ABOUT THE AUTHOR

Terje V. Loberg, age 30, has been modeling since the age of 8. He started with R/C modeling in 1968, and has now become one of the top scale builders and flyers in Scandinavia. He is also working as a contributing editor of the largest selling hobby magazine in Scandinavia, "Allt Om Hobby" ("All About Hobbies"), since 1976. In 1977, Terje was one of the three winners in Dave Platt's International Contest, with the Waco. Since 1970 he has lived in Sweden where he works as a system analyst at the Gothenbourg University computing center. Terje is a member of the Grabo Flying Model Club.

CONTAINER FLI

From Sweden comes this new dimension in R/C. The five performing functions shown are just a sample of what can be done. Use your imagination and create new ones to suit your needs.

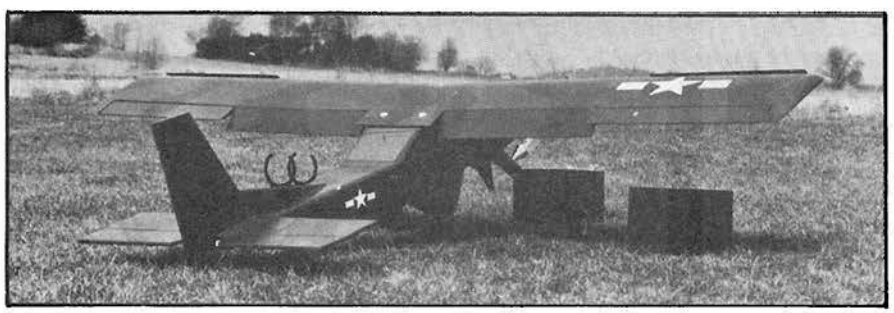
By Terje V. Loberg

Hello you fellows over there in the USA --- have you ever tried to build a model from plans with all the measurements in millimeters? Really? And you found it difficult? Yes I suppose so!

Here are my problems: A Norwegian living in Sweden, only having seen the USA on the map, trying to do a good job on plans, with all the measurements in inches. This also included taking photos, and writing a long construction article for the 1979 RCM design contest and the project must be finished in 8 weeks (RCM is 4 weeks later here than in the USA).

You think I must be crazy, but nevertheless here is the real flying machine presented --- the one and only "Container Fli."

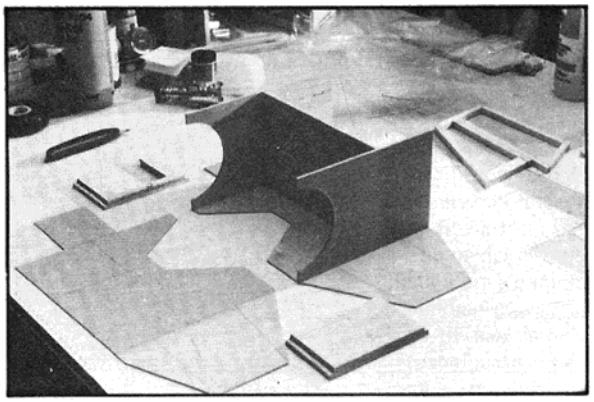
Okay fellows, to be honest I have had this model in mind for about a year, but I could never make up my mind whether or not to build it. But when I read the article in the February issue of RCM (given to me the 5th of March), I decided to start the project. After two weeks the model was airborne.



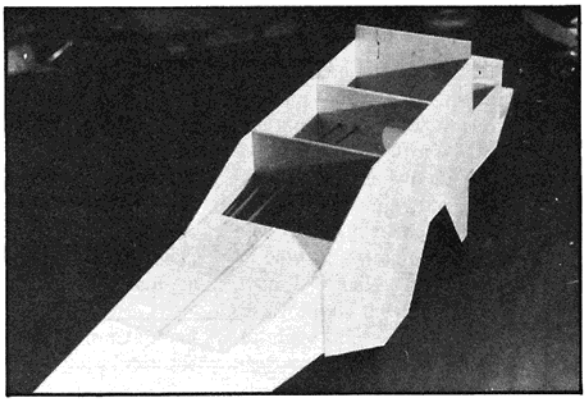
"Container Fli" awaiting pilots decision on which box to install for next flight.

