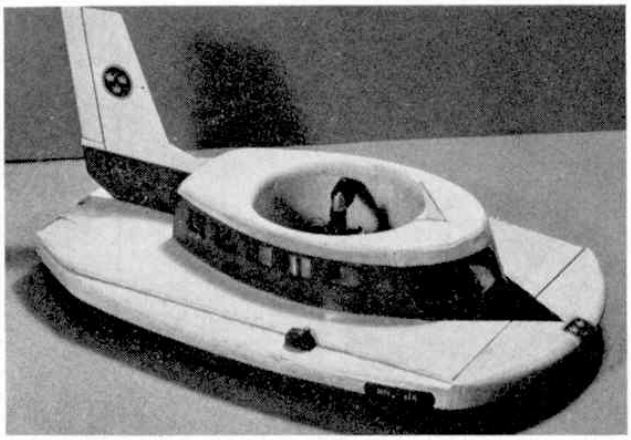


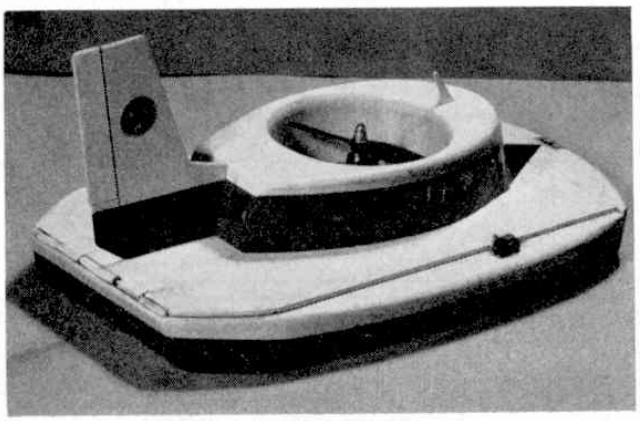
HOVASTAR

Enjoy the thrills of hoverflight with this indoor air cushion vehicle

BY RAY MALMSTROM

FULL-SIZE PLANS OVERLEAF

Top, Hovastar combines straightforward construction with plenty of eye-appeal for modern hovercraft age.
Centre, underside view shows what makes hovastar tick. When trimmed, rudder can be locked with scrap balsa blocks. Note R.T.P. bridle.
Below, original Hovastar still spick and span after dozens of flights after clear doping and Humbrol enamel, both durable and fuel-proof.

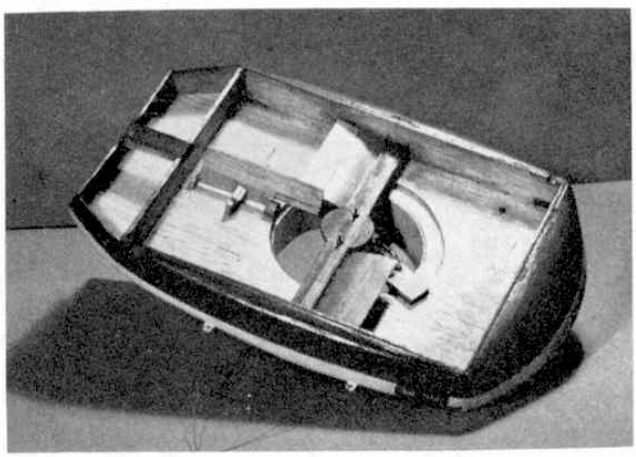


HOVERCRAFT undoubtedly have a fascination all their own. Working model hovercraft share this fascination and are among the most absorbing models to build and operate.

The intriguing little model featured here with full-size plans and constructional sketches, is powered with the easy-starting Cox .010 glo-motor, and is designed for indoor operation (no wind or weather problems!). A reasonably large room, your club hut, school hall or gym (with permission of course!) are ideal. Keen to own your very own hovercraft? Good! Then let's get together and start building.

