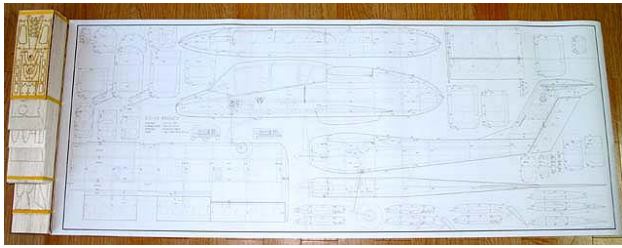


# OV-10 BRONCO INSTRUCTIONS

www.estarmodels.com

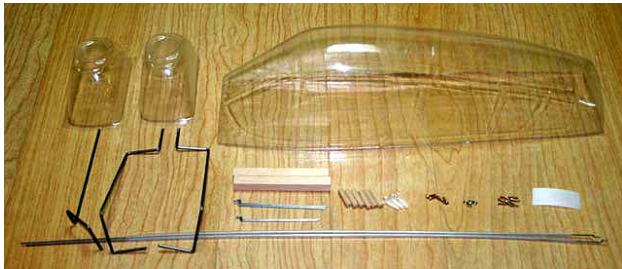
## ● KIT INCLUDES



Full size plan.

### Lasercut parts.

- 1.5mm(1/16")xL600mm(24") balsa : 7sheets
- 1.5mm(1/16")xL460mm(18.2") balsa : 18sheets
- 1.5mm(1/16")xL320mm(12.6") balsa : 7sheets
- 3.0mm(1/8")xL600mm(24") balsa : 2sheets
- 3.0mm(1/8")xL460mm(18.2") balsa : 9sheets
- 3.0mm(1/8")xL320mm(12.6") balsa : 2sheets
- 5.0mm(3/16") xL550mm(21.7") balsa : 1sheet
- 5.0mm(3/16") xL370mm(14.6") balsa : 1sheet
- 1.8mm(5/64")xL200mm(8") plywood : 2sheets
- 3.0mm(1/8")xL600mm(24") plywood : 4sheets



Vacuum formed Cowls and Canopy.

Motor mounts 10x10x90mm.

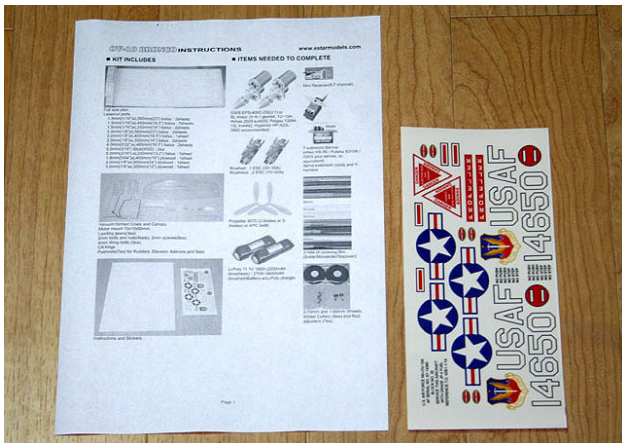
Landing gears(3ea),

2mm bolts/nuts(4sets), 3mm screws(4ea), 2mm screws(16ea).

5mm Wing dowels(6ea), 4mm Wing bolts (3ea).

CA hinge.

Pushrods(7ea) for Rudders, Elevator, Ailerons and flaps.

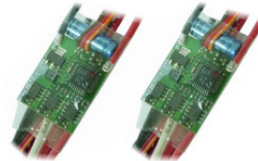


Instructions and Stickers.

## ● ITEMS NEEDED TO COMPLETE



Two GWS EPS-400C-DS(3:1) or  
Two BL motors(5:1 geared, 9~12A).



Brushed : 1 ESC (30~35A)  
Brushless : 2 ESC (15~20A).



Propeller 9070 (2-blades or 3-  
blades) or APC 9x6E.



Li-Poly 11.1V 3000~3400mAh  
(brushed) / 2400~3000mAh  
(brushless) battery w/Li-Poly  
charger.



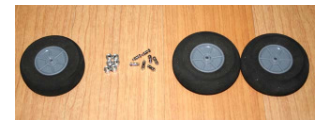
Mini Receiver(5-7 channel).



7 submicro Servos  
(Hitec HS-55 / Futaba S3108 /  
GWS pico servos, or  
equivalent).  
Servo extension cords and Y-  
harness.  
1 mini metal geared servo for  
nose steering(Optional).

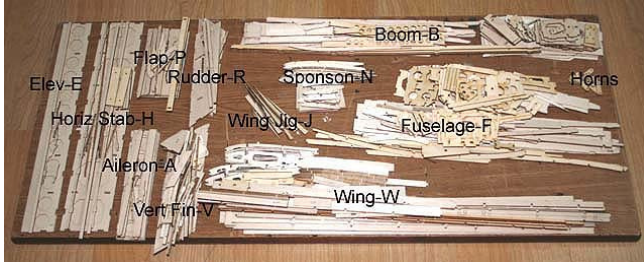


2~3 rolls of covering film.  
(Solite/Monokote/Oracover)



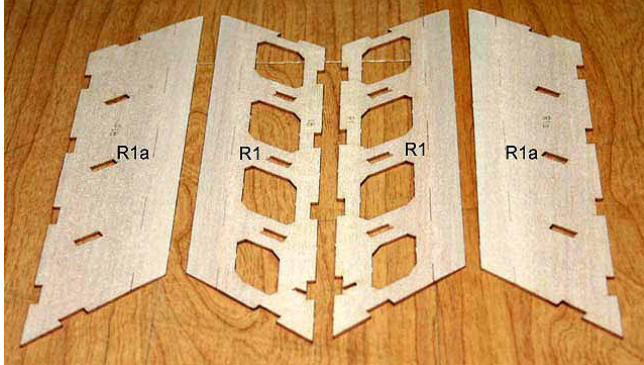
1-60mm and 2-70mm Wheels,  
Wheel Collars(5~7ea) and Rod  
adjusters(7ea).

## ● PREPARATION

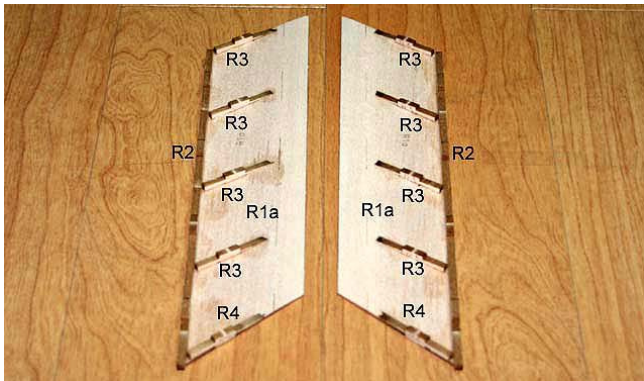


Remove parts from laser-cut panel and group as shown above.

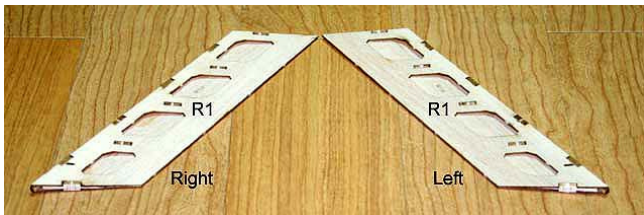
## ● VERTICAL FIN and RUDDER



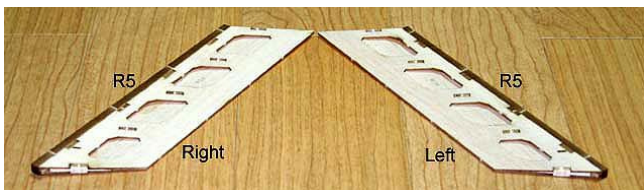
1. Sand trailing edges of rudder sheets(R1, R1a).