CONTAINER FLI
Designed By: Terje V. Loberg

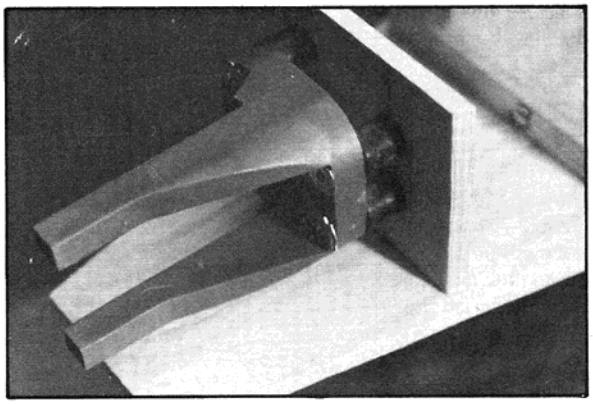
TYPE AIRCRAFT
Sport Experimental
WINGSPAN
74¾ Inches
WING CHORD
11¾ Inches
TOTAL WING AREA
882 Sq. In.
WING LOCATION
High Wing
AIRFOIL
Mod. Clark Y
WING PLANFORM
Constant Chord
DIHEDRAL EACH TIP
1 Inch
O.A. FUSELAGE LENGTH
58 Inches
RADIO COMPARTMENT AREA
(L) 4" x (W)6" x (H)4"
STABILIZER SPAN
23½ Inches
STABILIZER CHORD (incl. elev.)
7¾ Inches
STABILIZER AREA
182 Sq. In.
STAB. AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
6 Inches
VERTICAL FIN WIDTH (incl. rud.)
6" (Avg.)
REC. ENGINE SIZE
.61 Cu. In.
FUEL TANK SIZE
14 Oz.
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
6
CONTROL FUNCTIONS
Rud., Elev., Ail., Flaps
Throttle & Container
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa and Ply
Wing ..... Foam, Ply and Balsa
Empennage ..... Balsa
Wt. Ready To Fly ..... 158 Oz. w/o container
Wing Loading ..... 25.79 Oz./Sq. Ft.



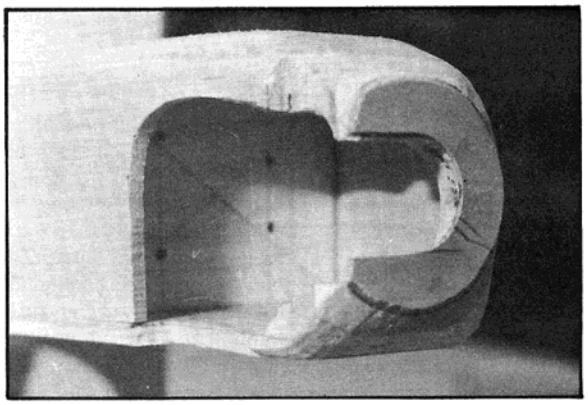
3/32" ply Container box is built first as the start of the fuselage.



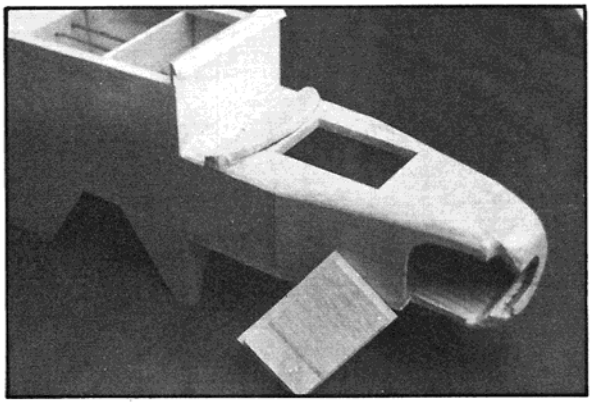
Tail boom has been added to box along with pushrods installed in boom.



