



# CARGO 40

**By Bertil Klintbom**

**T**he Cargo 40 is the "brainchild" that came out of a discussion with my modeling friend Freddy Irung, who has done most of the building and also many of the small construction details.

We wanted a model that could take off from small and rugged fields and still be able to carry a camera for aerial photography. The result is Cargo 40, equipped with leading edge slots, flaps, and vortex wingtips.

For the camera we used a special camera module mounted to the



#### ABOUT THE AUTHOR

Bertil Klintbom is 37 years old and has always been interested in aircraft -- rubber powered, jetex, free flight and, finally, control line models. He has been a full scale glider pilot and logged many hours in several different types of gliders. Bertil is now especially interested in scale aircraft with 4-stroke engines. He also makes his own designs, both Sport and Scale models, and is now working on a 1:3 Scale 1928 Heath Baby Bullet, drawn from the original plans purchased from EAA. Bertil, his wife Anita, and two children live on an island in the Baltic sea named Gotland, in eastern Sweden, where he works as an engineer in the building business.

fuselage with rubber bands.

In the rear of the fuselage we have a servo operated cargo box for a drag chute, bombing, etc. The possibilities are many. The engine used in the prototype is a standard Enya 40 TV but there is enough room for a 60 if you want more power. The construction philosophy is to build light, yet strong. The completed model without camera module weighs only 8.36 lb. (3.8 Kg), although it is covered with nylon and doped. This covering weighs more than plastic film covering.

The wing airfoil is NACA 2412 (12% thick). This airfoil is effective on the model. The aircraft is capable of STOL operation (Short Take Off and Landing). It is very stable in the air.

**The Cargo 40 is the result of wanting a model that could take off from a small and rugged field and be able to carry a load.**



*Winter flying with skis on — 10° day.*

As you can see on the plans, we use no rudders, only a steerable nosewheel. If you want to have rudders it would be possible to mount a rudder servo in the right tail boom and connect the rudders with rods.

The model is not complicated to build but it probably has more pieces than a standard model --- but you get something unusual too!

As always, first make a "kit" of parts from the plans, it will speed up building later. This construction article explains most of the details but it is not completely detailed. I believe that the builder of this model should have built at least a pair of models before.

## CONSTRUCTION

### Tail Booms:

First, check to see if your elevator servo fits into the tail boom as shown on the plan. If not, make the booms larger to get the required space.

Cut out the plywood parts B1, B2, and B3.

Cut out the sides from 1/8" balsa

and glue on the square balsa sticks. Also glue on the reinforcement stick under the slot for the flap.

Join the boom sides with former B1 and the pieces of 3/16" square stock. Add the other details such as B2 with the plastic tube for the hold-down bolt.

Glue on the balsa top and bottom and make the slot for the fin.

Install the plastic pushrod for the elevator in the left tail boom.

Cut out the fin from 3/16" balsa sheet and slot out for the plywood reinforcement B3 for the plastic bolt that holds the stab.

The spruce pieces for stab alignment should not be glued in place now. Wait until you can mount together the completed aircraft and measure the incidence between the stab and wing (0°).

Bevel all corners as shown in section A-A.

Make two tail booms. The left one will get the elevator servo installation.

### Stabilizer:

The stab is built up from balsa sticks as shown on the plans.

The bolt blocks S1 should be tapped for the nylon bolts, and glued in place with epoxy glue.

Mount the four hinges. Make the elevator out of a balsa sheet or trailing edge stock. Select all the sticks to ensure that they are straight. Shape the stab-elevator to the section shown. This builds up to a very light but strong stabilizer.

### Wing:

Start with the ribs that are made from 3/32 medium hard balsa.

Glue all the ribs to the balsa spars and add the balsa web.

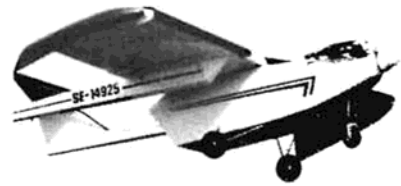
Building is quite straightforward. Proceed with the ailerons and flaps. The flap hinges are made from 3/32" plywood and are glued in place.

Glue together the wing halves with 3/4" dihedral on each tip. The dihedral braces should be glued with epoxy glue. Add the planking and the tail cones for the booms.