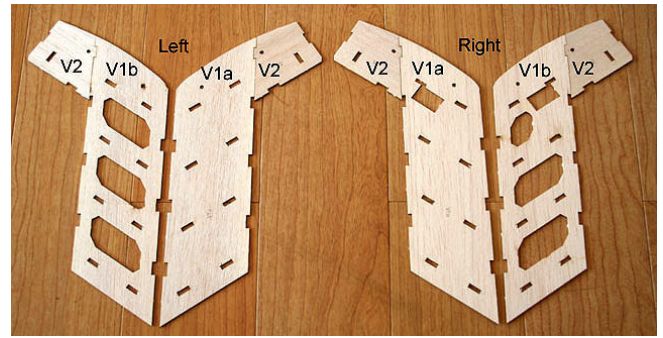
2. Glue sub leading edge(R2) and ribs(R3-R4) on the outboard rudder sheet(R1a) with thin CA and then **apply thick CA glue at each joints for reinforcing.**



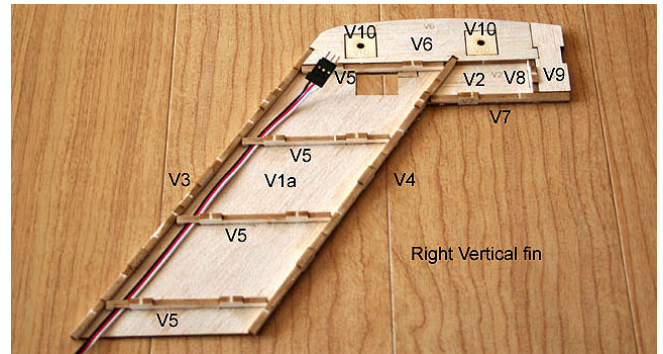
3. Cover the inboard rudder sheet(R1) with **thick CA.**



4. Glue the rudder leading edge(R5) with **thick CA.**



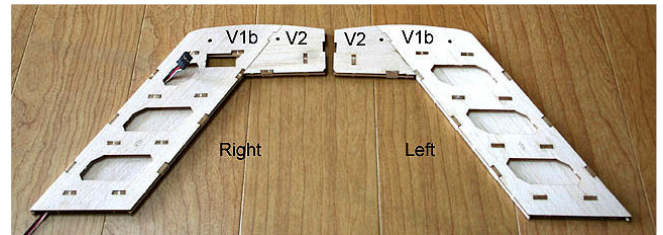
5. Glue vertical fin sheets(V1a-V2, V1b-V2) together.



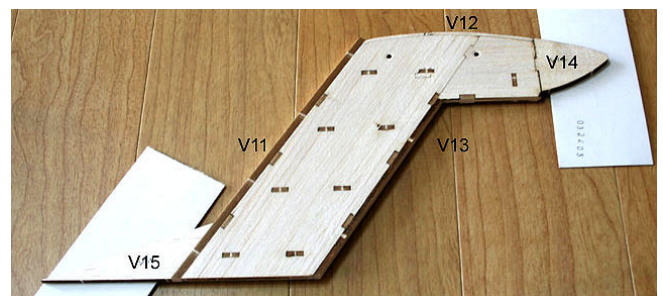
6. Lay elevator servo extension cord and glue the parts(V3-V10) on the outboard vertical fin sheet(V1a,V2) with thin CA and **apply thick CA glue at each joints for reinforcing.**  
**Note** Elevator servo extension needed right vertical fin only.



7. Make notch for extension on the V5a part and glue.



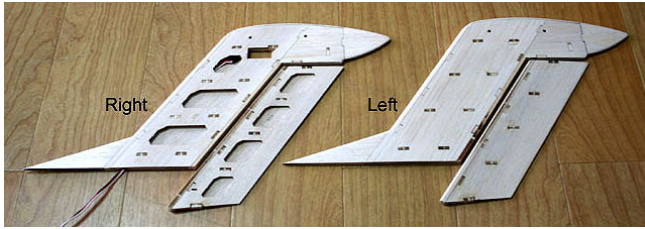
8. Cover the inboard vertical fin sheet(V1b,V2) with **thick CA.**



9. Glue the fin leading edge(V11) and trailing edge(V13) with **thick CA.**

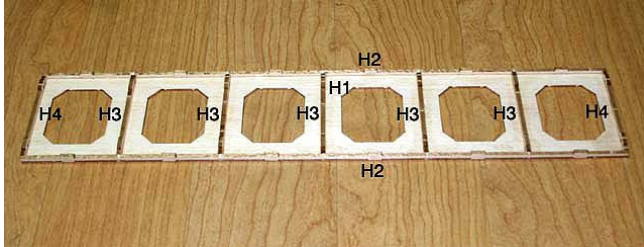
Glue the parts (V12,V14,V15) with **thick CA.**

**Note** To fit center, use cardboard as shown above.

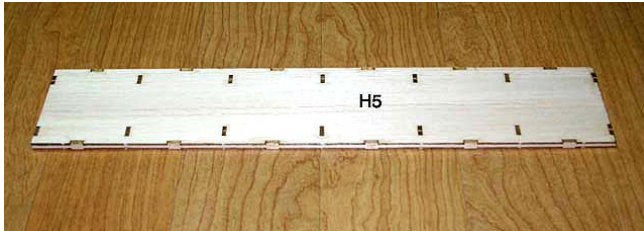


10. Carefully sand surfaces.

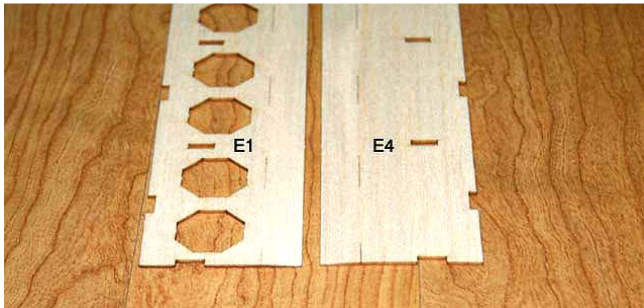
## ● STABILIZER and ELEVATOR



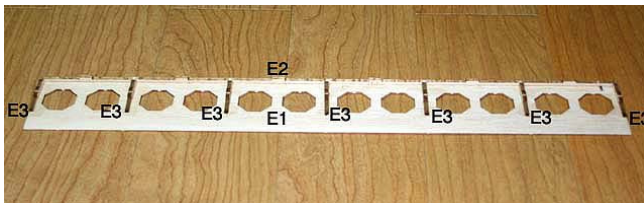
11. Glue the sub leading edge and sub trailing edge(H2), ribs(H3-H4) on the stabilizer bottom sheet(H1) with thin CA and **apply thick CA glue at each joints for reinforcing.**



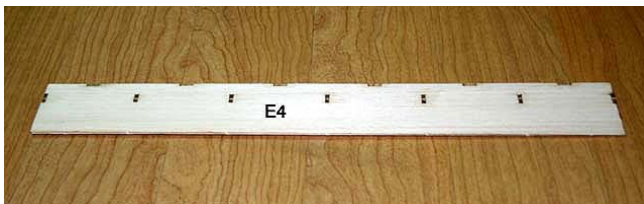
12. Cover the top sheet(H5) with **thick CA.**



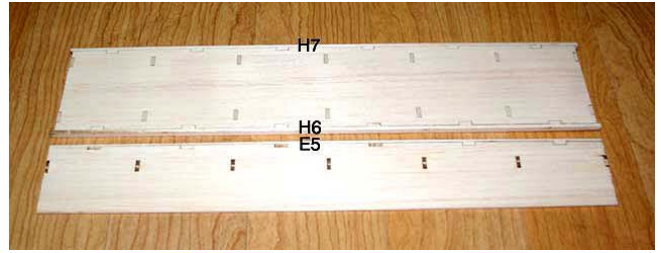
13. Sand trailing edges of elevator sheets(E1, E4).



