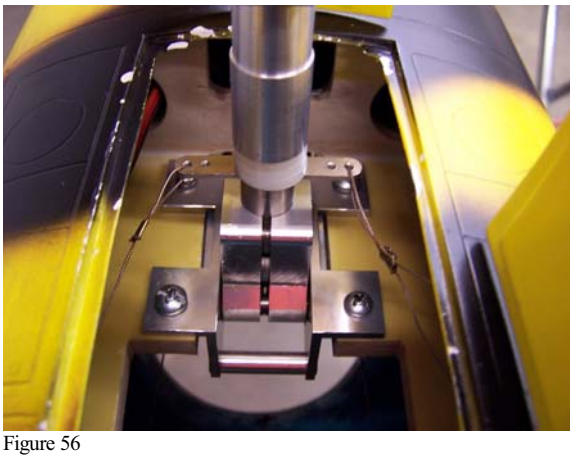
Figure 56

17: Install Missiles, Pylons & Tank.

The missiles, pylons and tanks have been pre-mounted at the factory for an easier installation. Bolt the pylons to the hard points in the wing. Attach the tanks to the pylons. Attach the missile rails to the wing tips using #4 screws. Attach the missiles to the missile rails using #2 screws.

Figure 57

Figure 58

Figure 59

18: Balancing.

The F-5 c.g. is 3 1/2" to 4 1/4" back from the leading edge of the wing at the root.

Figure 60

Congratulations, you have completed construction on your F-5 Tiger II. See the Pilots Notes for balance and control throws.

Technical data:

CG is 3 1/2"- 4 1/4" back from the leading edge of the wing at the root.

Control Trows

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

Ailerons	**1/2"- 5/8" up & down**
Elevator	**1 1/2"- 1 3/4" up & down**
Rudder	**1"- 1 1/2" left & right**
Flaps	**1" take-off 2" landing**

Credits:

Written by Paul Blanchard
Test Pilot: Paul Blanchard
Photos first fly:
Maiden at