

# STARCRUISER WARLOCK

READ THESE INSTRUCTIONS CAREFULLY  
BEFORE YOU START BUILDING

Additional materials and tools  
required for construction:

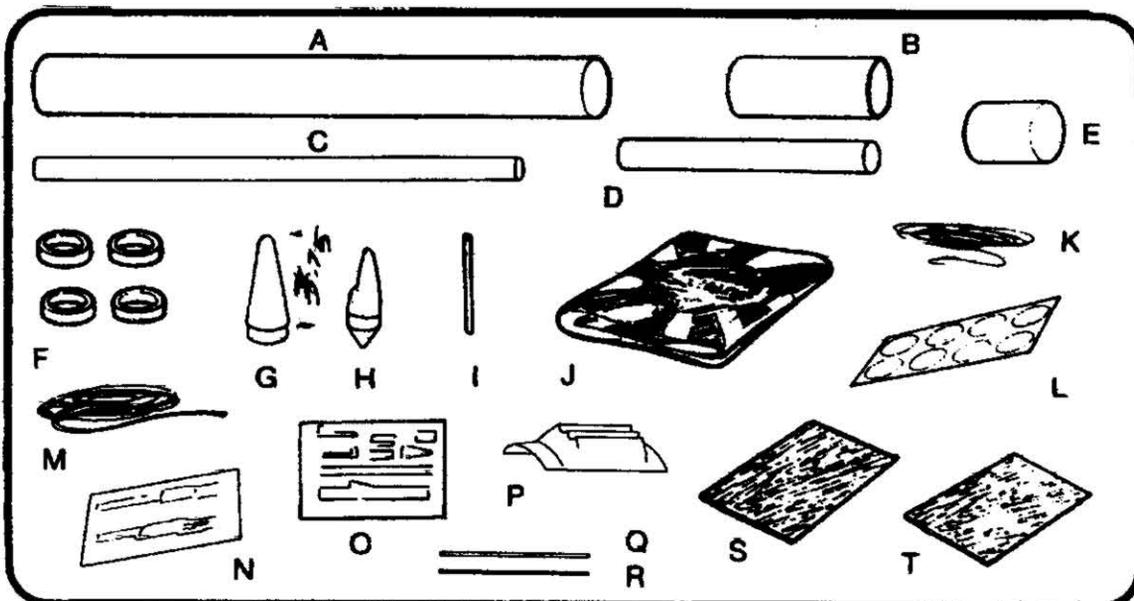
- modelling knife
- white glue
- contact cement
- fine sandpaper
- butyrate dope
- cornstarch or talc
- white spray paint
- scissors
- ruler
- modelling clay

Additional items required to  
fly the Warlock are:

- Recovery Wadding
- Trans-A-Pad Launcher
- Countdown Controller
- Engines
- Masking Tape

## PARTS LIST

- |   |                                    |
|---|------------------------------------|
| A) 1 - PT-400 Body Tube (40.6 cm) $\approx 16"$     | L) 8 - Tape Disks                  |
| B) 1 - PT-400 Body Tube (10.2 cm) $\approx 4"$      | M) 1 - Shock Cord                  |
| C) 3 - PT-200 Body Tubes (35.2 cm) $13\frac{1}{2}"$ | N) 1 - Small Body Panel            |
| D) 4 - PT-100 Body Tubes (21.1 cm) $8\frac{3}{8}"$  | O) 2 - Large Body Panels           |
| E) 2 - CT-400 Coupler Tubes                         | P) 1 - Laser Turret Panel          |
| F) 4 - Centering Rings                              | Q) 1 - Plastic Tube (6 mm dia.)    |
| G) 1 - PN-400B Nose Cone                            | R) 1 - Plastic Tube (3 mm dia.)    |
| H) 1 - PN-200D Nose Cone                            | S) 4 - Large Balsa Sheets          |
| I) 1 - Launch Lug                                   | T) 1 - Small Balsa Sheet           |
| J) 1 - Parachute (45 cm)                            | U) 2 - Decal Sheets (Not Shown)    |
| K) 1 - Shroud Line                                  | V) 4 - Centering Disks (not shown) |



## CUTTING THE TUBES

**A** Cut out each of the Tube Cutting Patterns from the pattern sheet.

Wrap the PT-200 Cutting Pattern around the end of one of the PT-200 tubes, and place a piece of tape on the pattern where the ends meet to hold it in place. Using the pattern as a guide, mark the tube to cut the end at an angle (Fig. 1)

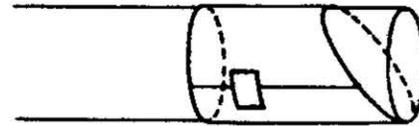


Fig. 1

**B** Using a modeling knife or single edge razor blade, cut the tube along the mark made with the pattern above. Once cut, the end of the tube should have an angled, flat profile, when viewed from the side (Fig. 2) Any unevenness may be smoothed out by laying a sheet of fine sandpaper on a table, and sanding the edge flat. This first tube is the Body for the Warlock Strike Vehicle.