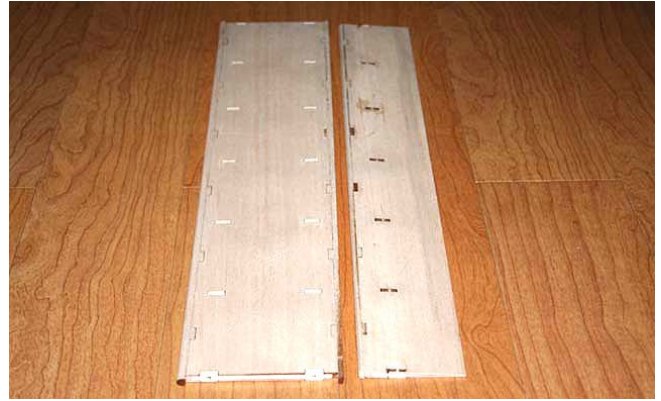
14. Glue the leading edge(E2) and ribs(E3) on the elevator bottom sheet(E1) with thin CA and **apply thick CA glue at each joints for reinforcing.**



15. Cover the top sheet(E4) with **thick CA.**

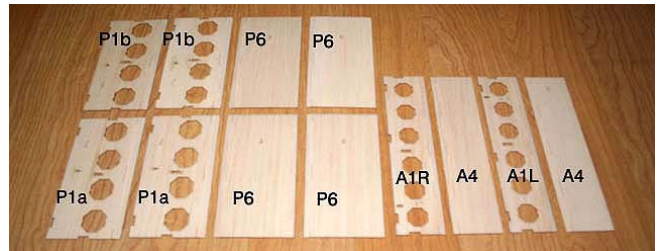


16. Glue the leading edges(H7, E5) and trailing edge(H6) with **thick CA.**

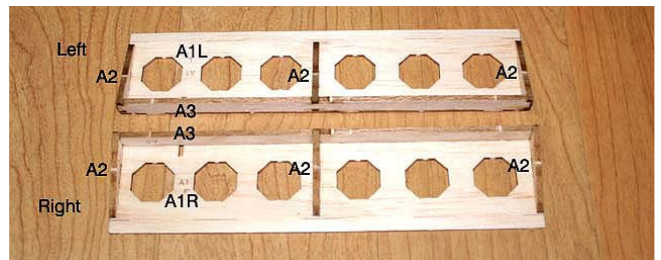


17. Carefully sand surfaces.

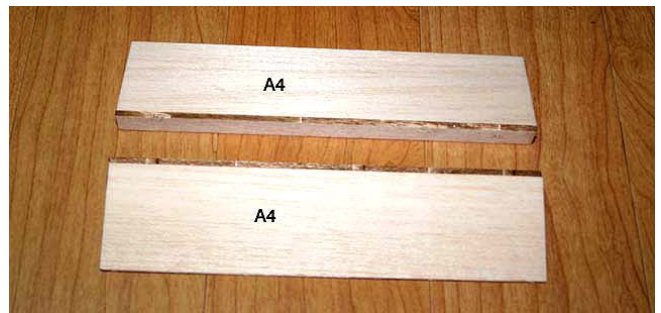
## ● FLAP and AILERON



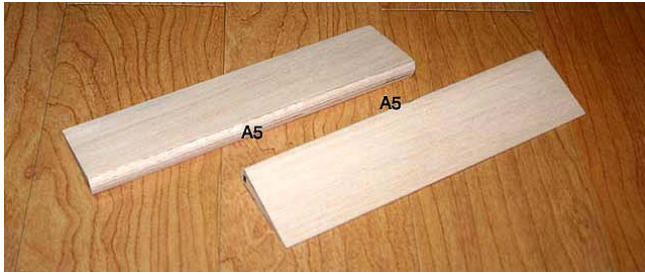
1. Sand trailing edges of aileron(A1,A4) and flap sheets(P1, P6).



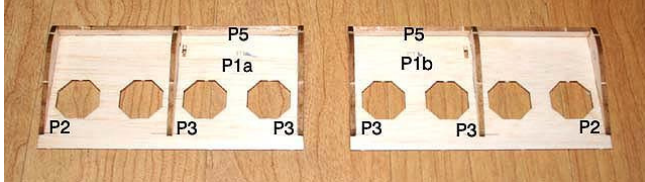
2. Glue the ribs(A2) and sub leading edge(A3) on the aileron bottom sheet(A1R,A1L) with thin CA and **apply thick CA glue at each joints for reinforcing.**



3. Cover the top sheet(A4) with **thick CA.**



4. After sand leading edges, and then glue aileron leading edge(A5) with **thick CA**. Carefully sand surfaces.

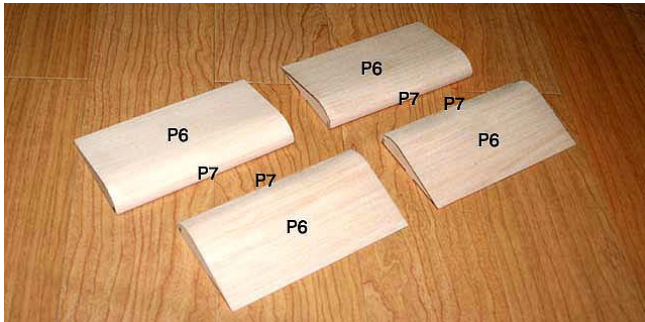


5. Glue flap ribs(P2,P3) and sub trailing edge(P5) on the flap bottom sheet(P1a, P1b) with thin CA and **apply thick CA glue at each joints for reinforcing**.



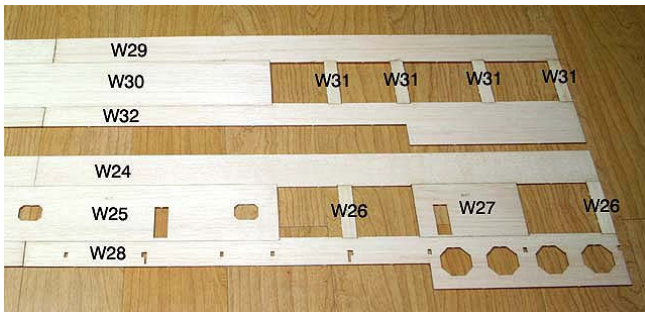
6. Test fit plywood joiner(P4) to the inboard and outboard flaps.

**Note** Do not glue joiner(P4) in this step.



7. Cover the top sheet(P6) with **thick CA**. After sand leading edges, and then glue flap leading edges(P7) with **thick CA**. And then, carefully sand surfaces.

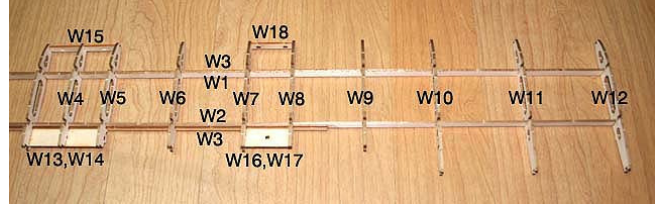
## ● WING



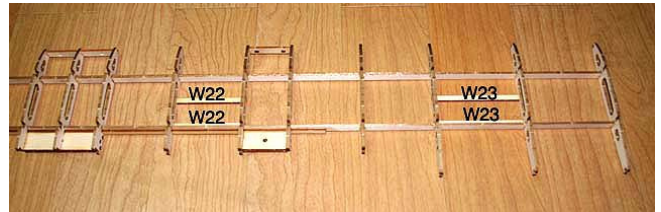
1. Glue wing bottom sheets(W24-W28) and wing top sheets(W29-W32) each together.