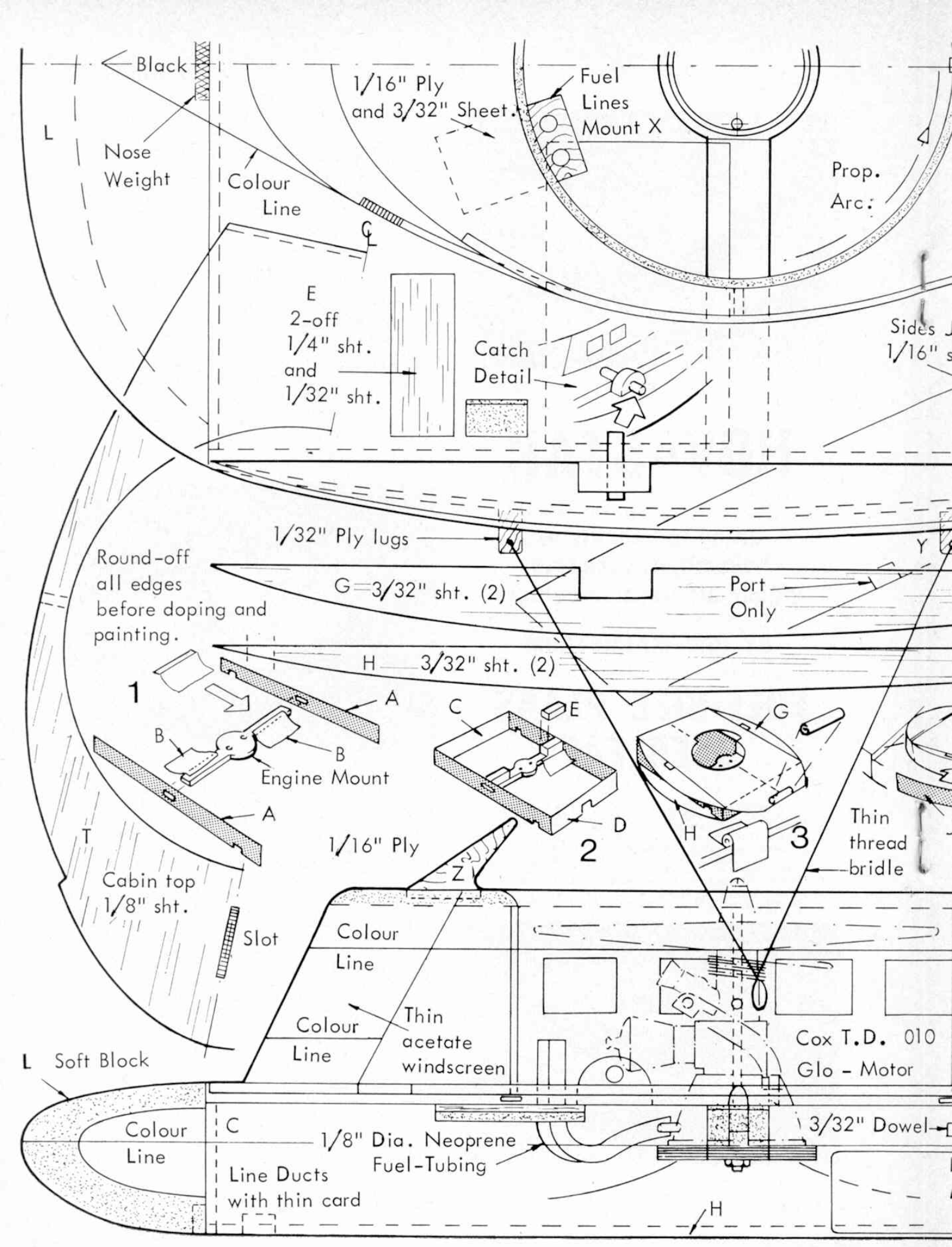
Cut the engine mount from $\frac{1}{8}$ in. ply and drill for your Cox T.D. .010 motor. Cement the engine mount to the $\frac{3}{32}$ in. sht. sides A. Cut two anti-torque vanes (B) from very thin tin. We cut ours from air-line lightweight cigarette tins. Curve vanes as shown and Araldite or Evo-Stik them to the engine mount. Sketch 1. Complete the basic frame with front and rear panels C and D and blocks E. Note the cut-out in piece D. Check that the basic frame is true and square. Sketch 2.

