

GiantScalePlanes.com

Sukhoi 31 – 80”

Thank you for purchasing this high performance aerobatic giant scale Airplane. The Sukhoi 31 is terrific for IMAA and IMAC events as well as your regular flying enjoyment. To get maximum performance and enjoyment from your Sukhoi 31, please read these instructions carefully before completing the model. In addition, we advise the use of high quality, high output servos, particularly on all flying surfaces. Note: Rule of thumb for servo selection is to choose an output equaling the square inch area of the surface being driven. IE: 50 sq. in. aileron use a 50 oz. output servo. We use one servo per aileron, two for the elevators, and one or two for the rudder depending on how hard you fly. If using two servos on the rudder, make sure they are matched perfectly and do not stall on one another due to unequal throws. This will cause a heavy load on your batteries and a short-lived battery charge. Although there are very few steps left for you to complete, do your best to keep the tail end of the airplane as light as possible. A little excess weight in the tail will add 4 to 5 times that amount in the nose for proper balance. We have provided an access hatch in the back for your servo connections. If you need to place your receiver in the rear of the fuselage add a light plywood hatch to the rear bottom. This is exceptionally easy due to the construction of the fuselage. Also remember if you are going to use an electronic ignition system, keep all servos and wiring at least twelve inches back from the engine electronic system. This includes batteries and switches. Also do not use a metal push rod from throttle servo to engine. This could cause interference.

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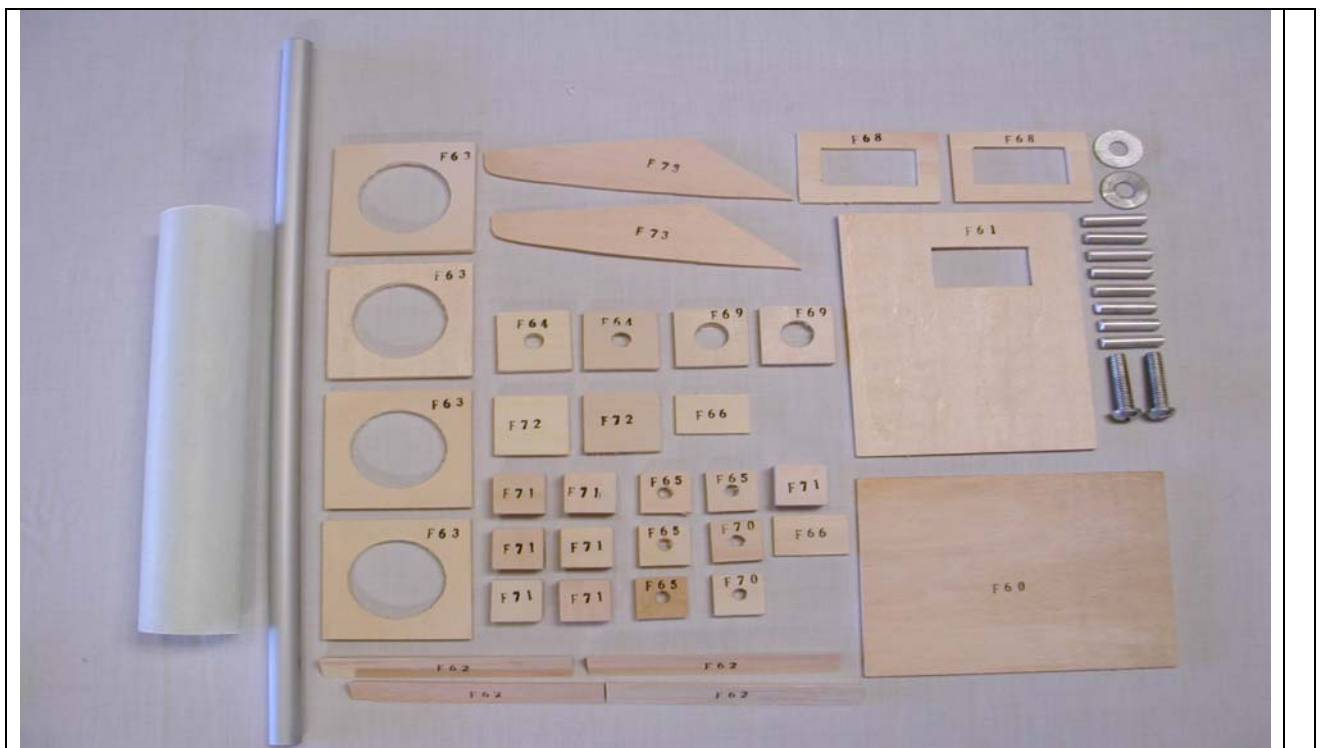
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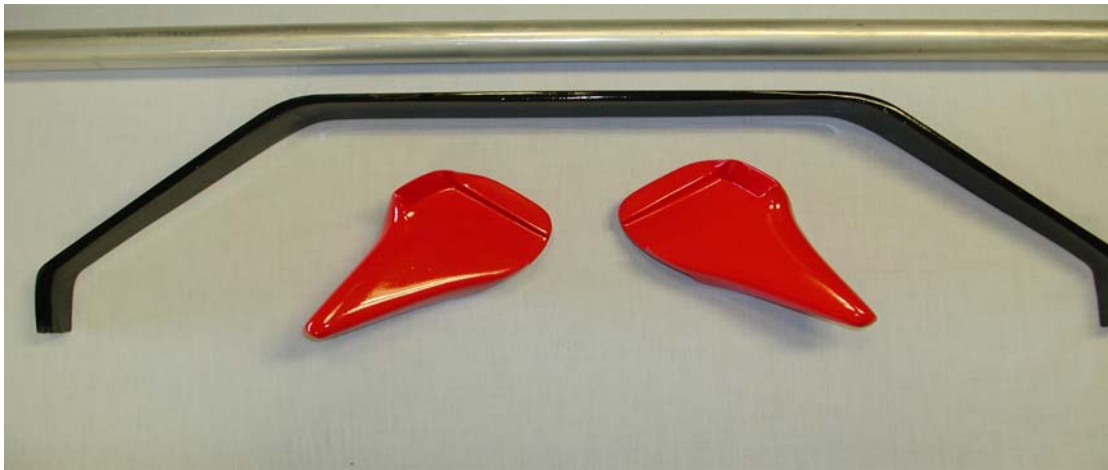
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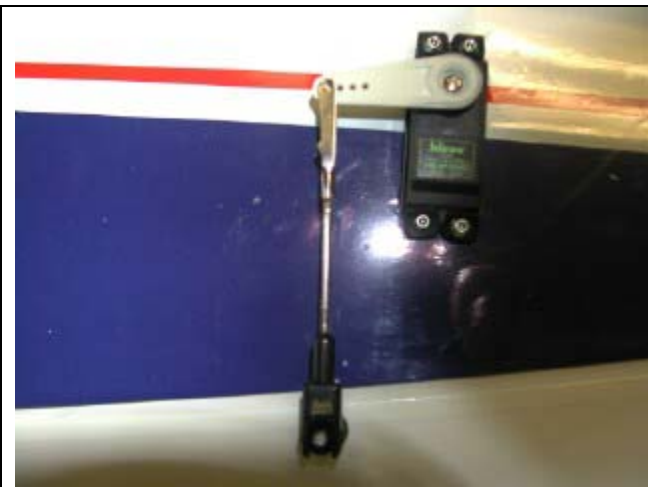
Sukhoi 31 Parts List & Identification