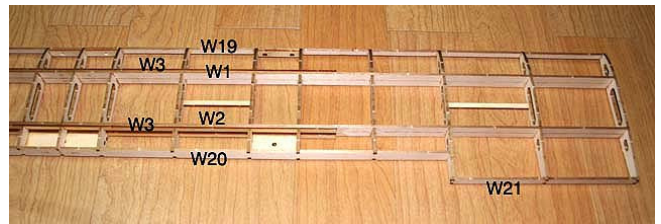
2. Glue right and left spars (W1-W1, W2-W2). Glue plywood spars(W3) with **thick CA**.



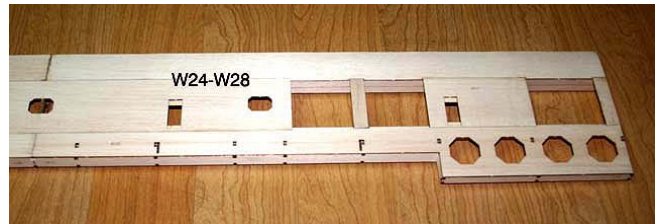
3. Assemble bottom spars(W1-W3), ribs(W4-W12), wing bolt mounts(W13-W14,W16-W17) and dowel mounts(W15,W18). **Note** Balsa mounts(W14,W17) must be located under the plywood mounts(W13,W16).



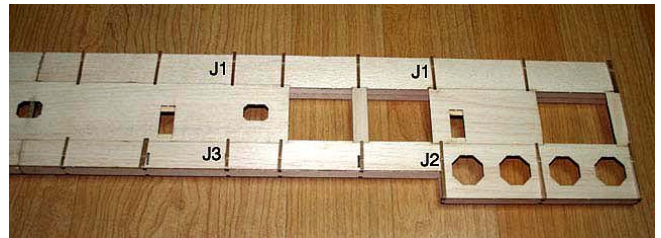
4. Assemble plywood servo trays(W22,W23).



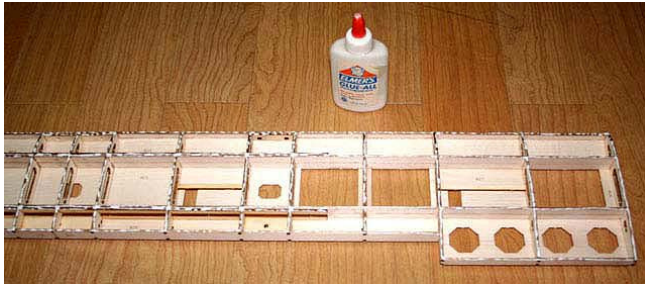
5. Assemble top spars(W1-W3), sub leading edge(W19) and trailing edges(W20,W21). Temporary glue all the frames with thin CA.



6. Cover the bottom sheet(W24-W28) with **thick CA**. From the top, **apply thick CA glue at each joints**.



7. Temporary glue wing jig with **thick CA**.



8. Apply wood glue as shown.



9. Cover the top sheet(W29-32). Hold down the front edge with pins to the sub leading edge.

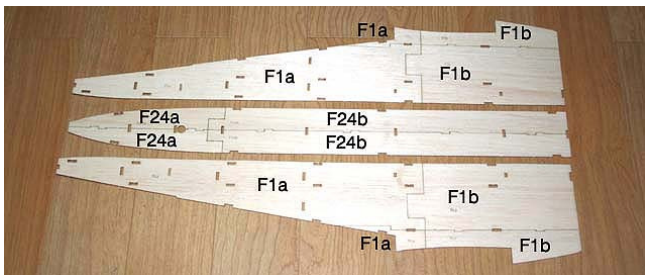


10. Weigh down with magazine as shown.



11. Insert wing dowels and glue.

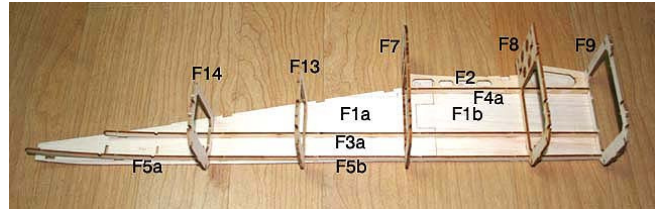
## ● FUSELAGE



1. Glue fuselage side sheets(F1a-F1b) and bottom sheets (F24a-F24b) each together.

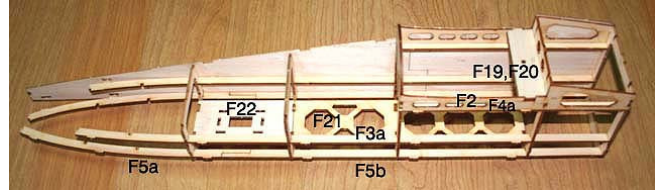


2. Glue the longerons(F5a-F5b, F23a-F23b) together.



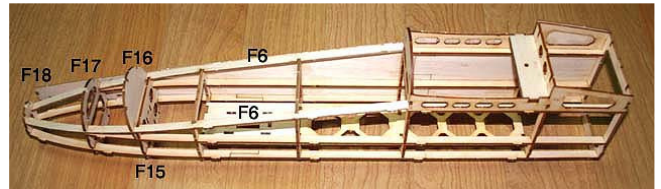
3. Assemble plywood doubler(F2), longerons(F3a,F4a, F5a, F5b) and bulkheads(F7-F9,F13-F14) on the right side sheet (F1a, F1b) and then, glue with thin CA.

**Note** Make sure to pay attention to all the bulkheads, the part numbers should be facing forward.

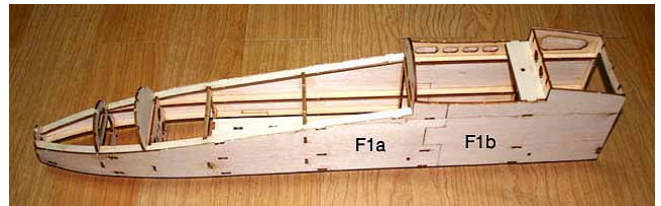


4. Assemble battery tray(F21), steering servo tray(F22), plywood doubler(F2), longerons(F3a,F4a, F5a, F5b) and wing mount(F19,F20).

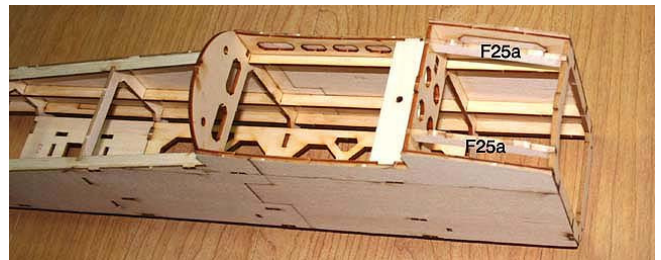
**Note** Balsa mount(F20) must be located over the plywood mount(F19).



5. Assemble bulkheads(F15-F18) and longerons (F6).



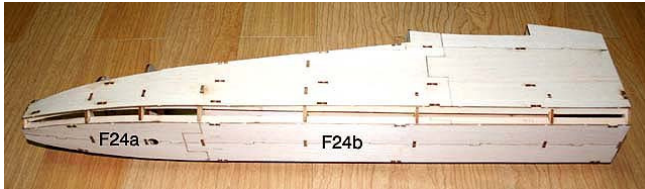
6. Assemble left side sheet(F1a, F1b). Apply thick CA glue at each joints for reinforcing.