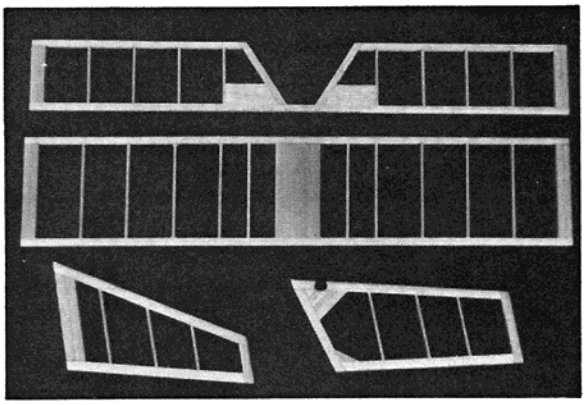
Engine mount shown installed using rubber landing gear mounts from helicopter kit.



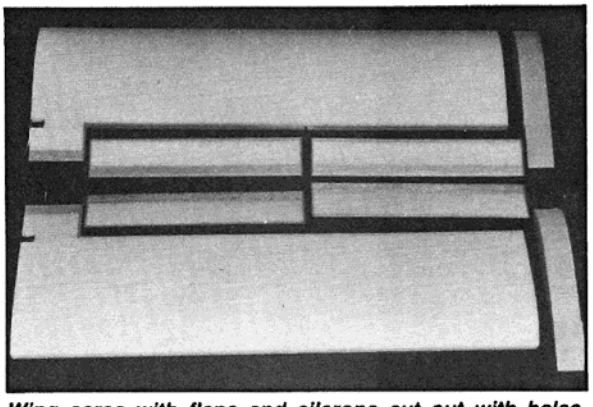
Mount removed showing nose section roughly carved to shape.



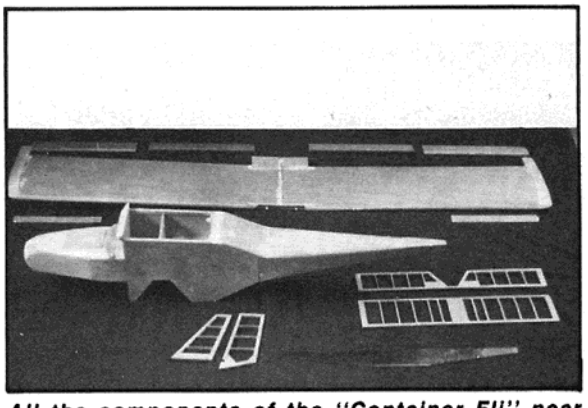
Fuselage near completion and needing only the final sanding. Tank hatch removed.



Completed tail structure sanded and ready to be covered.



Wing cores with flaps and ailerons cut out with balsa facing installed.



All the components of the "Container FII" near completion.

My children asked my wife, "Who's that man sitting beside you only during meals?" I lived two weeks in my hobby room and when the model was airborne, the inking and writing of the article was started, and also the continuous flight tests on the model.

I have always wondered, why just fly around there up in the sky? Can't we do something more with the R/C model?

Nowadays most of our R/C equipment has plenty of functions but all of them are not in use. Some people are using retracts and flaps but nothing more. I would like to bring a new dimension to R/C flying such as dropping bombs, firing rockets, taking pictures (using an 8mm movie camera) dropping a parachute, towing sailplanes, etc.

But to find a model which provides all this was impossible, therefore, I decided to build a model on which I can hook containers which contain the thing that I want, and are activated by standard connections, and with a towing-tower on the top of the wing. So the "Container Fli" was born.

The model is big, but not too heavy, and can carry a lot of weight. It would not win any beauty contest but it has a practical beauty, short take-off and landing, and can be flown from nearly any kind of surface. The model can also be flown by a novice, but a novice might have some problems in building it.

All measurements are in millimeters but to help you fellows, I have given the measurements in inches in parentheses. They are not always the exact measurements in millimeters but as close as possible, and with the small dimension that we build our models in, it should cause no problems, with the difference.