Fabricate the vortex wing tips from balsa sheets. The sections are shown on the plans. When you have carved them to the right shape, hollow them out and glue them in place.

Now you can glue on the plywood formers for the leading edge slots.

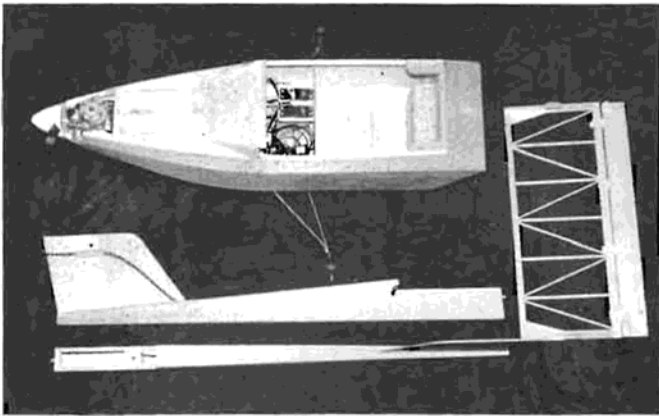
Drill and tap the formers for 3-48 screws.



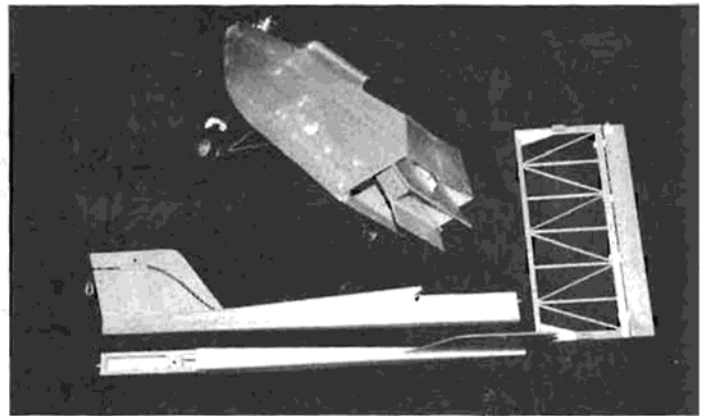
<b>CARGO 40</b>	
Designed By: Bertil Klintbom	
<b>TYPE AIRCRAFT</b>	
Sport/Cargo Carrying	
<b>WINGSPAN</b>	
60 1/2 Inches	
<b>WING CHORD</b>	
13 3/4 Inches	
<b>TOTAL WING AREA</b>	
809 Sq. In.	
<b>WING LOCATION</b>	
High Wing	
<b>AIRFOIL</b>	
NACA 2412 Semi-Symmetrical	
<b>WING PLANFORM</b>	
Constant Chord	
<b>DIHEDRAL EACH TIP</b>	
3/4 Inch	
<b>O.A. FUSELAGE LENGTH</b>	
49 1/2 Inches	
<b>RADIO COMPARTMENT SIZE</b>	
(L) 4" x (W) 6" x (H) 4"	
<b>STABILIZER SPAN</b>	
17 1/2 Inches	
<b>STABILIZER CHORD (incl. elev.)</b>	
8 3/4 Inches	
<b>STABILIZER AREA</b>	
153 Sq. In.	
<b>STAB AIRFOIL SECTION</b>	
Flat	
<b>STABILIZER LOCATION</b>	
Top of Fins	
<b>VERTICAL FIN HEIGHT</b>	
5 1/2 Inches	
<b>VERTICAL FIN WIDTH</b>	
7 Inches (Avg.)	
<b>REC. ENGINE SIZE</b>	
.40 - .60 Cu. In.	
<b>FUEL TANK SIZE</b>	
10 Oz.	
<b>LANDING GEAR</b>	
Tricycle	
<b>REC. NO. OF CHANNELS</b>	
4-7	
<b>CONTROL FUNCTIONS</b>	
Elev., Ail., Throt., Nose Gear	
Steering, Aux. Flaps, Cargo Door,	
Camera	

<b>BASIC MATERIALS USED IN CONSTRUCTION</b>	
Fuselage .....	Balsa & Ply
Wing .....	Balsa & Ply
Empennage .....	Balsa
Wt. Ready To Fly .....	134 Oz. (8 Lb. 6 Oz.)
Wing Loading .....	24 Oz./Sq. Ft.