7. Glue frames(F25a) and top sheet(F26a) with **thick CA**.



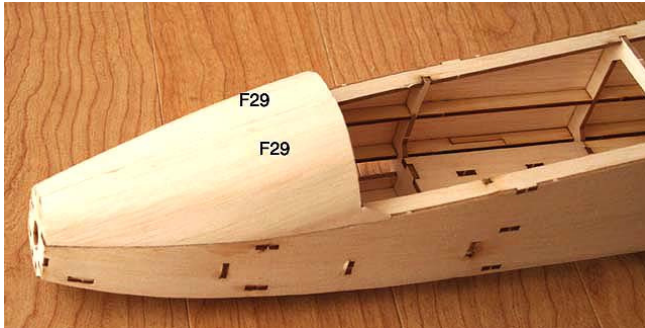
8. Assemble and glue longerons(F23a,F23b) with **thick CA**.



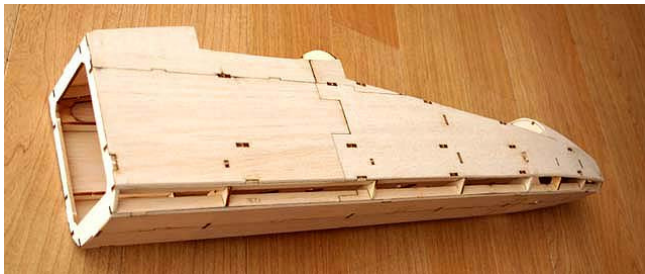
9. Assemble and bottom sheet(F24a,F24b) with **thick CA**.



10. Assemble and glue longerons(F27-F28) with **thick CA**.



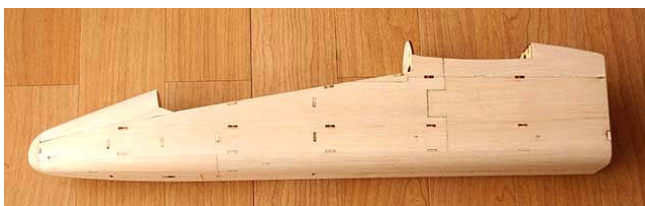
11. Glue fore turtle deck(F29) with **thick CA**.



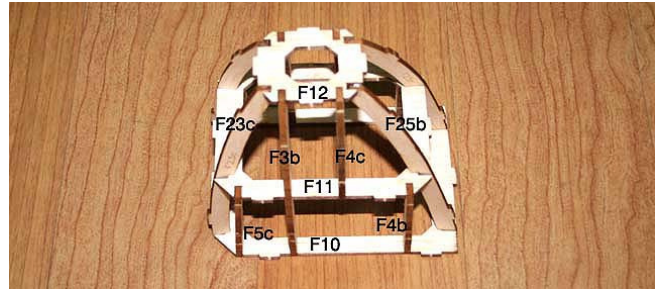
12. Sand fuselage bottom edges.



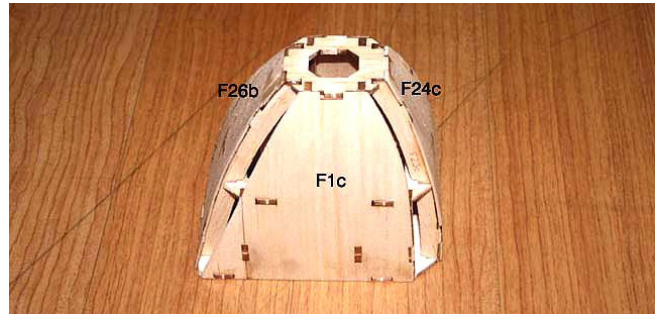
13. Glue edges(F23a,F23b) and nose cones(F37-F39) with **thick CA**.



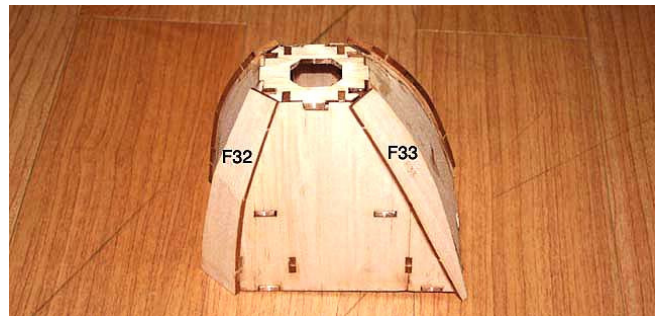
14. Carefully sand fuselage surfaces



15. Assemble and glue rear fuselage frames(F3b,F4b,F4c, F5c,F10-F12,F23c,F25b) with **thick CA**.



16. Assemble and glue rear fuselage sheets(F1c,F24c, F26b) with **thick CA**. And then, sand edges.

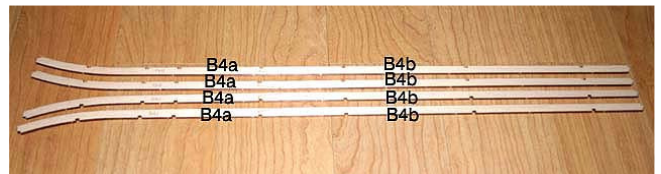


17. Glue edges(F32,F33) with **thick CA**.

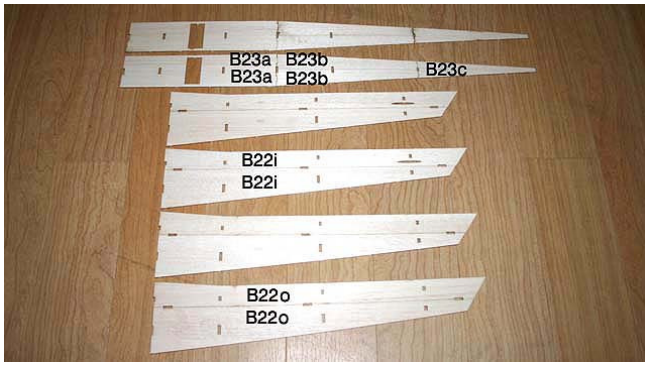


18. Glue and rear cone(F40-F42) with **thick CA**. Carefully sand surfaces.

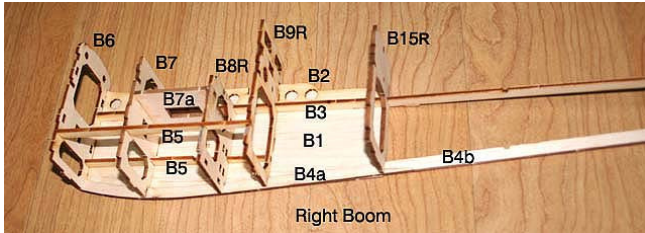
## ● BOOMS



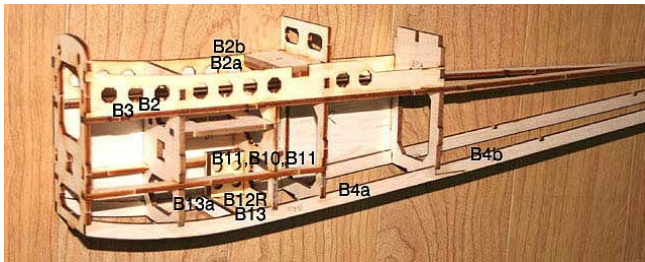
1. Glue the longerons(B4a-B4b) together.



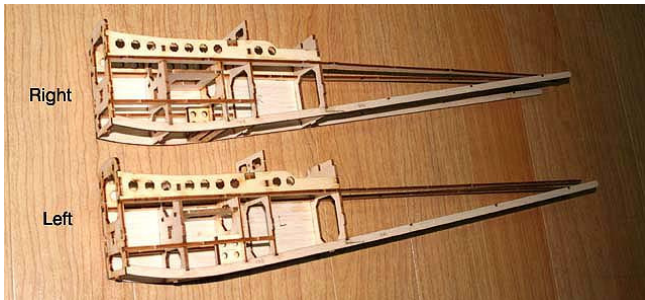
2. Glue side sheets(B22i,B22o) and bottom sheets(B23a-B23c) each together.