Fig. 2

**C** Many of the other tubes must be cut to various lengths; some of them with one or both ends cut at an angle. Each tube which must be cut is diagramed in Fig. 3. Care must be taken to properly orient the angles of the cuts in tubes. On some of the tubes, the two cuts are parallel, on others they face opposite directions.

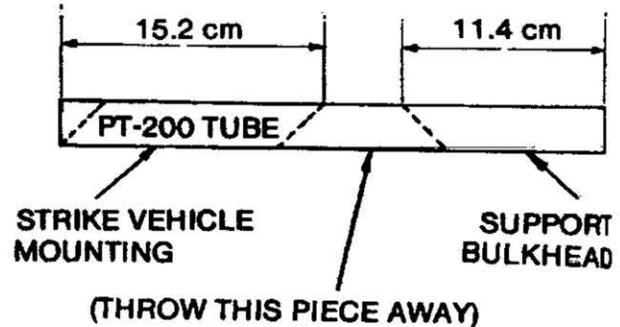


Fig. 3a

One of the tubes must be cut without an angle on either end. Use the "straight" end of the Cutting Pattern to mark this tube.

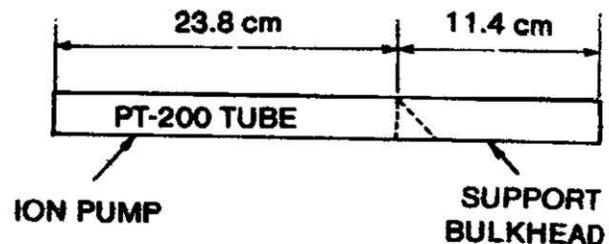


Fig. 3b

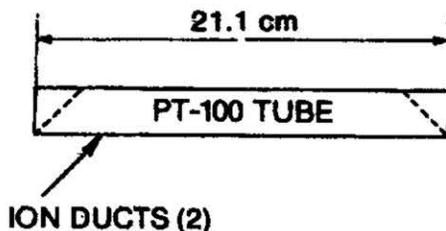


Fig. 3c

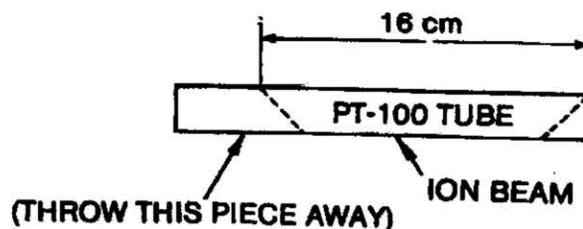


Fig. 3d

## CONSTRUCTING CRUISER ION ASSEMBLY

**A** Glue a centering disk to each end, of each of the coupler tubes, using white glue (see Fig. 4). Allow to dry.

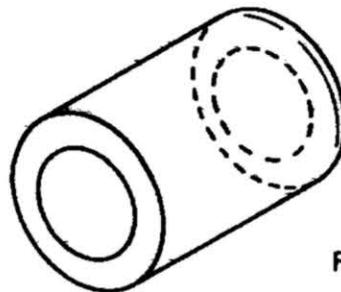


Fig. 4

**B** Slide the coupler tube assemblies onto opposite ends of the Ion Pump Tube (compare with Fig. 3b), and center them on the tube, 12 cm apart. Apply a coat of glue as shown in Fig. 5, to make a strong joint between the tube, and each of the centering rings.