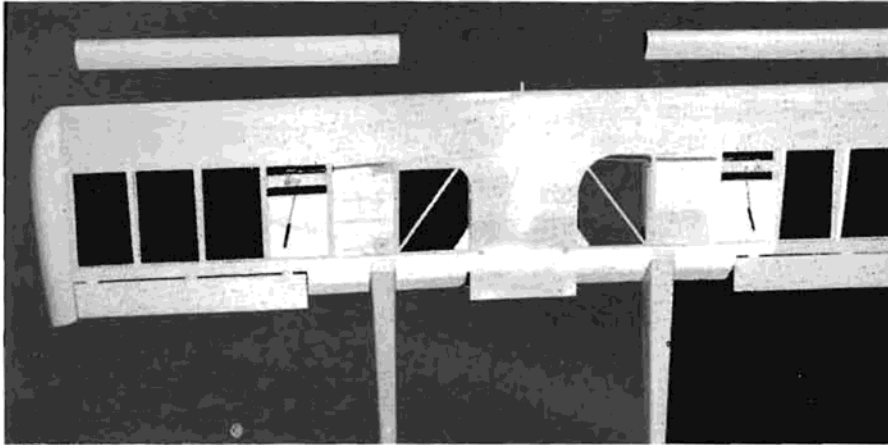




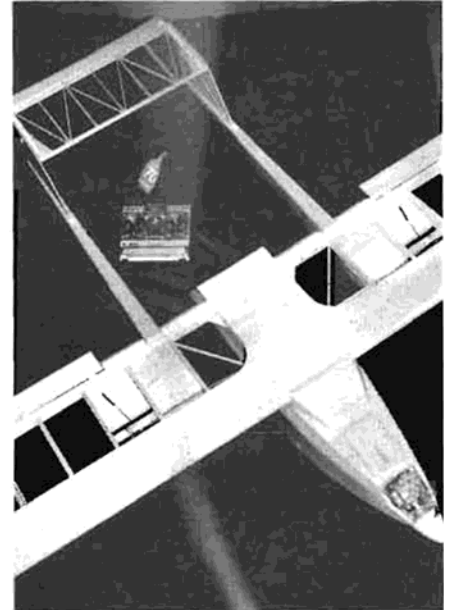
*Fuselage pod, booms and stab assembly completed.*



*Another view looking into rear of fuselage pod.*



*Wing assembly completed with slots ready to cover.*



*Everything completed and assembled. Time to decide on color scheme.*

Make the slots from balsa and form them to section as shown.

Reinforce the vortex tips on the underside with resin and light glass cloth at once, otherwise you will break them. Once they are covered they will be quite strong.

#### **Fuselage:**

Cut out formers F1 and F2 from plywood. Make and glue the laminations for F3 and F4. Cut them out when the glue has dried. Glue them to the fuselage sides together with the balsa doublers for the wing seat. Glue on the triangular sticks and make saw cuts

at the bend locations.

Glue on the top and bottom with their reinforcement.

Glue in the tank balcony, rubber band hooks, and the landing gear blocks.

Make the hatches with spring loaded pins as shown.

Glue in the wing hold-down blocks with epoxy. Glue in the spruce joiner between the blocks. Bend the landing gear from music wire or use a commercial gear together with a conventional nosegear.

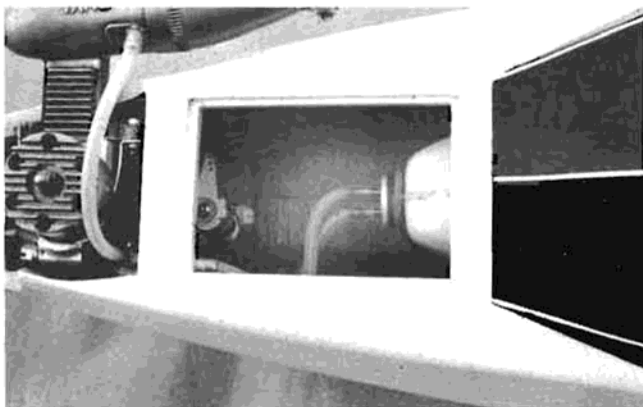
Install the pushrod for cargo box door release. The rod should pass through the hook in the cargo box

and into the plywood guide block when the box is in closed position.

