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## Building the Nightstik

The F-117 Nightstik is an outdoor “park flyer” with a direct drive “400” motor. The model handles quite well in the wind, because of its low profile. No matter what the color scheme is, this model can be difficult to see at a distance. Keep it close and have fun with it!!

### General building notes

All MODELAIR-TECH "stik" models are a natural for Cyanoacrylate glues (Ca), however many people are allergic to them. Ambroid, Duco, or aliphatic resin glues (Elmers) are just as suitable if you're not in a hurry. Generally, cut your longest pieces from the stock given first. This assures that no splices will be needed. Epoxy is not required on any structure including the motor mount or wing joiner, although, if Ca glues are used, we recommend the gap filling type (Ca+) for these joints.

This model may be covered in our “Clearfilm ES” covering material (provided in kit). It goes on much like any other Hi-Temp mylar model covering material. It is considerably stronger than our standard “Clearfilm”, and can be used on most any type of electric model.

### **CONSTRUCTION**

The Nightstik is constructed in one piece. Built completely flat on the table from the lower rib caps up! Study the isometric views provided on the plan before starting construction. Begin by choosing the hardest sticks for the leading edge, spars and the straight sticks just forward and aft of the elevon hinge line. To begin construction, over the plan view of just the bottom surface sticks, lay the 1/8 lite ply motor “deck” over the plan and pin into place. Glue the 1/4” triangle stock that cradles the motor onto the lite ply, making sure to space them properly and not cover up the laser cut slots. Lay the lower rib and spar caps, servo deck, bat-tail, and all other “bottom” sticks in place and glue as required. Do not lay down any sticks for the elevon at this time. Glue sticks together to create the main spar and cut or sand to the taper shown on the plan. Glue these assemblies to the lower spar cap. Just butt glue the two spars at the centerline. No internal splice is needed. Also at this time, add all the “doubling” sticks near the center of the aircraft. These toughen the bottom of the “fuselage” for landings and launching. Next add the vertical risers that determine the shape of the centerline top keel (see sectional side view for heights of these sticks). From the 1/8 sheet balsa pieces provided create the battery box. Make sure to use the balsa “cross grain” on the top of the box. This box should be “open” on both the front and rear ends. Glue the box in place over the plan. Add the top centerline keel next. Add all the upper rib caps to the outer wing panels next. Note that the upper rib caps are staggered to the inboard side of the lower caps. This provides a better gluing surface for the ends of the ribs. The ribs should be “cracked” or cut over the main spar to produce a “triangle” airfoil. Whether they are cut partially through or crack naturally, add some glue to the open area. Later when the wing is finished, sand this sharp edge off. Move onto the “upper” fuselage sticks next. It's probably easiest to start from the highest point and work forward and then aft. Before all the “bat-tail” sticks can be added, build up two identical vertical tails. Pin the vertical tails in place using a scrap “spreader bar” at the top to get the angle correct. The root of the vertical tails should touch one another on the table and fit within the space provided by the lower stick in this area. Glue all the bat-tail sticks in place, being careful not to get glue onto the vertical tails. Remove the vertical tails. Add the sticks the frame-out the area where the servos will go. Note that these stick positions should be coordinated with the servo you decide to install. Finally, add the upper spar caps to the wing in-between the upper rib caps. **This strengthens the wing considerably, so don't leave them off!!!** Pull the wing off the plan and sand the leading edge round before covering.

### ***ELEVON CONSTRUCTION***

Build the elevons over the plan. There is nothing special about this assembly. Be sure to make the “slot” available for the laser cut control horn also. Lift the elevon off the plan. Sand a slight bevel to the leading edge of each elevon, to provide clearance for the “down” deflection when hinged at the top surface. Cover the vertical tail and elevons. Cut away the covering for the laser cut plywood control horns and install. Note, the lower section of the horn may be removed after the glue has set to avoid catching it in the grass upon landing. Also, the top of the horn may need to be relieved in the front to accommodate the “up” travel of the elevon.

### ***ASSEMBLY/COVERING***

Cover the entire lower surface with either the “Clearfilm ES” provided or any other suitable covering of your choice (see separate sheet on “Working with Clearfilm”). Do not shrink it tight though. Cover the entire top section next. Most of the upper “fuselage should be covered in pieces, as one large piece will not shrink without a lot of wrinkles in the corners. Slowly shrink a little of the lower side, then the opposite section on the top side, until the entire wing is tight. Check for warps. If any occur, place the model back on the building board, weigh or pin it down and reheat the covering material and let it cool slowly. Cut away the covering material in the servo area. Also, cut away the covering for the battery, and the three bays shown on the lower isometric for the finger holes.

Hinge the elevon to the wing with a full length strip of Clearfilm or mylar tape. Install the servos into the wing. A good method is to wrap the servo with tape and epoxy or CA them in, or wrap them with single “sub-c” cell shrink wrap. Bend the pushrod from the 1/32 MW provided. The “V” bend is your adjustment. This saves the weight of brass couplers and clevises. Open or close the “V” as required to get 3/16” of “reflex” in the elevon with the elevator trim on the TX at neutral. Lastly, glue the vertical tails to the bat-tail, making sure to remove the covering material where wood-touches-wood.

To keep the model from becoming nose-heavy, leave all the wire on the ESC as it comes from the manufacturer, and place it loosely in the fuselage as far aft as possible. The RX can be mounted on either side of the fuselage just forward of the battery. If weight should be needed to balance the model, it should not be much more than a ½ ounce or so, either way up in the nose (not likely) or back in the bat-tail.

### ***MOTOR SYSTEMS/BATTERY PACK***

The Nightstik flies very well on the 7.2v “400” motor using 7-8 500-600MAH cells. The “6v” motor is also acceptable on 7 cells with the usual 6 x 3 folding props. The battery pack can be retained in the battery box by hook and loop fastener straps found in most home improvement stores. Glue (with epoxy) one of these straps to the roof of the battery box. Alternately, a balsa hatch can be made and hinged or taped into place.

### ***“400” INSTALLATION***

The motor is “cradled” on the motor deck between the two ¼ triangle balsa pieces. The motor is held in place with two plastic “pull-ties” that wrap the motor and pass through the slots provided in the motor deck. Make sure the “clasp” is on the top side and it would be a good idea to put a little RTV (silicon) glue/sealer on the bottom of the motor to keep it from rotating or sliding under the ties. Leave the area behind the motor open into the fuselage to let cooling air to the ESC.

### ***FLYING THE NIGHTSTIK***

The Nightstik is quite a different looking model in the air. Keep it close for the first few flights to get used to the aspect of this unusual model. It slows down quite a bit in tight turns, so try to keep the radius of turn large like a “real jet fighter”. Stalls with the power off are practically non-existent... the model just “mushes” with the nose high, but the descent is steep. With the power on, the stall is noticeable but relaxing the up elevator initiates a quick recovery. The model loops and rolls best with some speed. It will fly inverted, and surprisingly with little “forward” stick required to maintain level flight. Be careful though, speed falls off quite sharply inverted, as the drag seems to be much higher inverted. Attempt this with plenty of altitude for the first few times to get used to it. ***Do not overpower this model though!*** Higher powered “400” system will definitely change the character of this model! As designed, the elevons will flutter causing loss of control. The model may pitch-up or down wildly and unexpectedly. Keep it “mildly powered” and you enjoy many hours of flying with the F-117 Nightstik.

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