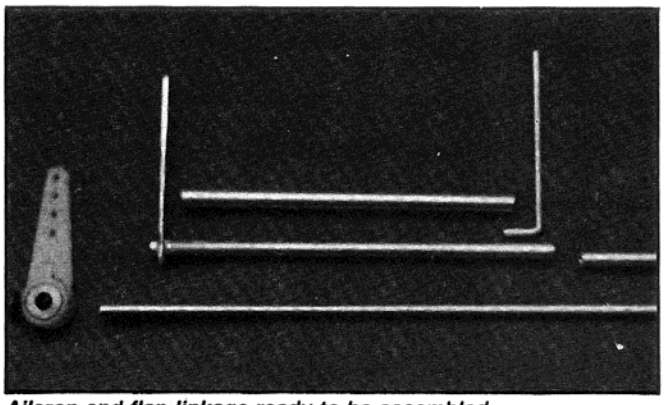
CONSTRUCTION

Fuselage:

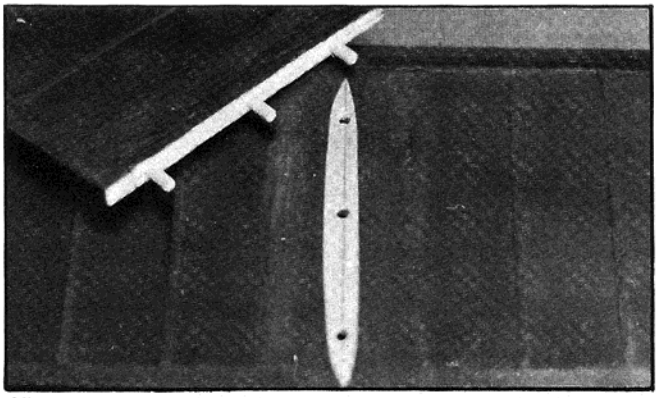
Cut out the two 3/32" plywood sides simultaneously and the formers F5 and F8 from 3/16" plywood, as shown on the plan. Then cut out former F6 and the bottom former F7. Epoxy the pieces together as shown on the plan, by squeezing the sides together with furniture clamps and checking for perpendicularity. This is very, very important, otherwise you will have problems when putting the containers into the container area. The best thing is to use a jig while building the fuselage.

Cut out the front bottom from 1/4" plywood; it looks over-dimensioned but remember that the landing gear is mounted on it and that heavy cargo may be used. Also cut out formers F4 a and b, F9 a and b, and laminate a and b together. Former F2 is cut out from 3/8" balsa sheet, and the sides from 1/4" balsa sheet. Epoxy the bottom onto the fuselage and let it dry.

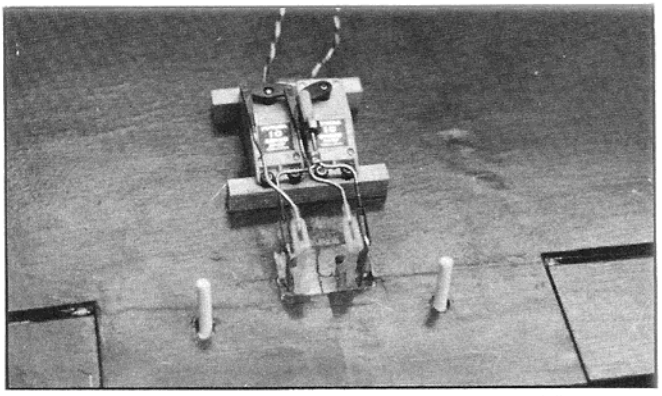
Drill holes in F3, made from 1/4" plywood, to fit the motor mount you will be using. Then epoxy F2, F3, F4 and the sides, and also the scrap balsa, triangular stock cut to fit for later sanding to final shape.