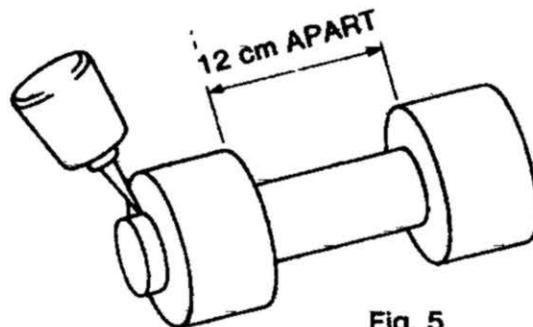


Fig. 5

**C** Trim the large body panels to size (as shown Fig. 6), using a ruler to mark the panels, and scissors to cut them.

**D** Spread a thin coat of contact cement on the areas shown on the Ion Pump assembly in Fig. 7.

**E** Spread contact cement all around the perimeter of the bottom side of one of the Large Body Panels. Wait 10 minutes, then wrap the Panel around the Ion Pump Tube, starting one edge of the Panel on the middle of the "strip" of cement on the tube (Fig. 8). Pull the panel tightly around the tube, and press the remaining edge of the panel firmly into (the other half of) the "strip" of cement.

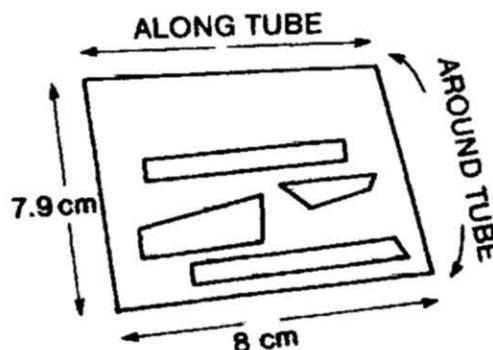


Fig. 6

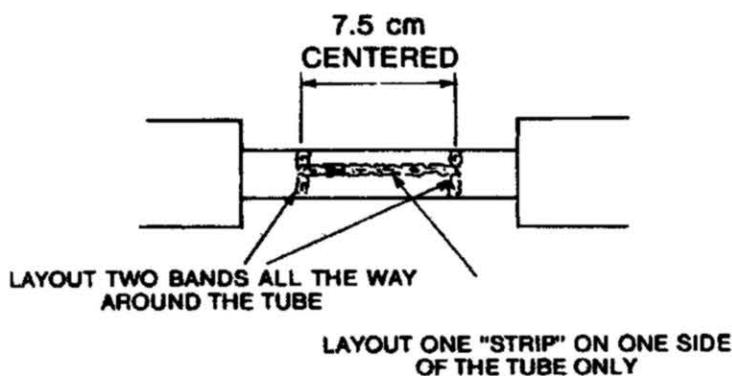


Fig. 7

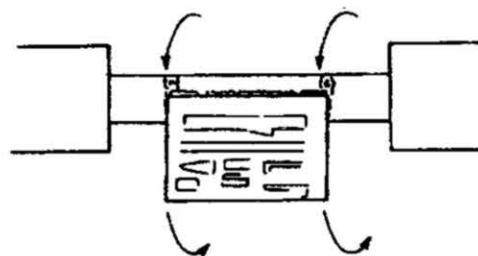


Fig. 8

F Let the cement set for at least 1 hour, then mask both of the coupler tubes with plastic bags or paper then spray paint white the exposed sections of Ion Pump Tube and the Body Panel.

When spray painting, hold the can 20 to 30 cm from the model, and spray in even strokes. Paint should always be applied in thin coats to speed drying, and to prevent unsightly "sags". Apply at least two coats, allowing 30 minutes between coats, for the paint to set.

Allow paint to dry at least 3 hr. before handling.

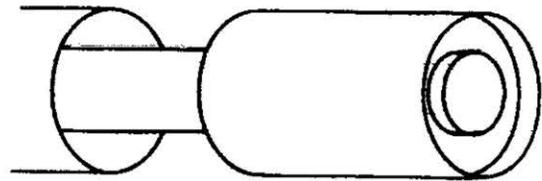


Fig. 9

### CONSTRUCTING THE CRUISER BODY

A Spread white glue in a wide band, between 4 and 8 cm inside one end of the shorter length of PT-400 tube. Push one end of the Ion Pump Assembly into the tube, sliding the Assembly through to the point where the Ion Pump Tube comes up flush with the opposite end of the PT-400 tube (Fig. 9).

B Spread a wide band of glue inside the longer length of PT-400 tube, between 3 & 7 cm inside the tube. Push the Ion Pump Assembly into the tube. The two sections of PT-400 tube should end up separated by a distance of 3.8 cm. Check to make sure that the tubes are properly aligned.

C Cut out the Fin Patterns from the pattern sheet, and trace the patterns onto the balsa sheets as directed in Fig. 10. Make sure that the balsa grain direction is as shown on the patterns.

D Cut out the Cruiser Vehicle Placement Guide from the pattern sheet.