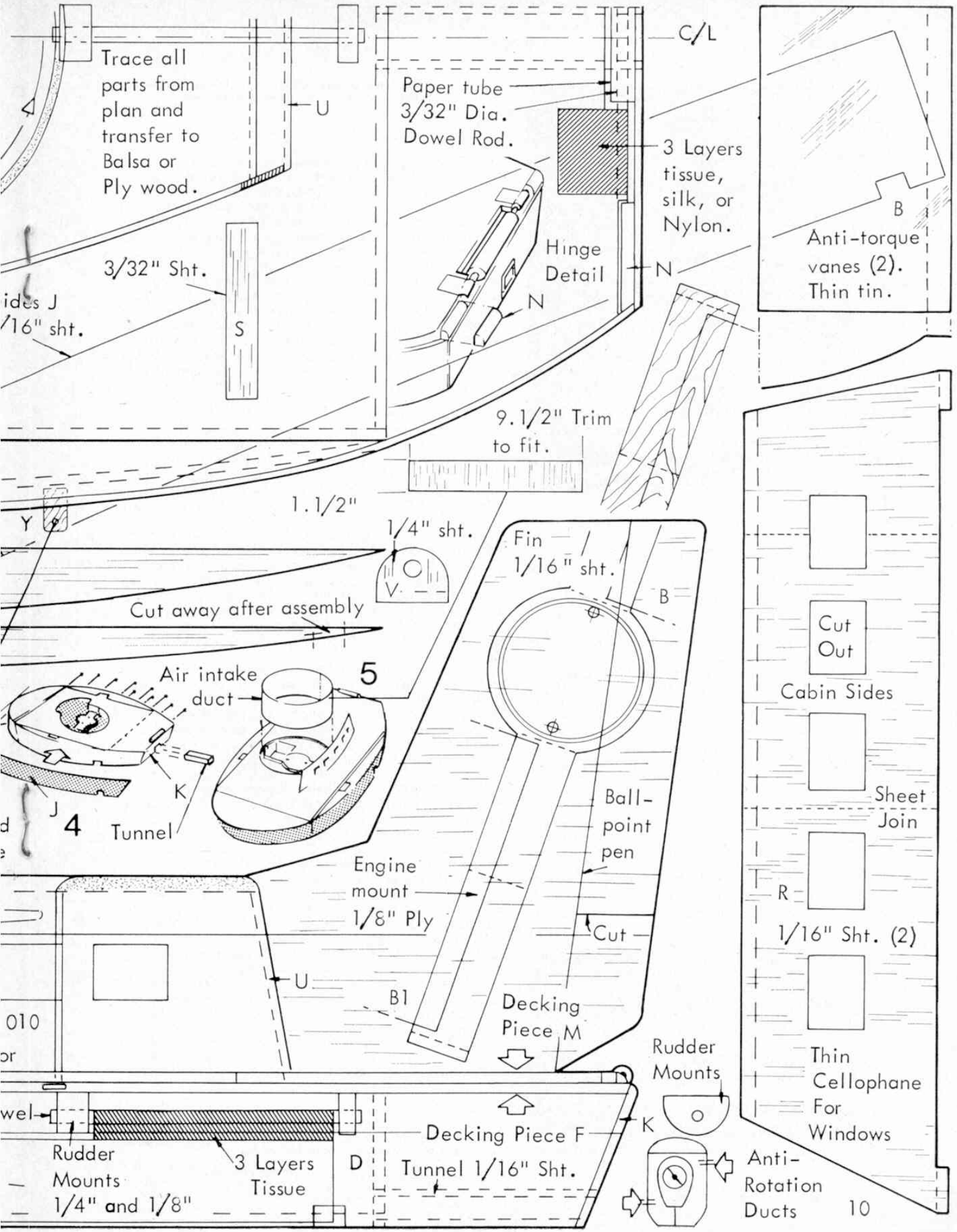
Cement two 10 in. long by 3 in. wide pieces of $\frac{3}{32}$ in. sheet together. On to this trace decking piece F. To get this the right size you must join the lines Z1–Z1

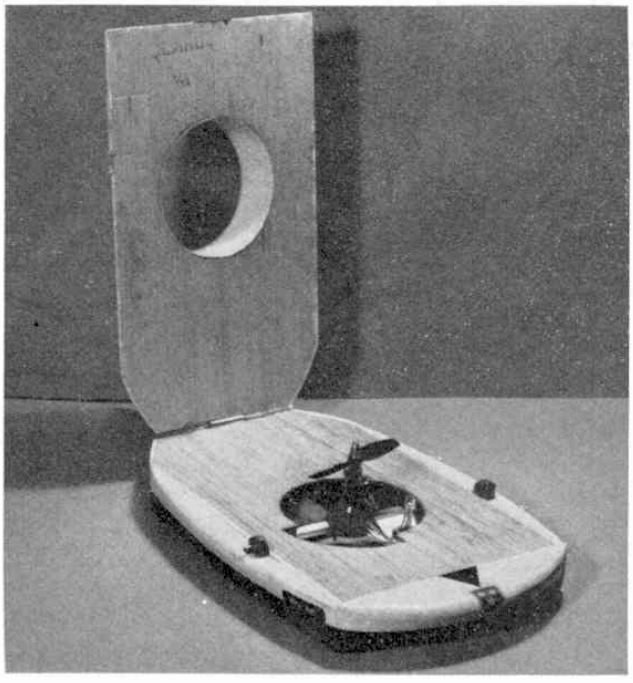


together from the plan. Cut out piece F and cement accurately to the basic frame. Make a paper tube by rolling 1 in. wide gummed paper strip around a length of $\frac{3}{32}$ in. diam. dowel rod, taking care not to stick the tube to the rod—the dowel rod should be a sliding fit in the tube. Cement the tube on the rear edge of piece F. Hold it accurately in position with 3 layers of tissue paper doped on. Now add the side pieces G and H. Sketch 3. Cut two side pieces J from soft balsa, damp the *outer* surfaces, and cement to pieces G and H, holding in position until dry with modelling pins. Build the tunnel from $\frac{1}{16}$ in. sht., cement rear piece K in place, and cement tunnel in cut-outs in pieces D and K. Carve and sand to shape nose block L, hollow out and cement to the front of piece C. Sketch 4.