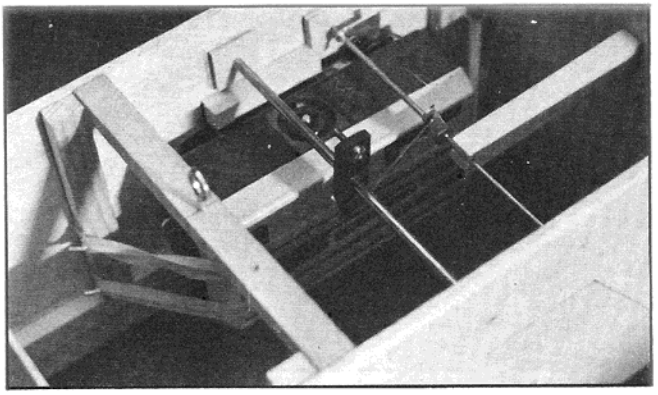
Aileron and flap linkage ready to be assembled.



View showing 1/4" dowels glued into fin. These are glued into stabilizer for secure bond.



Bottom view of wing showing aileron servo (left) and flap servo (right).



Container box showing camera installation and linkage.

The motor mount is not mounted in the usual way, but on four vibration damping connectors, such as used on helicopter landing gear. This has taken away most of the vibration from the engine, which is very important if you intend to carry cameras for taking pictures.

After having cut the hole in the fuselage side for the engine (with spinner on), install the motor mount on the connectors and cut out former F1 from 3/32'' plywood and epoxy it in place to the same contour as the spinner. You may have to cut out a hole in the bottom plate to fit the silencer.

Now it's time to build the ''tailboom'' from 1/4'' balsa sheet. Note the direction of the grain on the 1/4'' sheets going into the fuselage sides. Epoxy all together and when dry, epoxy the ''boom'' into the fuselage shell. Cut out the slots for the plywood piece needed for mounting the Goldberg tailwheel bracket.

To prevent fuel damage in the engine and tank compartments, paint with epoxy colors as well as the bottom of the turtledeck which is made from 3/8'' balsa sheet. Cut out the instrument panel F10, sand to shape, and cement in place. Also cement the 5/16'' sq. balsa inside the fuselage where the wing is attached. Cut out the hatch area over the tank compartment and epoxy the 3/32'' plywood hatch top onto the remaining piece.

For mounting the wing, use two wing mounts and screws. One of the commercially available mounts can be adapted or made from 1/4'' plywood. Sand the fuselage, especially the nose section, to as nice a shape as possible, by rounding all edges and the front of former F2 to the same contour as former F1.

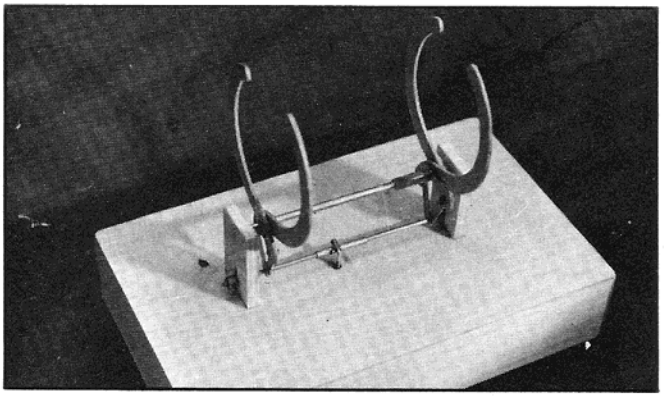
Empennage:

The construction of the stabilizer, fin, rudder and elevator is very simple, you can build it right on the plan. Use hard balsa and cover it with your favorite covering material. The fin and stabilizer should be mounted with three 1/4'' dowels. Smaller ones can also be used on the fuselage. This might seem to be weak, but there are no high forces on the tail during a normal flight. The mounting of rudder and elevator horn depends on servo rotation, but do not place them on the same side of the fuselage. If you are using the towing-tower, you must mount a wire from the top of the rudder and down to each tip of the stabilizer. This is necessary for preventing the towing-line from getting in contact with the rudder or the elevator during the flight.