Part Number	Description	Qty
F60	Fuel Tank Support	1
F62	Support	4
F71	Cowl Fixing Block	7
F63	Wing Join Support	4
F65	Wing Anti Roll Pin Support	4
F64	Wing Screw Support	2
F68	Tail Servo Support	2
F69	Tail Plane Join Support	2
F70	Tail Anti Roll Pin Support	2
M1	Anti Roll Pin	6
M2	Wing Lock Screw	2
M3	Washer for M2	2
M4	Wing Join	1
M5	Tail Plane Join	1
G1	Tail Join Sleeve	1
G2	Landing gear	1



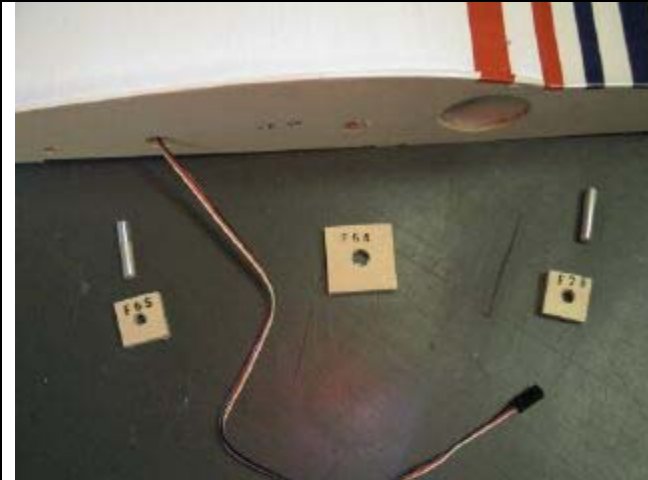


Installation of Wings



The Sukhoi 31 uses one servo per wing panel. Find the servo cut out in the bottom of wing panel and trim away the covering making sure to iron down any loose edges. Tip: Iron down covering around servo opening before cutting out. Your aileron push rods come off the opposing sides of the servo on each wing panel. When installing the wing servos make sure that the servo output arm is closest to the trailing edge of the wing. Note orientation of servo and output arm in photo. This will help minimize play. Make aileron push rods using at least a 4-40 rod and H/D servo arm to help add rigidity to control linkage.