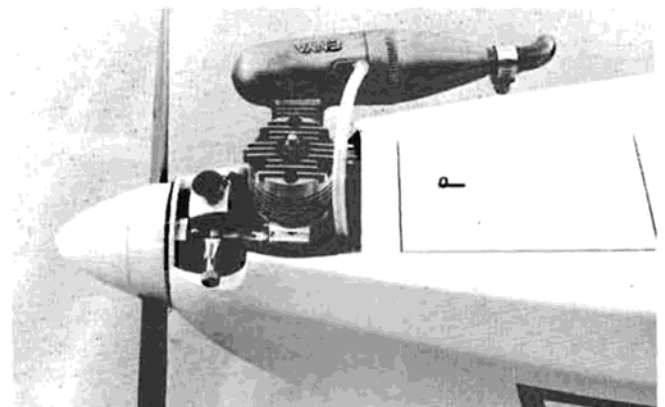
When the fuselage is completed, bevel all corners to shape.

#### **Cargo Box:**

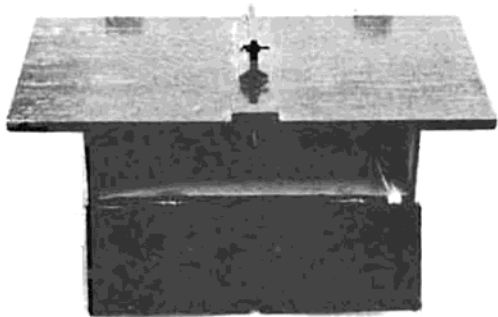
The box is made from balsa sheet. Glue the sides together as shown and install the four hinges, two for box to fuselage, and two for



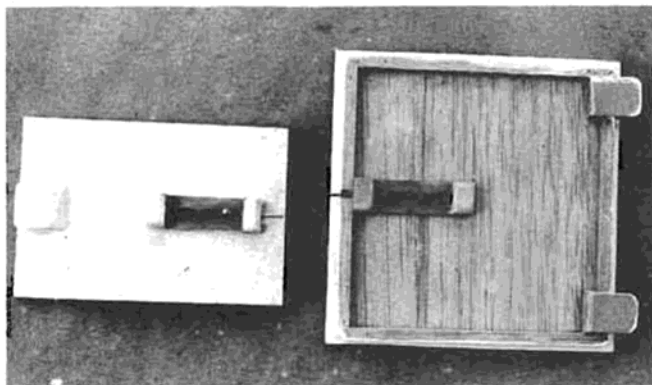
*Tank compartment with hatch removed. Nose gear linkage has bend to act as servo saver.*



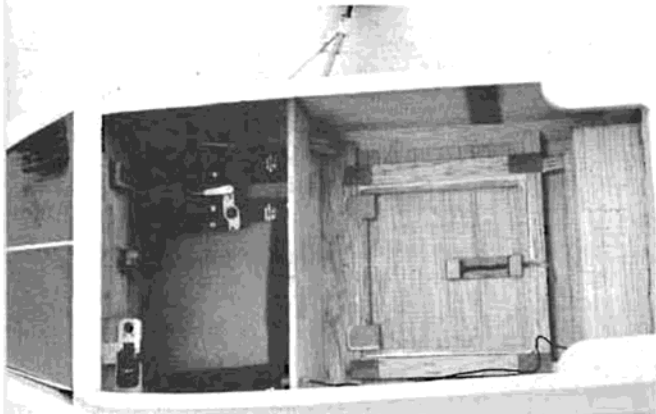
*Tank hatch in place — neat release mechanism.*



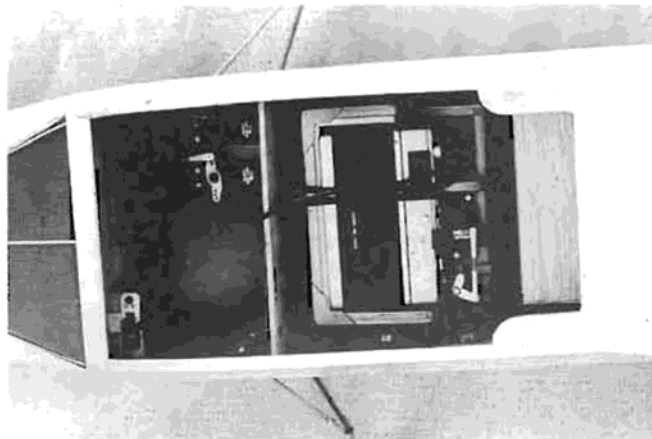
*Cargo box. Note curtain spring on right side that swings up the door.*