Wrap the Guide around the smaller PT-400 body tube, and tape the ends of the Guide together. Place a mark on the tube, at each position indicated by an arrow on the Guide. Note which positions are for the wings and rudder.

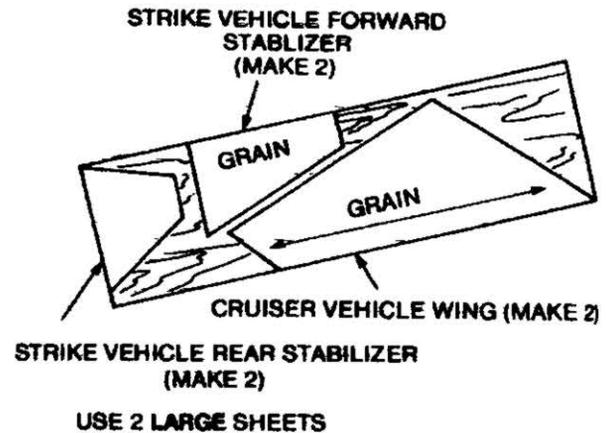


Fig. 10a

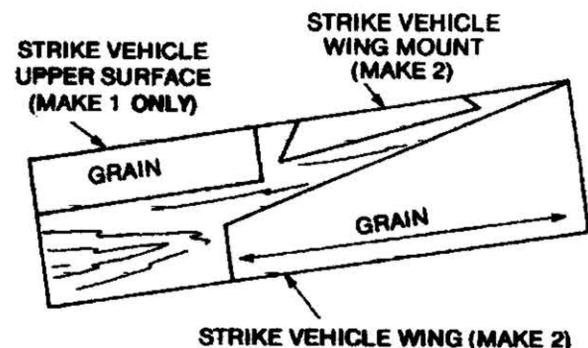


Fig. 10b

CRUISER VEHICLE RUDDER  
(MAKE 1 ONLY)

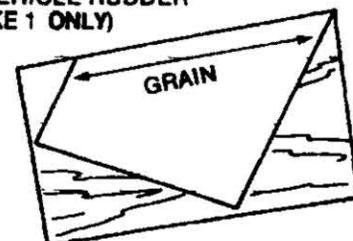


Fig. 10c

USE THE SMALL SHEET

E Place a line of glue along the root edge of a wing (Fig. 11). Stick the wing to the tube along one of the sets of alignment marks. Make sure that the wing is pointing forward as in Fig. 12. Be sure that the wing is sitting at 90° to the tube when viewed from the end (Fig. 13).

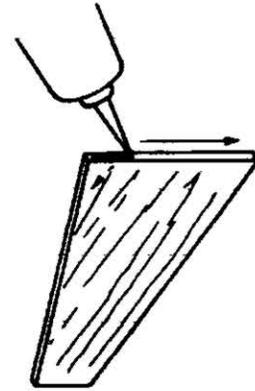


Fig. 11

F Repeat the procedure to glue on the other wing and the rudder. Make sure both are pointing forward, and are evenly spaced around the tube.

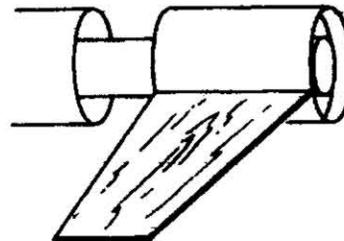


Fig. 12

G Once the joints have dried, lay a thin line of (white) glue along each side of each joint to form a "fillet". Smooth out the line of glue neatly with the tip of your finger.

H Mark each of the Ion Duct Tubes (compare with Fig. 3c) a distance of 3 cm & 9.5 cm respectively, from each end of the tubes, along their shortest sides (Fig. 14). Spread glue along the alignment marks as shown in Fig. 14, and apply the Ion Duct Tubes to the rear of the Cruiser body as shown in Fig. 15.