Dowel & Hinge Installation



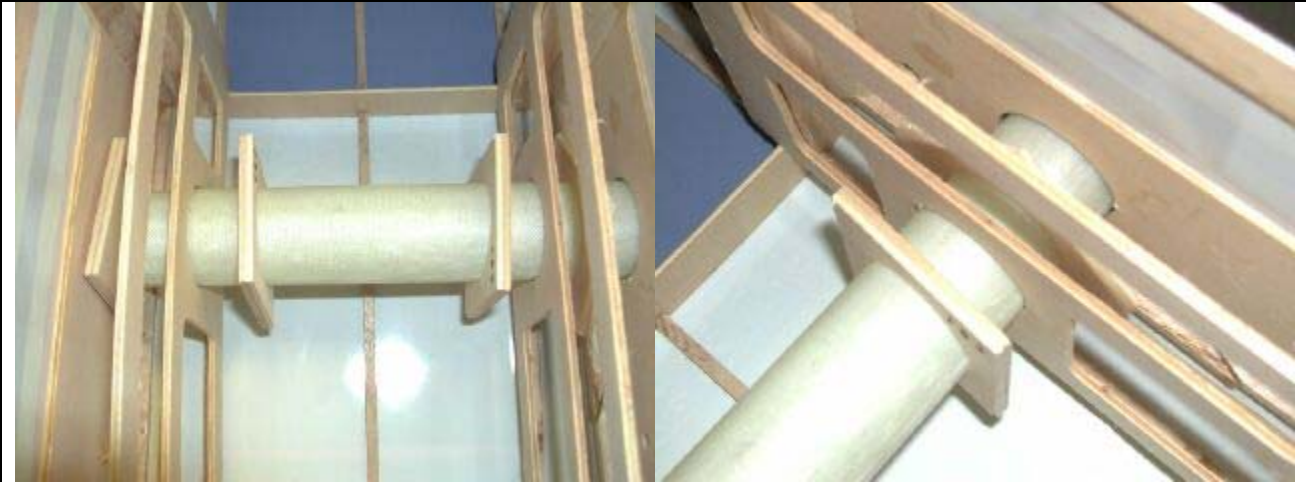
Dowel Installation

Locate **M1**, the anti rotation dowels for the wings. Holes are provided in the plywood root rib for the installation of these dowels. It is imperative that these two dowels are installed parallel to the wing tube not to the root rib. As a guide slide the wing tube into each panel. Epoxy the dowels into each hole allowing 5/8 of an inch protruding from root rib.

Hinge Installation

Do not use CA type hinges, as it will damage the wing. We recommend the use of large #310 Robart Hinge Points. Because the Sukhoi uses rolling surfaces, the hinges must be installed so the center of the hinge is at the center of the surface radius. This will give you the rolling effect without binding.