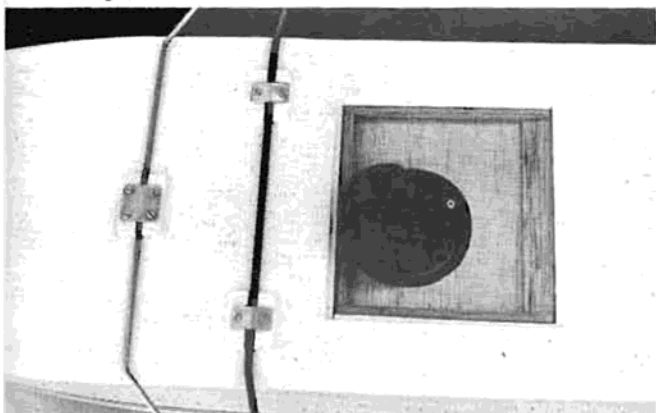
*Left side is bottom view of tank hatch, and right is bottom view of camera module hatch. Note music wire lock pin.*



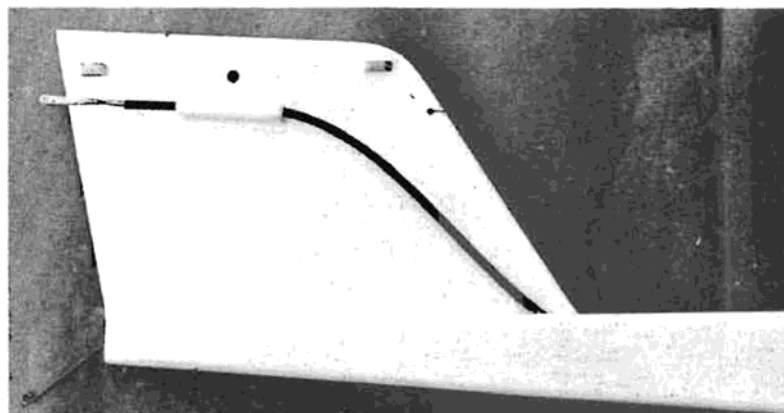
*Looking into fuselage with servo compartment on left, and cargo box on right.*



*Camera module in place. Note hooks for rubber bands.*



*Camera protruding out from bottom of fuselage. Lens shield on front side is from 1/64" ply.*



*Tail boom with wood guides for stab, and plastic rod for elevator.*



*Bertil gets a nice photo of flying field from his camera in the Cargo 40.*

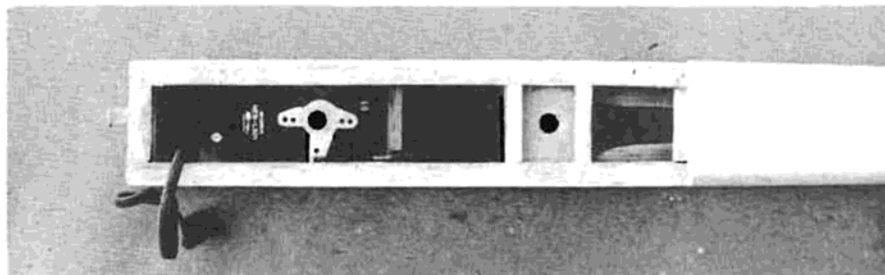
attachment for the box door.

Mount the curtain spring in a plywood block into the box.