Wing:

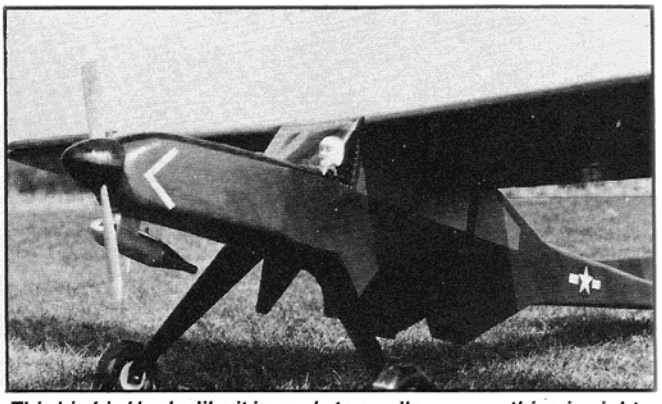
The airfoil is a modified Clark-Y, for slow flying machines. I have built the wing in foam and ply.

The wing has a constant chord and is cut in two halves from foam. Cut out the ailerons and flaps, then cement the 3/4'' x 3/8'' and 3/4'' x 3/16'' balsa to the trailing edge of the wing and leading edge of the ailerons and flaps. Cement the 3/16'' x 3/4'' trailing edge in place as shown on the plans. The wing is very easy to

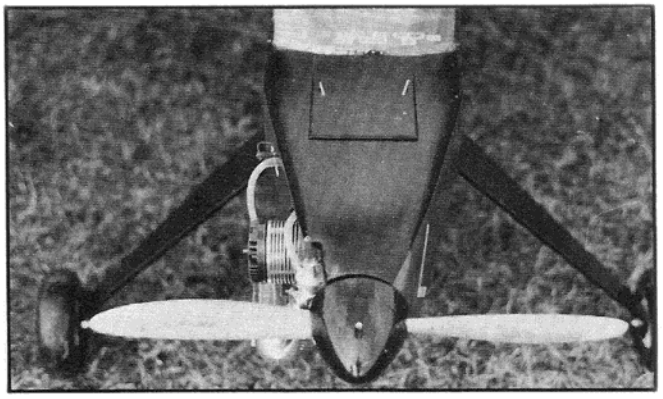


Container box used for carrying various cylindrical objects.

Ready to go.



This big bird looks like it is ready to swallow up anything in sight.



Looking at this view of the nose, it could be any conventional sport airplane.

build but the aileron and flap linkage system require a little care. You need a piece of 3/16'' diameter brass tube, a piece of 5/32'' diameter brass tube which fits into the first one, and also a piece of 1/8'' diameter piano wire to fit inside the last one. The 5/32'' tube is also used as a guide for the piano wire going to the ailerons.

Wrap and solder an ''L'' shape piece of 3/32'' piano wire for the flaps onto the 5/32'' brass tube end, then solder a piece of brass for the control arm on the other end for a flap pushrod. Don't forget to put the big tube on before soldering the arm. Cut out slots in the wing for the linkage system. Bend the 1/8'' aileron piano wire and put it inside the guide tube. At the end of the wire you can use adjustable nosewheel steering arms for the aileron pushrod, and epoxy in place without getting any epoxy into the tubes. Cover the wing attachment area with 1/16'' plywood after having adjusted the foam around this area for a good fit.

Mount the ailerons and flaps and check for good fit and ease of operation. Sand the wing before covering. Cover with 1/64'' plywood or cardboard.

Epoxy the balsa tip blocks in place. Cut out the space for the aileron and flap servos and then cut out the 1/4'' plywood brace in one piece.

Sand the wing root to get the right dihedral (1'' under each tip) and epoxy the wing and brace together. Cover the section with fiberglass and epoxy. Cement the leading edge in place and sand the wing to proper shape.

Mount the wing onto the fuselage and check for alignment to the fuselage. Drill two 1/4'' holes for the wing holding dowels through F5 and the dihedral brace. Epoxy the dowels into the wing.

Now it's time to cement F11 in place. It will cover the holes. The wing slots are optional but are a great help for short take-offs and landings. All you have to do is to laminate three sheets of 1/64'' plywood around the nose section of the wing to get the right form.