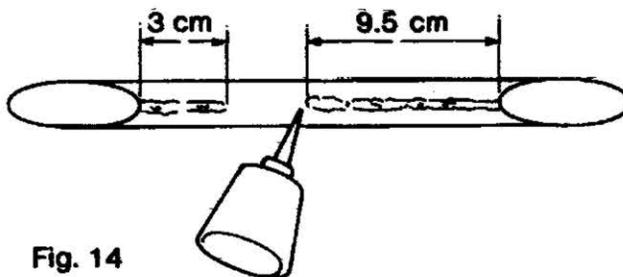


Fig. 14

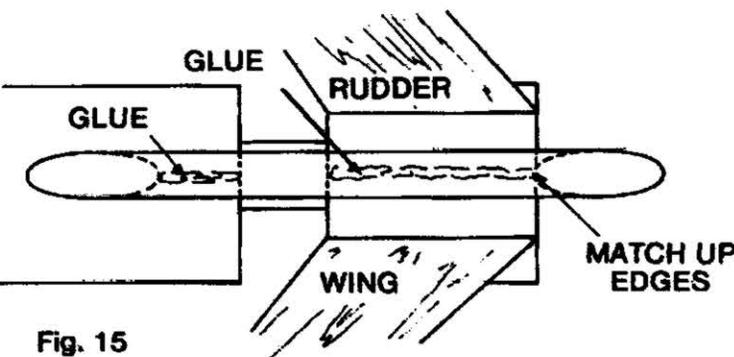


Fig. 15

I Glue the two Support Bulkhead Tubes together as shown in Fig. 16.

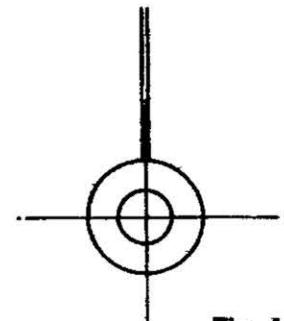


Fig. 13

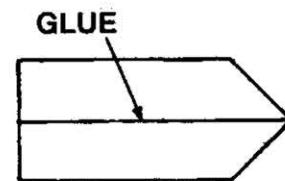


Fig. 16

- J Lay a line of glue on each of the Support Bulkhead Tubes, as shown in Fig. 17, and set the Strike Vehicle Mounting Tube in place as shown in Fig. 18, allow the assembly to dry.

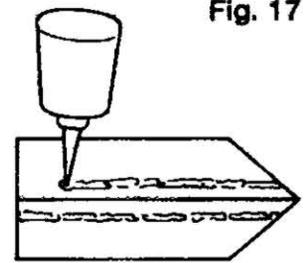


Fig. 17

- K Glue the launch lug to the shorter length of PT-400 tube along the remaining set of alignment marks.

- L Place a mark on the Cruiser Body, 3.5 cm from its top end (the end furthest from the Ion Pump Assembly). The mark should be on the same side of the tube that the launch lug is on.

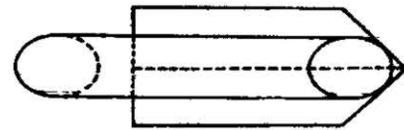


Fig. 18

- M Turn over the Support Structure (Strike Vehicle Mounting Assembly) and apply glue to the underside of the Support Bulkhead Tubes, (as was done in Fig. 17).

Set the Cruiser Vehicle Assembly on a table, so that the Rudder hangs down, over the edge of the Table.

Set the structure on the Cruiser Body, just aft of the mark made above (Fig. 19). Align the Structure, so that the void between the Cruiser Body, and the two Support Tubes is directly in line with the launch lug. Make sure that there is no glue obstructing this void, since the launch rod will run through both the launch lug and the void.

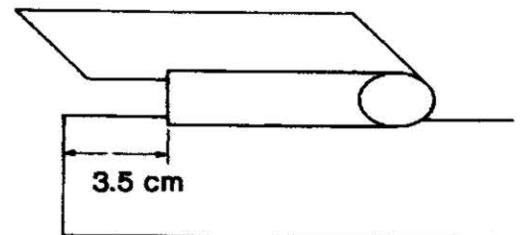


Fig. 19

- N Lightly sand the shoulder of the PN-400B nose cone with fine sandpaper. Spread (white) glue inside the top end of the Cruiser Body, and push the nosecone into place. By sanding the nosecone shoulder before glueing it in place, you will make sure that the glue joint will be permanent.

- O Lay a line of (white) glue along the "tip" edge of the Cruiser Vehicle Rudder. Stick the Ion Cannon Tube to the Rudder Tip, as Shown in Fig. 20.

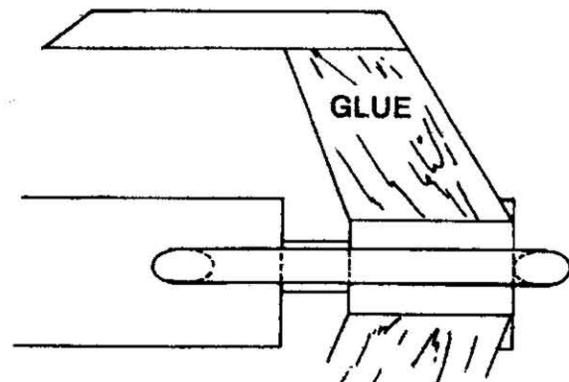


Fig. 20

## CONSTRUCTING THE STRIKE VEHICLE

- A** Take the two Strike Vehicle Forward Stabilizers and round the leading and trailing edges of each of them, using fine sandpaper.