Cut away anti-rotation ducts in pieces H. (Starboard front, Port rear). Trace and cut out upper decking piece M, as for decking piece F, noting different rear end and also cabin slots. Decking piece M is hinged to decking piece F. The $\frac{3}{32}$ in. diam. dowel is passed through the paper tube and cemented at either end to piece M, the joins being, once again, reinforced with 3 layers of tissue paper. Check that piece M is absolutely *flat* on decking piece F and opens up easily. Finally cement $\frac{1}{8}$ in. sq. strips N to decking piece F. Study hinge-detail sketch. Check that the circular openings in both decking pieces F and M line up


Black
L
Nose Weight
Colour Line
1/16" Ply and 3/32" Sheet.
Fuel Lines Mount X
Prop. Arc.
E
2-off
1/4" sht.
and
1/32" sht.
Catch Detail
Sides J
1/16" s
1/32" Ply lugs
Y
Round-off all edges before doping and painting.
G 3/32" sht. (2)
Port Only
H 3/32" sht. (2)
1
A
B
B
Engine Mount
A
T
Cabin top 1/8" sht.
Slot
C
E
D
2
1/16" Ply
Z
G
H
3
Thin thread bridle
Colour Line
Colour Line
Thin acetate windscreen
Cox T.D. 010
Glo - Motor
L Soft Block
Colour Line
C
1/8" Dia. Neoprene Fuel-Tubing
3/32" Dowel
Line Ducts with thin card
H


Trace all parts from plan and transfer to Balsa or Ply wood.
U
3/32" Sht.
S
ides J
/16" sht.
Paper tube 3/32" Dia. Dowel Rod.
C/L
3 Layers tissue, silk, or Nylon.
Hinge Detail
N
N
B
Anti-torque vanes (2). Thin tin.
9.1/2" Trim to fit.
1.1/2"
Y
1/4" sht.
V
Cut away after assembly
Fin 1/16" sht.
B
Air intake duct
5
K
J
4
Tunnel
Ball-point pen
Engine mount 1/8" Ply
Cut
U
B1
Decking Piece M
Rudder Mounts
K
Decking Piece F
Tunnel 1/16" Sht.
D
Rudder Mounts 1/4" and 1/8"
3 Layers Tissue
Anti-Rotation Ducts
Cut Out
Cabin Sides
Sheet Join
R
1/16" Sht. (2)
Thin Cellophane For Windows
10



Top decking opens up for easy access. Starting and adjusting motor no problem. Lock decking down before launching.

correctly. Now construct the main air intake duct. Cut a strip of $\frac{1}{16}$ in. sht. (noting grain direction) to the dimensions shown. Soak in water and wrap around a tin roughly 3 in. diam. Hold in position with rubber bands until dry. Do not cement the join. Slide off the tin and test fit the duct into the opening in decking piece M. When a correct fit, cement the duct join and cement the duct accurately into the opening.

Cut out two cabin sides, cut out the windows and cover them from the inside with thin cellophane. Cement cabin sides into slots in decking piece M. Please see that the bottom of the tabs are flush with the underside of piece M. Sand them flush, they must not protrude. Sketch 5. Cement cabin support pieces 5 in position and fit rear cabin piece V. Cut and fit cabin top T. Add fin, and catch pieces V with $\frac{1}{8}$ in. diam. locking dowels. When in the closed position catches must keep decking piece M and cabin assembly flat against decking piece F. Sketch 6.

Turn model over. Cut out rudder W and cement a length of $\frac{3}{32}$ in. diam. dowel rod to top of rudder, reinforcing with 3 layers of tissue paper. Cut out and put rudder mounts on ends of dowel rod, they must be a tight fit. Cement rudder assembly to underside of decking piece F. Build the fuel-line mount piece X from $\frac{1}{16}$ in. ply laminated to $\frac{3}{32}$ in. balsa sheet. Drill holes for $\frac{1}{8}$ in. diam. neoprene fuel tubing. Cement piece X in position on underside of piece F. Sketch 7. Cut the windscreen from thin acetate or cellulose sheet. Hold in place with modelling pins until set. Cut two lugs Y from $\frac{1}{32}$ in. ply. Drill a small hole in each and cement in slots cut in decking piece F. Make the round-the-pole bridle from thin thread. Cement wireless mast Z in place. Sketch 8.