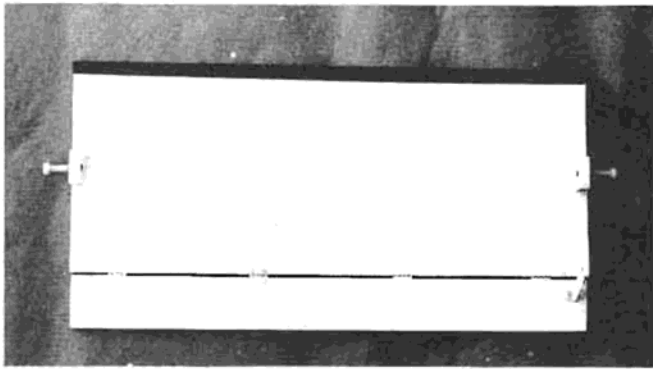
Glue on the plywood horn for the spring that will be connected to the

airframe to swing up the whole box when the servo releases it.

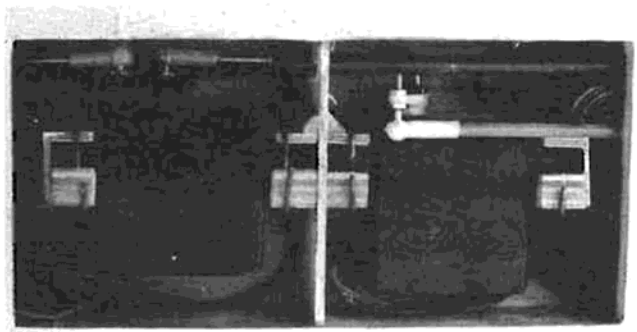
The cargo box door is actuated by the curtain spring when the whole box swings out. Connect the box to



*Tail boom showing elevator servo, and plastic pushrod.*



*Stab and elevator showing attach bolts for stab.*



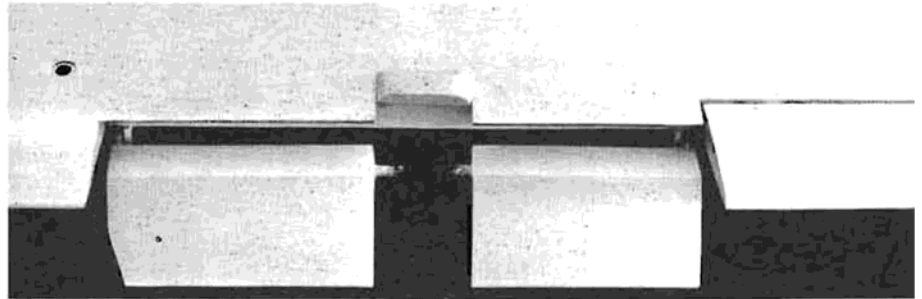
*Cut-out in wing for alleron and flap servos.*

the fuselage with two 4-40 screws with nuts through the hinges.

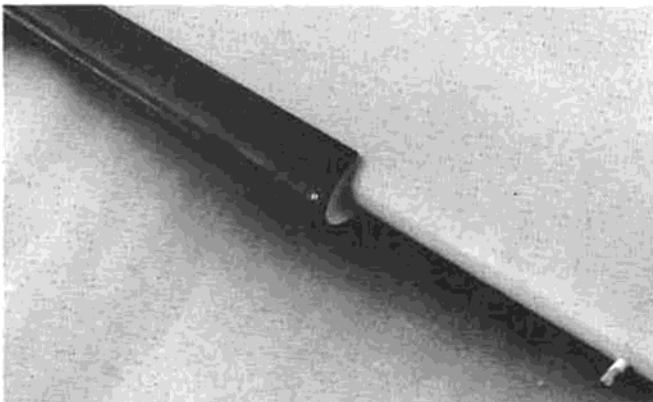
**Camera Module:**

The method that we use to attach the module to the fuselage is shown in the photos and on the plans.

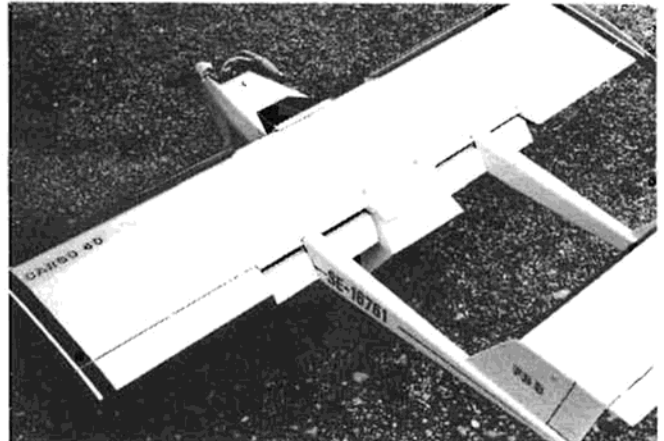
The shape and measurements for the module varies with the camera you choose. The best camera is, of course, one equipped with a winder



*Right wing panel showing flap and slot for tail boom. Flaps move 35°.*



*Leading edge slots bolted with 3-48 flat head screws. The dowel is wing attachment to fuselage.*



*Flaps are deployed to their full 35° limit. Very effective.*

so you are able to get more than one shot on each flight.