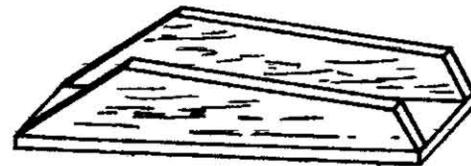
Lay a line of (white) glue along the root edge of one of the Stabilizers. Stick the two Stabilizers together, root edge-to-root edge. Stack up the 4 centering rings and use them to prop up the tip of one of the Stabilizers, while they dry. (Fig. 21)



Fig. 21

- B** Glue the two Strike Vehicle Wing Mounts to the Strike Vehicle Upper Surface, as shown in Fig. 22.

Fig. 22



- C** Cut out the Strike Vehicle Placement Guide, and wrap it around the cut end of the Strike Vehicle Main Body Tube. Tape the ends together and align the curved edge of the Guide with the angled cut on the end of the tube. Mark out the positions for the Rear Stabilizers.

- D** Glue the Strike Vehicle Body Tube to the Wing Mount Assembly, as shown in Fig. 23.



Fig. 23

- E** Round the leading and trailing edges of the two Strike Vehicle Wings, with fine sandpaper.

Stack up two centering rings, and use them to prop up the front end of the Strike Vehicle Body. Prop up the opposite end of the Strike Vehicle to a height of 5 cm.

- F** Spread (white) glue along the root edge of one of the Wings, and stick it to the Body (it should rest on the Wing Mount Assembly) as shown in Fig. 24. Repeat for the other Wing. Allow to dry.

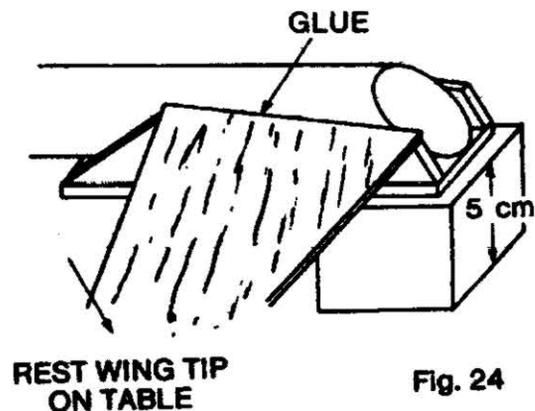


Fig. 24

**G** Without moving the Strike Vehicle, mark the Body 2.5 cm from its front. Spread glue in the center of the "V" of the Forward Stabilizer Assembly. Place the Stabilizer Assembly on the Main Body, just aft of the mark made above (Fig. 25). Sight along the tube to make sure that the Stabilizer Assembly is level and properly aligned. Allow to dry.

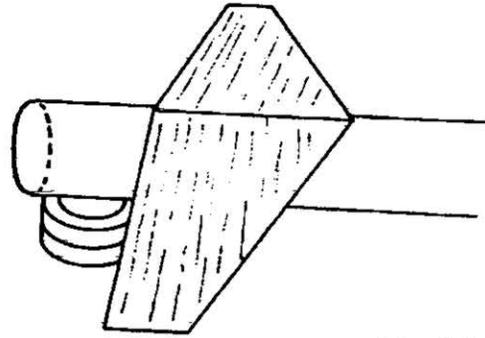


Fig. 25

**H** Glue the two Strike Vehicle Rear Stabilizers in place, along the alignment marks made earlier (see Fig. 26). The tips of the Rear Stabilizers should have a spread of about 6.5 cm.

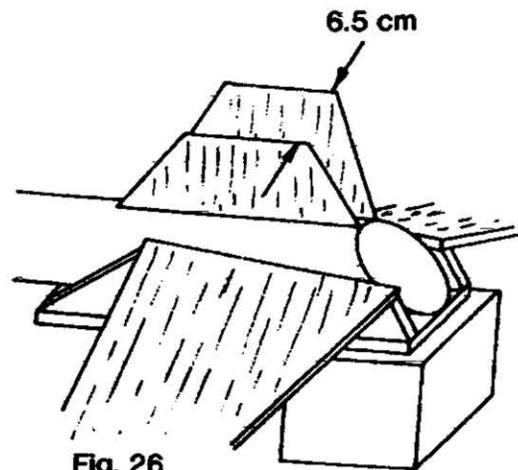


Fig. 26

**I** Once all of the Wing/Stabilizer joints have dried, apply a "fillet" to both sides of each joint to strength it.

**J** Lightly sand the shoulder of the PN-200D nosecone, spread a band of glue, just inside the front edge of the Strike Vehicle Body, and insert the nose cone into place. Make sure that the "Cockpit" side of the nose cone is facing upwards on the Strike Vehicle.