Wing Tube Installation

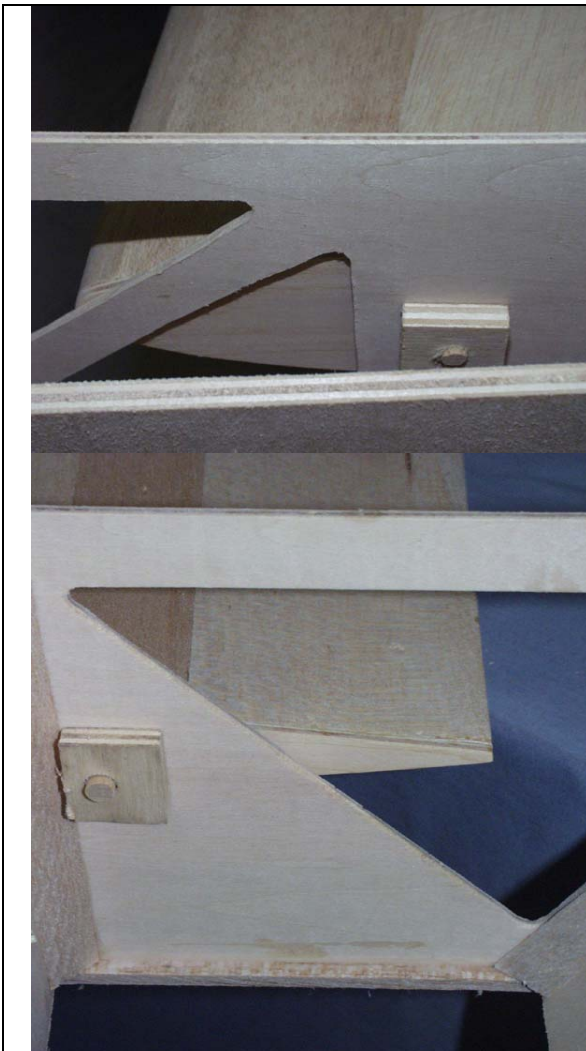


Locate 8 1/4-inch fiberglass tube sleeve. Lightly sand outside of tube to accept epoxy. Locate the four wing tube doublers marked F63. Take the fiberglass tube and insert it into the fuselage, put the doublers on the inside of the formers. Slide the doublers over the fiberglass tube at the appropriate time so that the doublers are on the insides of the formers. Slide the wing tube into fuselage. Now slide the wing panels onto the wing tube making sure wing panels are flush against the fuselage. Make sure that the fiberglass insert remains centered in fuselage. Measure distance from the trailing edge of the wing tips to rear fuselage. Make sure distance is exactly the same on both sides of the airplane. Adjust wing-tube assembly if necessary. When satisfied that everything is true install the 8mm wing retainer bolts to hold the wings in alignment. Epoxy the wing tube doublers into place making sure that the top of the doublers are parallel to the top of the fuselage sides. Be careful that no epoxy gets into the wing-tube and remove the excess epoxy from the outside of the doublers with a paper towel and rubbing alcohol.

Setting Wing Incidence

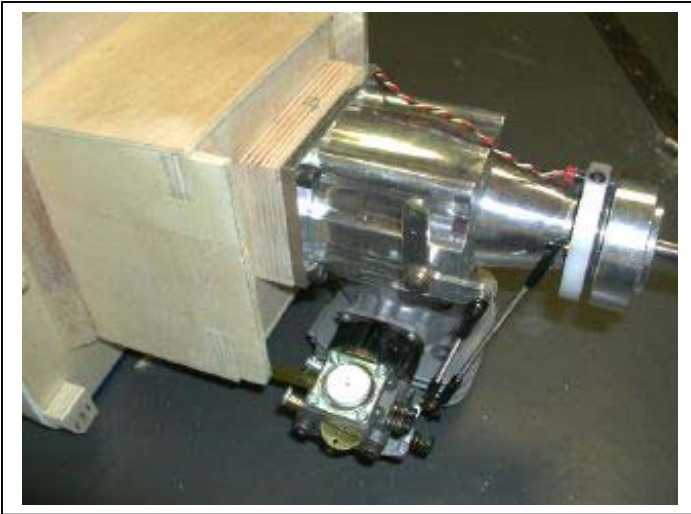


Locate the four F65 dowel hold-downs. These will hold the anti-rotation dowels at the proper incidence once installed. Slide the wing-tube into the panel. Find a flat building surface for the fuselage. Raise tail until the fuselage sides above the wing-tube are level. Slide wing and tube onto fuselage (one side at a time). From the inside of the fuselage slide F65 over the protruding dowels, (do not glue at this time). Install 8mm wing retainer bolts. Place incidence meter on wing and set to zero and tighten 8mm bolt.



In addition you can use masking tape at wing/fuse joint to help hold alignment. If you need to adjust the wing incidence, re-drill the hole in the fuselage to a slightly larger size. The F65 will give capture to the pin in the correct position when glued in place. Remove F57 and carefully epoxy them in place over the dowels, be extra careful not to get any epoxy on the dowels. When dry remove wing panel and repeat procedure for other side. Once you are satisfied with the fit of the wing panels, you can install the wing fairings. Place the fairing in place and draw a fine line with a felt tip pen to mark the outline. Remove the covering 1/8-inch inside the line for a good gluing surface. Medium CA used very sparingly works very well for this step.

Engine Installation



The engine's thrust line is centered on motor box. Motor box has 1.5-degree right thrust offset built in. To find engine location: Mark a centerline down the top of the engine box; use a straight edge to extend centerline to forward of firewall. Viewing from above move engine right/left so that prop shaft lines up with straight edge. Mark engine mounting points and drill holes for motor mount.