Landing Gear:

The landing gear is made from 3/16'' dural.

I used 4'' Du-Bro wheels but you can, without any problem, use larger ones depending on the surface you will fly from. Big wheels offer the advantage of good shock absorption and they tend to ride on rough surfaces and grass without digging in and causing nose-overs.

The gear is mounted with 1/4'' screws and there is plenty of room for access to the nuts inside the tank area.

Tailwheel:

The tailwheel is operated by the rudder, using Goldberg's tailwheel bracket. Don't forget the little 1/16'' plywood pieces on each side of the rudder. I used the screws for the rudder horn as an extra reinforcement for the wire.

Covering and Finishing:

The prototype was painted with epoxy paint, however, use whatever type of paint or material you are familiar with. I painted my model dark green, with brown pattern. The windshield is made from .020 clear plastic and mounted with contact cement and small nails to get a more scale-like appearance. To simulate windows on the fuselage, blue MonoKote was used.

Container Linkage System:

The fork, or guide, is made from nylon/plastic and mounted onto a piece of hardwood block. From the fork I use a pushrod to the servo. Depending on which type of container you will use, I think it's best to use a retract servo, because you sometimes need extra power. The container hook and bracket are made from 3/32'' dural and mounted onto a piece of hardwood block. Use a pushrod from the hook and solder on a spring from a ballpoint pen. To secure locking, let it go through the top sheeting of the fuselage.

Radio Installation:

Since there is plenty of room for the equipment, there should be no problems in finding places for the servos. I mounted three servos side by side for engine, rudder and elevator. I used NyRod for elevator and rudder. The servo which activates the guide (fork) for the container linkage system, and the servo for the towing-tower, are mounted as shown on the plan.

Containers:

On the plan I have shown five different types of containers which should only give you some good ideas on how to build your own containers to meet your own demands. Use you own imagination and the experience you have.

All kinds of containers may be built to fit inside the fuselage, so that the linkage system fits into each other without any problems. From the bellcrank in the container you must make your own system to activate your special equipment inside the container.

Cameras must be mounted to prevent any kind of vibration from the engine and fuselage. The cameras can be mounted in any direction, depending on their size, but usually with the lenses on side opposite to the silencer, to prevent contact from exhaust residue. A movie camera can be pointed backward or forwards but, in this case, it's necessary to use a silicon tube on the silencer to lead the exhaust behind the lenses.

Another idea is to use a servo to operate the container hook, then it is possible to drop down a container hanging under a parachute.

The towing-tower is used for towing sailplanes or towing a target — a balloon on the line — so that your friends can try to hit the balloon with their aircraft.

Once again, use your imagination and follow my ideas in order to bring a new dimension into R/C flying. Most important of all have fun.

Flying:

When the model is finished, the C.G. should be just at the right place. If it is not, move the power pack or add weights to balance. Do this step with fuel in the tank. Before the first flight I tried the ground handling, which was good, then full power and, after about five yards, the model was airborne without using the flaps. It climbed like an elevator so you probably do not have to use full power during the flight.

During the first flight there were no problems, except that I had too much response on the elevator. It is very sensitive on the aileron, but a little slow on the rudder so fly it as they do the real aircraft --- use the rudder and aileron in combination. Suddenly the engine was dead, and my heart was quiet for awhile, but the quality of gliding was good and I had to land in a cut-down cornfield. With the high undercarriage and the big wheels, it looked more like a normal landing than a corny one (bad joke). The reason for the dead engine was that I ran out of fuel.

I have since flown many times with the model and in windy weather, with flaps fully down, it is airborne after about two yards. With the flaps down, up-elevator, and against the wind, it doesn't stall, so you have plenty of time to use whatever container functions that you may have on board. There are no problems during landing, but be careful with the flaps because when the flaps are lowered, the ailerons are not quite as effective as when flaps are up. Have fun flying, fellows --- I certainly have and this aircraft can be a real work horse. Just dream up the jobs that you want it to perform. □

Editing By Hlsat.
RCModeler
Jan.1981.