The module is held in place by rubber bands. Use foam between the camera and module and between the module and fuselage to minimize vibration.

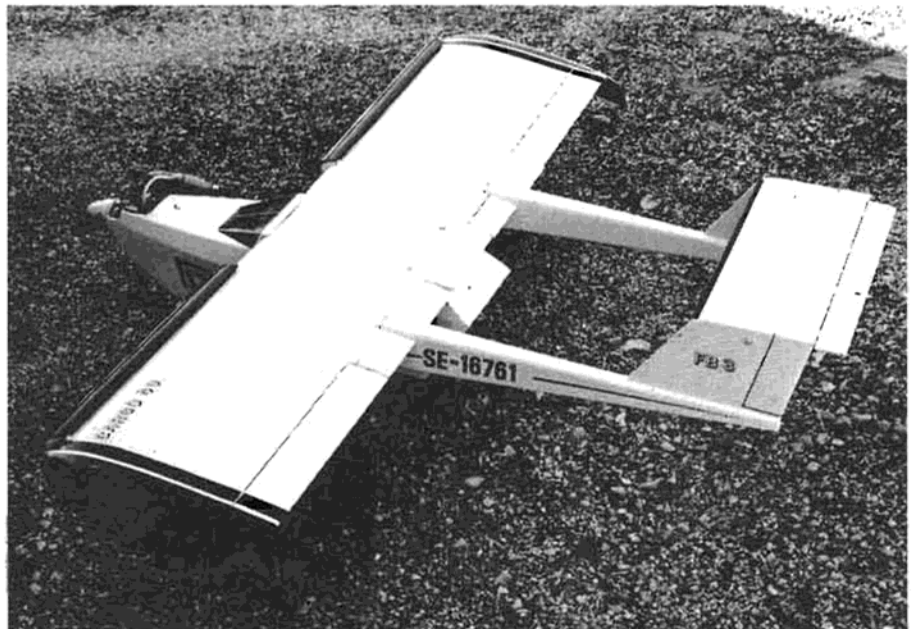
The forward pointing shield from 1/64 plywood protects the camera from snow, dust, or dirty grass.

**Radio Installation:**

You have a lot of space for even bulky R/C gear and the installation is straightforward.