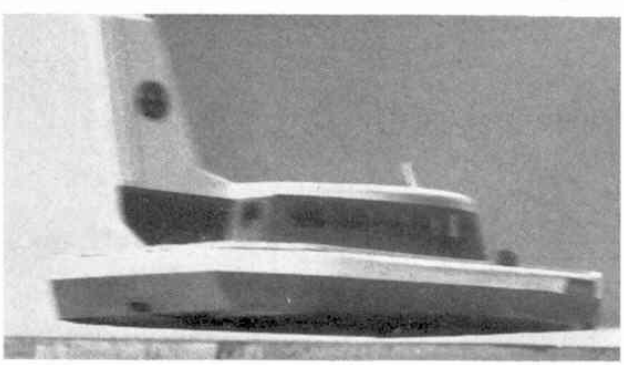
Give entire model two coats of clear dope, lightly sanding between coats. Fuel proof engine mount and cemented joints likely to come in contact with glo-fuel. We used Humbrol enamel, which in addition to giving an attractive finish, is also hot-fuel-proof. We choose white for the top surfaces and top of fin, red for the cabin sides and lower part of fin, and grey for the lower part of the sides. Catches grey. All that remains is to bolt in the engine and put small lengths of neoprene fuel tubing (from your model shop) between mount X and the engine tank.

Balancing and trimming your hovercraft is all-important for successful flight. Suspend the model from a length of thread tied to the propeller retaining nut. Add a small piece of lead or folded empty cement tube in the nose block (see plan), until the model hangs slightly nose down. Sketch 9. For easy access to the motor for starting, open up top decking piece M. Full instructions for starting the Cox T.D. .010 are supplied with the motor. Access to the needle valve is through the cut out section on the circular opening in piece F. When the motor is running at full power, close top decking and lock. Best method of launching (free flight and tethered) is to hold the sides of the model lightly between the hands, place near the floor and give a steady push forward in the direction you wish your hovercraft to travel.

Now a few tips on trim. On first test, your hovercraft will quite likely tend to rotate in a clockwise direction (the effect of propeller torque). To correct this move the rudder (W) over to the left (model viewed from the rear and below). The exact amount is a matter for experiment. On our model the rudder was moved to the angle shown in Sketch 11. By the way, with use the rudder tends to work too freely and is best fixed with small balsa blocks when the right position for straight flight has been obtained. Rotation can also be checked by enlarging the anti-rotation ducts, Sketch 10, but this should not be necessary. Slight adjustment up or down of the anti-torque vanes (B) will control rotary movement of the model (either direction) but as shown on the plan they needed no adjustment on our own model. Your hovercraft may also tend to slide sideways. This is corrected by adding a very small amount of weight to the opposite side (conceal this weight by a recess cut in pieces H).

Remember you are trimming a flying model, that has no direct contact with the ground, so very small additional weight can greatly alter the flight performance. A little patience and perseverance and you'll be in the hovercraft business in no time. For tethered operations we have included a lay-out of a simple pole and tether line. Remember to weight the base of the pole before take-off! Sketch 12.

Good luck and "good hovering" to you.



Getting with the action! Hovastar in actual flight on its cushion of air. Tiny T.D. 010 at full revs.

Z1

HOVASTAR

Power : Cox TD ·010

Weight : 3·5 ozs.

INDOOR HOVERCRAFT

Z1

C/L

F Outline

Outline M

N.B. Use tracing and carbon paper for transfering parts to wood.

6

T

U

S

Anti-rotation Duct

D Only

Front and rear ends C.D. 3/32" sht.

Access cut-out for glow-plug clip and needle valve

X

W

Rudder Mount

7

Important. Dowel rod must be a tight fit in mounts

Z.1.

Z.1. Join this line to Z1-Z1 above

Z

Cabin slots in decking piece M only

Slot

Y

8

Rudder Mount

Sides C 3/32" sht.

Hover Height:
Front - 1/2" approx.
Rear - 3/4" approx.

C/L

Rear Cabin

W Rudder 1/16" sht.

Tissue silk or Nylon

Decking Piece M

Paper Tube

Piece U 1/16" sht.

Thread

Balance Point

9

11

5'-6'6"

Pin

Decking piece F

6" sq.

12

1/2" Dia. dowel

4" High