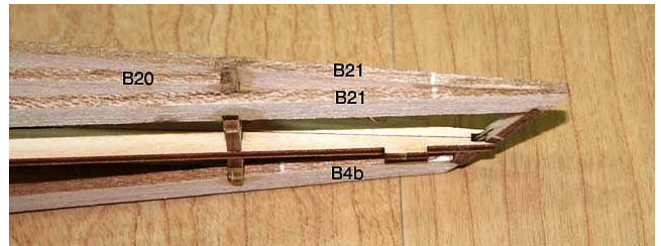
3. Assemble plywood doubler(B2), longerons(B3,B4a,B4b, B5), servo bed(B7a) and bulkheads(B6,B7,B8R,B9R, B15R) on the right side sheet(B1) and then, glue with thin CA.  
**Note** Make sure to pay attention to all the bulkheads, the part numbers should be facing forward.



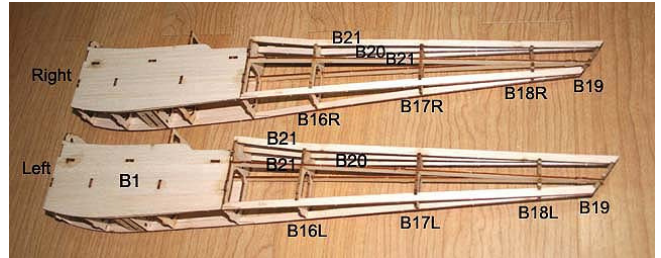
4. Assemble plywood doubler(B2), longerons(B3,B4a,B4b) and wing mount(B2a,B2b) and then, glue with thin CA. Glue landing gear mount(B10-B12,B12R,B13,B13a) with thin CA.  
**Note** Balsa mount(B2b) must be located over the plywood mount(B2a).



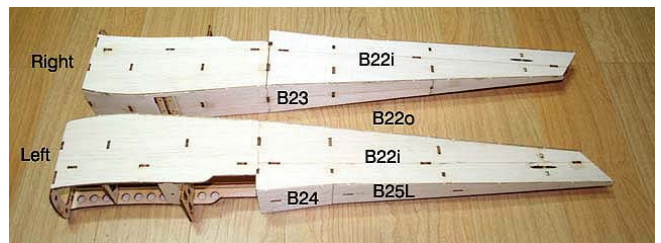
5. Assemble left boom with same order. (B1,B2,B2a,B2b,B3,B4a,B4b,B5,B6,B7,B7a,B8L,B9L, B10,B11,B12,B12L,B13,B13a,B15)



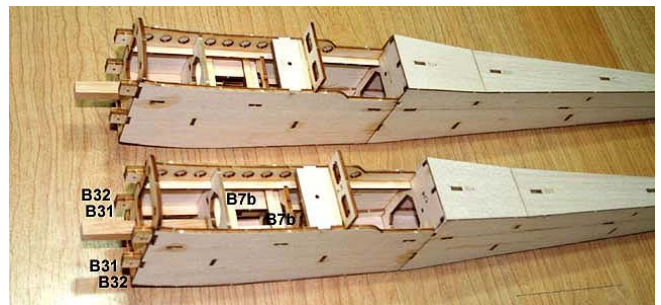
6. Sand the end of longerons(B21,B4b) as shown.



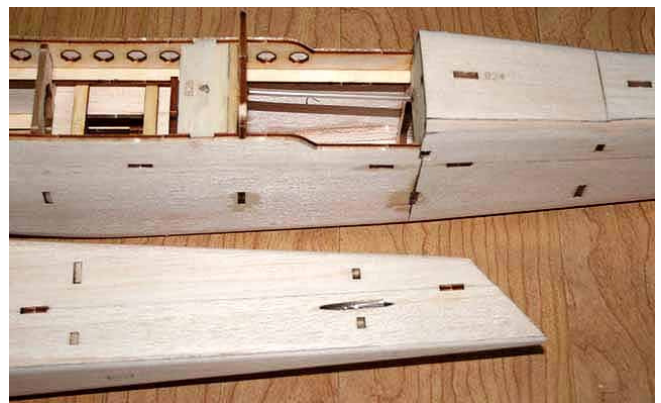
7. Assemble plywood bulkheads(B16-B19), longerons(B20-B21) with thin CA.  
**Apply thick CA glue at each joints for reinforcing.**



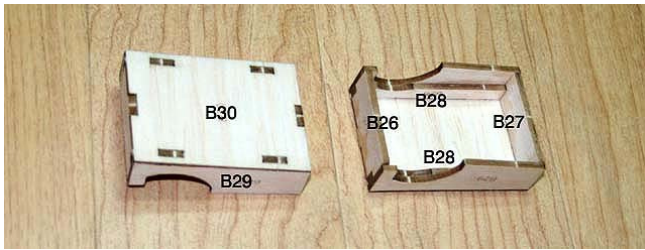
8. Assemble inner(B22i), outer(B22o) side sheets, and then, apply thick CA glue at each joints for reinforcing from inside.  
 Assemble bottom(B23) and top(B24,B25) sheets.



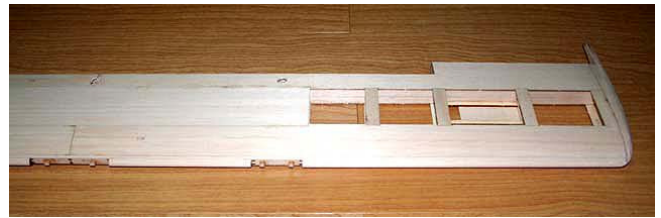
9. Glue motor mount sticks, servo trays(B7b) and cowl mounts(B31,B32).



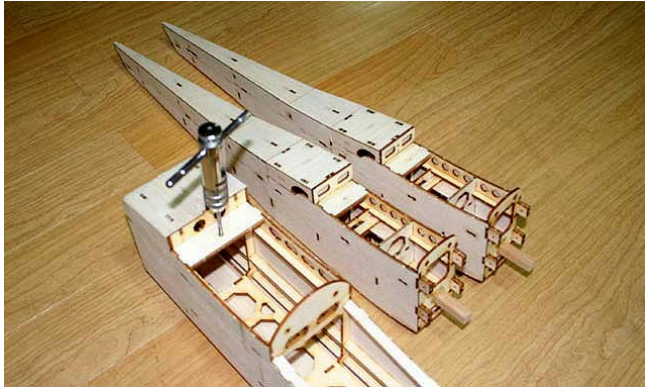
10. Insert and glue plastic pipes for rudder pushrods.



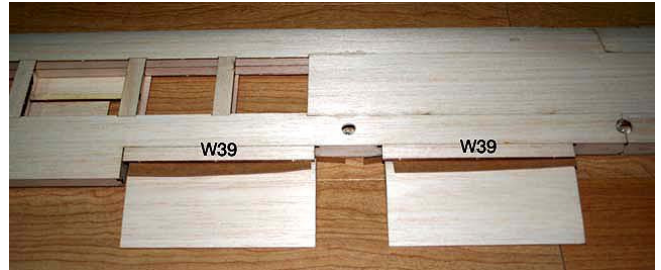
11. Assemble flap joiner cap (B26-B30).



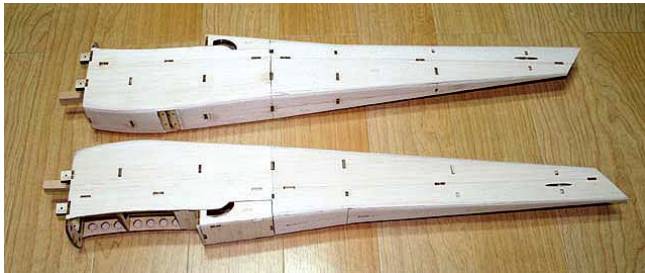
16. Insert and glue wing dowels. Shape and sand the surfaces.