### CONSTRUCTING THE POWER MOUNTING

**A** Test fit the centering rings on the remaining uncut PT-100 tube. If they will not slide on easily, then peel a layer of paper from the inside of any of the rings which fit too tightly.

**B** Smear glue in a band around the outside of the tube, 5 cm from one end, and slide a centering ring onto the tube and onto the glue.

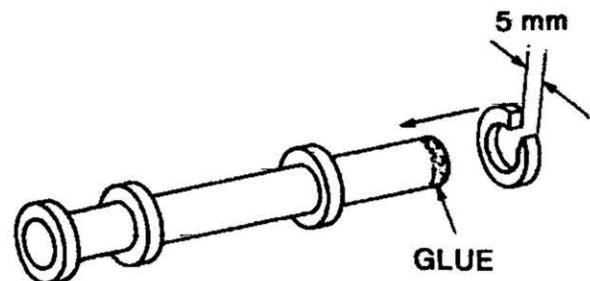


Fig. 27

Smear another band of glue 5 cm from the other end of the tube, and mount a second centering ring on the tube.

Mount the third centering ring flush with one end of the tube.

Cut a 5 mm wide section from the last centering ring (Fig. 27). Mount this ring flush with the other end of the tube.

C Tie one end of the shock cord very tightly around the tube as shown in Fig. 28 . Spread a line of glue along the body tube/centering ring joint, to permanently fix the "loop" in the shock cord in place.

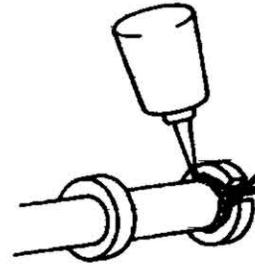


Fig. 28

D Spread a thick band of glue inside the Cruiser Strike Vehicle Mounting Tube, a distance of 6 to 7 cm from the (very) front of the tube. Stick the above assembly into the tube from the front (leave the end with the shock cord on it hanging out) and push the assembly in until the second centering ring "just" disappears inside. (Fig. 29)

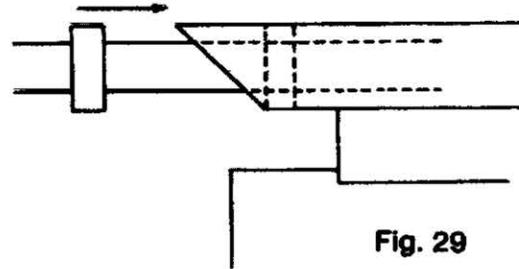


Fig. 29

E Construct the parachute as instructed on the parachute pattern. Tie the knotted end of the parachute shoud-lines to the free end of the shock cord.

#### FINISHING THE Balsa PARTS

Raw balsa is unsightly, coarse and grainy if painted before the grain is "filled" and the surface is "sealed". Model rockets look professional if the time is taken to finish the balsa. The Canaroc Guide to Space Modelling contains tips on finishing and may be consulted for assistance.

A Butyrate dope is used in the most common method of finishing balsa. You will find it at most hobby outlets. To assist in filling the balsa grain, cornstarch, talc, or baby powder may be rubbed onto the balsa and worked into the grain. Brush a thick coat of dope onto each balsa part. Be sure to do both sides of each fin at once to avoid warping.

B After the dope has dried completely, lightly sand the balsa surfaces with fine sandpaper. The sanding operation removes the excess thickness of dope and speeds up the process of filling the grain.

C After repeating the doping/sanding operation three or four times, the balsa grain should be filled and the surfaces smooth. The last sanding operation should be done with extra fine sandpaper.



TWIST KNIFE GENTLY

Fig. 30

#### CONSTRUCTING THE LASER CANNONS

A Using a razor knife, or razor saw, cut out six "7 cm" lengths of the 6 mm plastic tube. Then cut out an additional six "3.5 cm" lengths of the 3 mm plastic tube.

B Remove any roughness from the ends of the plastic tubes, by sanding lightly with fine sandpaper.