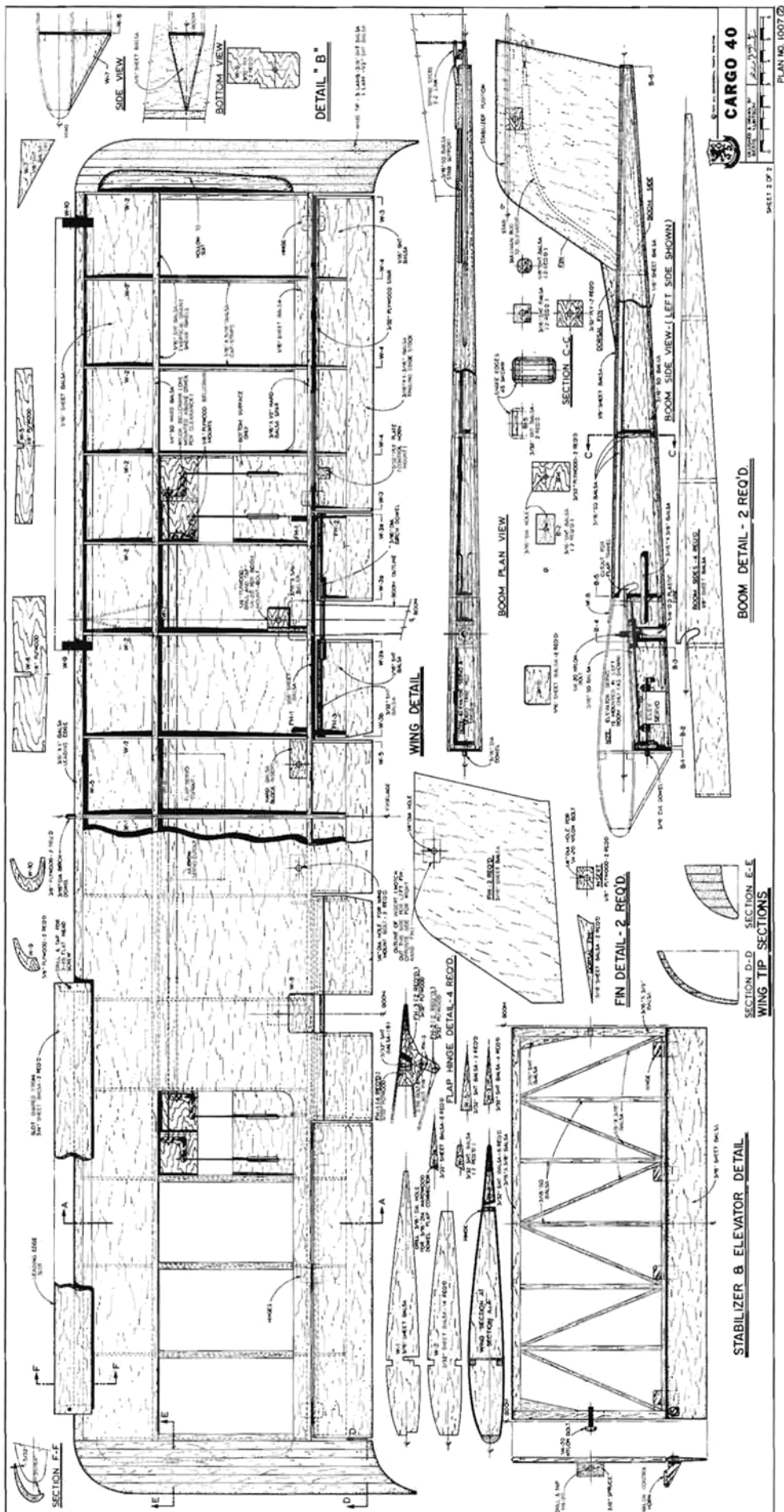
We use seven servos in our Cargo 40.

Mount all equipment and make sure that all control surfaces can move freely through the travel specified, and that the flaps can move from 0°-35° without touching the tail booms. Adjust where necessary.



*Cargo 40 with flaps in up position.*





**Covering & Finishing:**

Remove the radio gear again and disassemble the entire aircraft. We sanded the aircraft to a smooth surface and added doped-on nylon. The entire aircraft is covered including the leading edge slots.

The paint is polyurethane paint. We think that this is an outstanding covering in its durability and ability to stay tight and fuelproof. We have found that most of the plastic coverings do sag and loosen after a while. The decision is yours, the aircraft can be covered with any material you want. However, we think that our alternative is the best. Add your trim, ours is white with red and black trim.

**Balance & Incidence:**

Assemble the model with the radio and engine in place. The battery should be put under the tank balcony and locked in place with a piece of foam. You can see the C.G. range on the plans measured with the tank empty.

Adjust the battery so you can have the C.G. near the front position without the camera module. Lock the battery in place. Check the incidence (0°) between the wing and the stabilizer and glue the spruce alignment pieces with epoxy when you are satisfied.

**Flying:**

If the C.G. and the control throws are set up as recommended, the model should fly easily. Open the throttle and away she goes! Put in some up elevator when the speed has built up and it gets airborne.

The Cargo 40 has no bad habits and when you get used to her, you can easily make real STOL take offs and landings. But be sure you have a reliable engine when you take off at a high climb-out angle. When it is time to land, use the flaps to slow down the speed and land at walking speed and make a short stop.

When you use the camera module be sure to have the C.G. within the limits. This is really no problem because while we are using an old camera that, together with the module, weighs over 1 1/4 lbs., we have found no problems. Use the aircraft for plain fun flying, aerial photography, candy bombing on fly-ins or whatever interests you.

We have had a lot of fun with our Cargo 40 and we really hope you will have the same with yours. □