Cowl Installation



In order to get proper cowl placement mount engine so there is between 6 and 6 1/4 " between firewall and back side of spinner backing plate. Depending on the engine you choose it may be necessary to make spacer from plywood to get proper spacing from firewall to spinner backing plate. Glue (8) small cowl mounting blocks to top and sides of former. Trial fit cowl and trim rear edge to final fit. When satisfied with final fit drill holes into mount blocks for retaining screws. 6-32 button head machine screws work well.

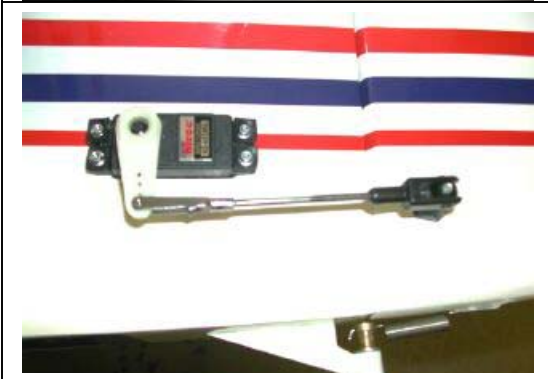


Hatch Installation



The hatch can be installed with two different methods. The first is to use blind nuts and bolts, and the other is to use self-tapping screws. Again, 6-32 button head screws.

Rear Stab & Rudder Installation



Prepare the stabs by hinging the elevators using at least 4 Robart large #310 hinge points per elevator. After hinging each elevator half glue the anti rotation dowel in place parallel with the stab tube. Place the stabs aside and hinge the rudder with no less than (6) #310 large Robart Hinge points. Now that your rudder is hinged and installed, locate the Fiberglass tube sleeve (G1) and the tail tube doublers (F70). Level the fuselage as you did earlier for the installation of the main wings. After the fuselage is level locate and trim out the holes that are predrilled in the side of the fuselage. Find and remove the lower tail hatch. The fiberglass tube and tube doublers will have to be dry fit into the pre-established position. After the tube and it's accessories are in position put the stabs into position and set the stabs to zero incidence and mark the side of the fuselage for their location. Trim back the covering to allow a place to adhere the inner root of the stab to the side of the fuselage. After you are sure you have everything center and zeroed glue everything with a 1 hour epoxy. The last method of installing the stabs is to drill a hole into each stab and tap the stab tube so that it accepts bolts.

Landing Gear Installation



Landing gear installation can be done several different ways but our recommendation is to use 6 $\frac{1}{4}$ -20 bolts with locknuts and washers. If so desired you may want to use 6 nylon bolts. The use of nylon bolts prevents damage to the fuselage of the aircraft if hard landing should occur.

Wheel Pants Installation



The wheel cuff installation is very simple. Locate the 2 wheel cuffs. Using a 3 1/2 to 3-3/4 inch wheel, center the wheel in the center radius of the cuff with clearance for the wheel. Drill through the wheel to mark the cuff for the axel. Place the cuff on the landing gear and drill through the cuff and into the gear. Install the axel and wheels. Secure the cuff with Zap a Dap a Goo. The recommended wheel size for the two main wheels is 3 1/2 to 3 3/4". The recommended tail wheel is 1 1/4".

Fuselage Reinforcements (Optional)



This is an option for modelers that will be using their Sukhoi 31 for 3D or hard aerobatic maneuvers. Install the blocks into the fuselage so that they go inline with the leading edges of the wings. This will provide additional support for the fuselage and stiffen the whole system up. Place the stiffeners between the outside fuse wall and the inner wall. One on each side of the tube and one just under rear of hatch cover.

Install the servos using the servo doublers provided. Also provided are the fuel tank and radio tray platforms for use once the motor and tail surface servos are installed. Find the ideal location for those two platforms that will benefit the CG. Remember the CG is located between 25 and 30% of wing chord measured from leading edge of wing at root end. Measure wing chord at root then multiply by 25-30%. IE: $18 \times .25 = 4.5$ " Measure back 4.5" from leading edge at root, that point will be your 25% starting point for your CG. It is recommended that you start with the CG closer to the 25% point than 30% for initial flights. As the CG gets closer to the 30% point elevator sensitivity increases which could lead to an unexpected stall/spin before you get to know your new plane's flying characteristics. The recommended starting points for travel are $3/8$ " for the ailerons and $1/2$ " for the elevators. The starting point for the rudder doesn't matter, use whatever you can get. After your first flight you can put more travel in for 3D and aerobatics using your radios exponentials to reduce sensitivity around neutral. Also, if there are any questions or comments, please direct them to Stefan@ewtech.com



Trim the canopy to fit the fuselage. Install your favorite pilot and instrument panel and glue the canopy on to the fuselage with canopy glue.