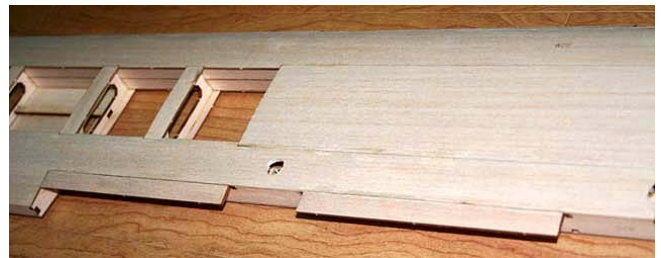
12. Tapping with 4mm tap to fit wingbolts.



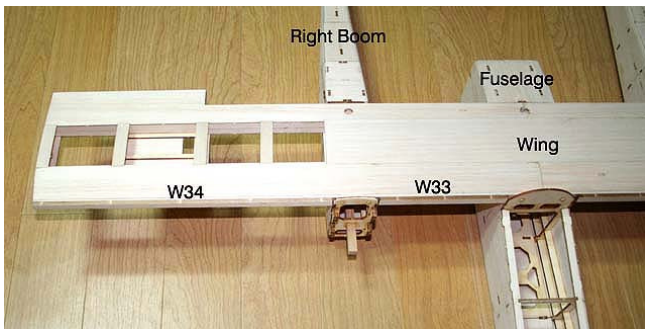
17. Glue trailing edge(W39) with **thick CA**.  
**Note** Refer to the wing section on the drawing and use cardboard to make a gap.



13. Carefully sand right and left boom surfaces.

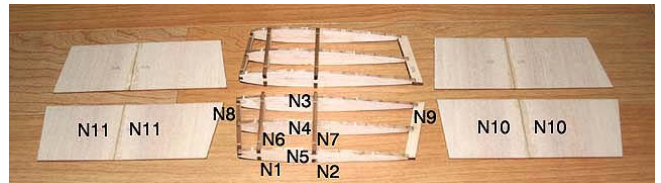


18. Shape and sand the surfaces.  
**Note** Refer to the wing section on the drawing

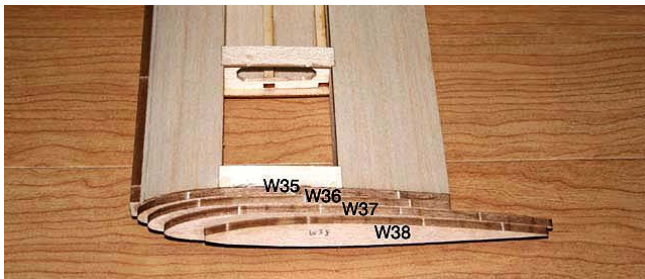


14. Temporary assemble wing to fuselage and booms. Glue leading edge(W33,W34) with **thick CA**.

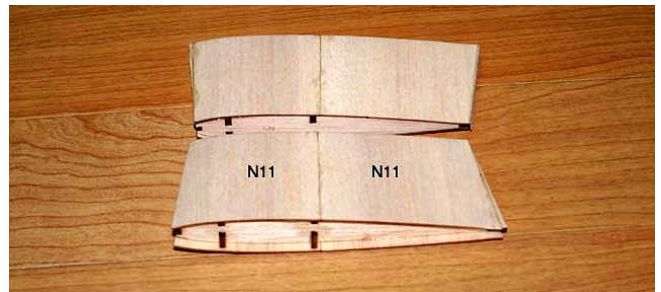
## ● SPONSON



1. Glue sponson bottom sheets(N10-N11), top sheets(N11-N12) each together. Assemble and glue sponson frames(N1-N9) with **thick CA**.

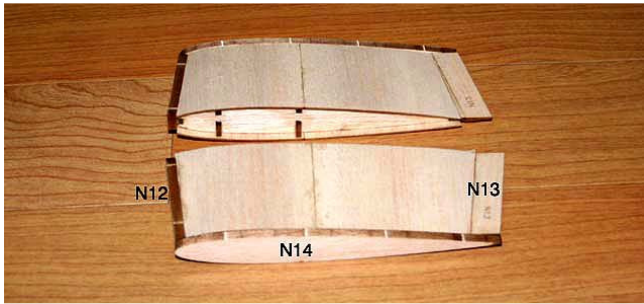


15. Glue wingtips(W35-W38).



2. Cover the sheets(N10,N11) with **thick CA**.





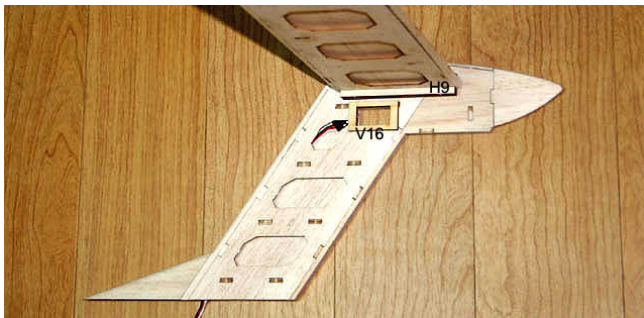
3. Glue leading(N12), trailing edges(N13) and tips(N14) with **thick CA**.



4. Carefully sand surfaces.



5. Glue sponson to the fuselage with **thick CA**.

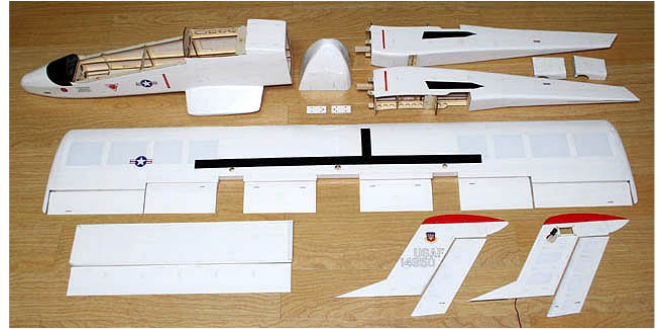


6. Fix stabilizer to the vertical fin with screws. (**Horizontal tail must be at right angle to vertical tail.**) Glue H9 parts to the stabilizer and elevator servo bed(V16) to the vertical fin with **thick CA**.



7. Sand H9 parts as shown above.

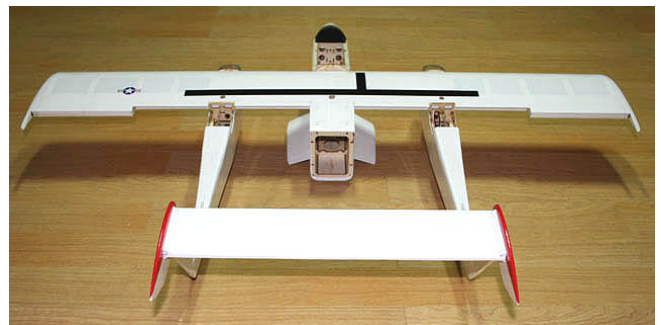
## ● COVERING AND EQUIPMENT INSTALLATION



1. Cover films with your own color scheme.



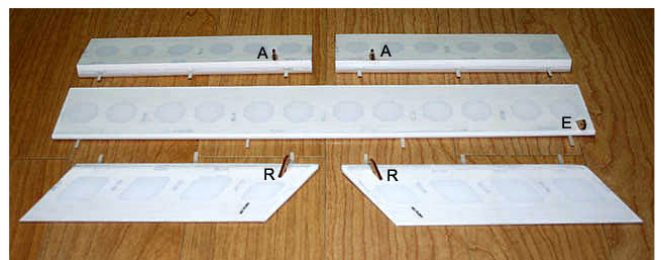
2. Assemble tail and insert elevator servo extension.



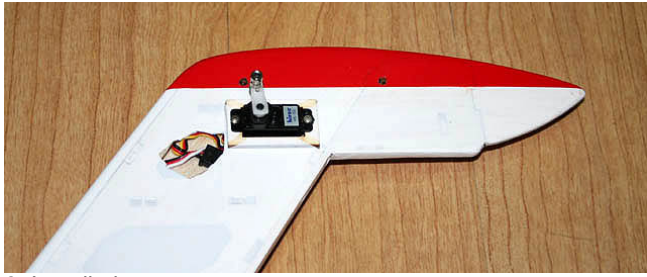
3. Glue vertical fins to the booms with **thick CA**. (**Horizontal tail must be paralleled with wing and at right angle to vertical tail.**)



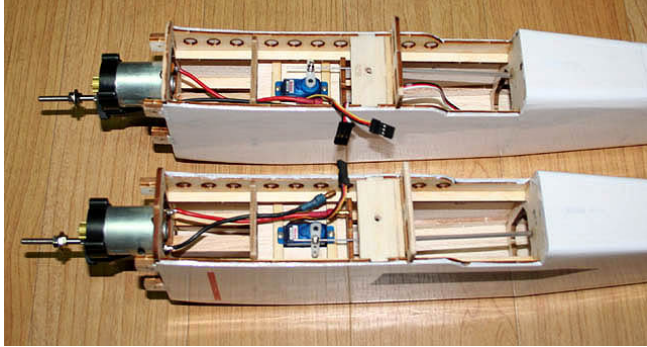
4. Cut CA hinges as shown above.



5. Install and glue plywood horns with **thick CA**. Apply thin CA to the horns for reinforcing. Make slots and install hinges.



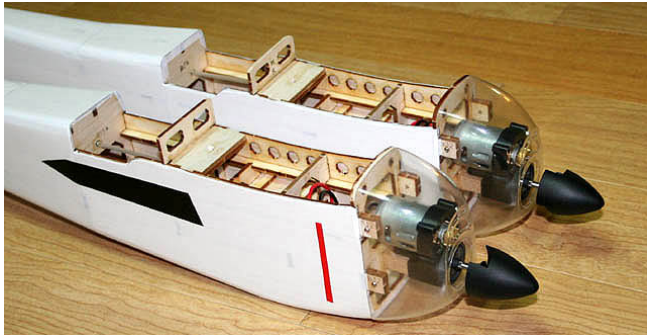
6. Install elevator servo.



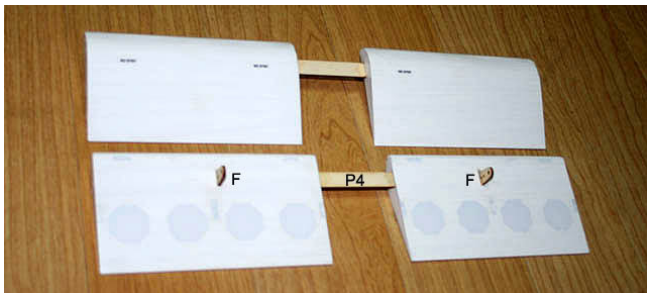
7. Install motors and rudder servos.



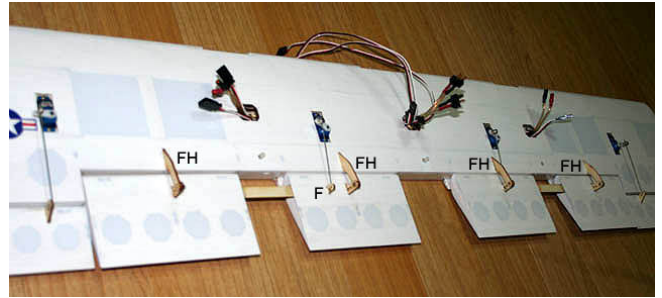
8. Insert rudder pushrods to the horns and then glue hinges to the fin with small amount of thin CA.



9. Temporary assemble cowls. Drill holes for fixing screws.



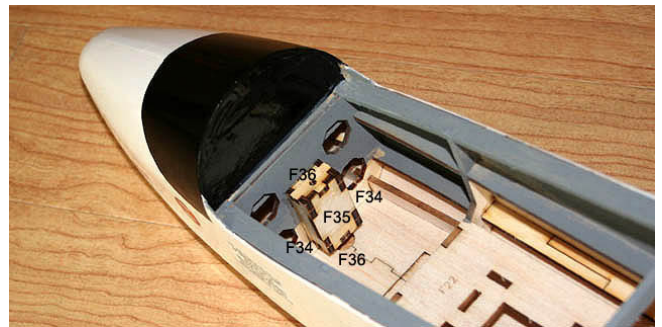
10. Insert and glue plywood joiner(P4) to the inboard and outboard flaps and then glue plywood horns(F)



11. Insert flap hinges(FH) and temporarily glue with small amount of CA. After throwing check, and then glue them firmly. Install aileron and flap servos. When you connect flap servos with Y-harness, install additional flap horn(F).



12. Paint canopy, cowl and cockpit area.



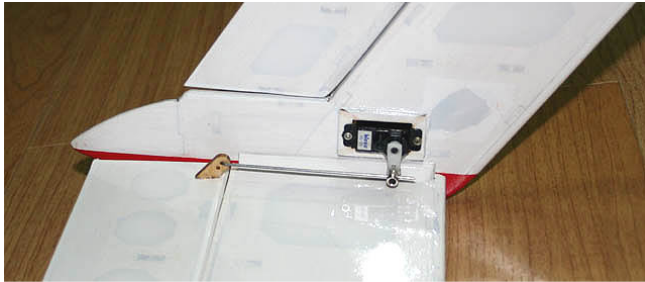
13. Assemble and glue nose gear mount(F34-F36) with thick CA.



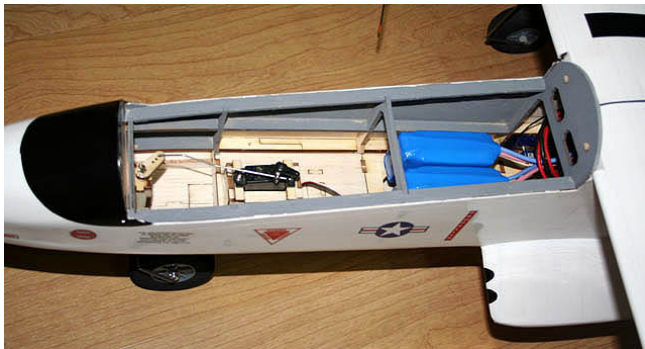
14. Install nose gear and fix with wheel collar below and above of mount. (Optional) Assemble and glue nose steering servo mount (F44-F47) and install nose steering arm, drill, tap and fix to the collar with small bolt.



15. Install main gear and then fix plywood retainers (B14) with screws. Fix wheels with wheel collars.



16. Glue hinges to the stabilizer with small amount of thin CA and then, connect elevator pushrod.



17. Fix battery with Velcro tape. Install switch and charge connector on the bottom of fuselage.



18. Install canopy, rear cone and flap joiner cap with scotch tape. Check CG. (CG location is shown on the drawing.) Congratulations! Enjoy flying.



With Landing gear.



Without Landing gear.

### Control Throws

The following control throws are recommended starting points. After you are familiar with this plane, you may increase, or decrease.

- Ailerons : 19mm(5/8") up, 16mm(5/8") down.
- Elevator : 16mm(5/8") up and down.
- Rudders : 16mm(5/8") right and left.
- Flaps : takeoff-15degrees(16mm), landing-35degrees(37mm)

(Flap-elevator down mix is required.)