C Using a pointed razor knife, lightly scrape the inside edge of one end of each 6 mm plastic tube (Fig. 30).

D "Force" a 3 mm tube into the "scraped" end of each 6 m tube. Approximately 2.5 cm of the 3 mm tube should remain protruding from the 6 mm tube (Fig. 31). Make sure that the 3 mm tube is properly aligned in the larger tube.

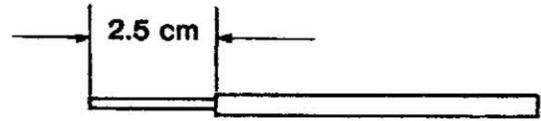
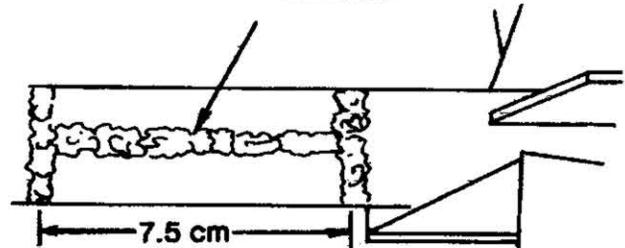


Fig. 31

**ATTACHING THE REMAINING BODY PANELS, AND THE LASER TURRET**

A Spread a pattern of contact cement on the Strike Vehicle Body, as shown in Fig. 32. Spread contact cement around the perimeter of the bottom side of the remaining Large Body Panel. Let the cement dry for 10 minutes then apply the Panel the same way you applied the Panel to the Ion Pump Assembly. The Panel should butt up against the "Upper Surface" on the Strike Vehicle.

**LAYOUT ONE STRIP OF CEMENT ON UNDER SIDE OF STRIKE VEHICLE**



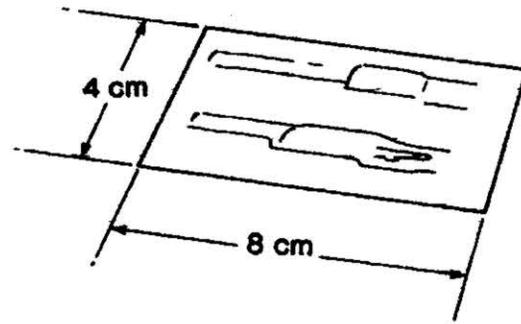
**LAYOUT TWO BANDS OF CEMENT, 7.5 cm APART**

B Trim the Smaller Body Panel, as shown in Fig. 33.

C Apply contact cement to the Cruiser Vehicle, in the pattern shown in Fig. 34. Again, apply contact cement to the underside of the Panel, wait 10 minutes, and press into place. The panel should sit at the very rear edge of the Cruiser Vehicle Main Body, centred between the two Ion Tubes.

Fig. 32

D Trim the Cruiser Vehicle Laser Turret as shown in Fig. 35.



E Cement the turret in place on the top of the Cruiser Vehicle, a distance of 1.5 cm back from the nose cone/body tube seam.

Fig. 33

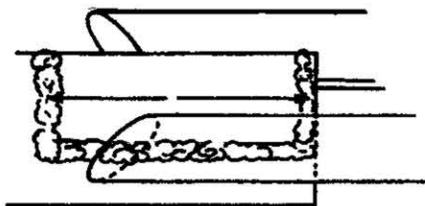


Fig. 34

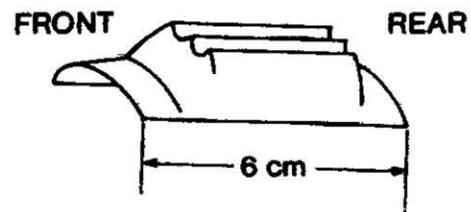


Fig. 35

## ATTACHING THE LASER CANNONS

**A** Using contact cement, glue two Laser Cannons in place on the Cruiser Vehicle Laser Turret (Fig. 36).

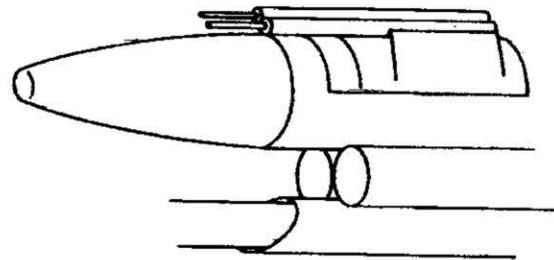


Fig. 36

**B** Cement two Laser Cannons to the Upper Surface on the Strike Vehicle. Use the dimensions illustrated in Fig. 37 to guide you in placing the Cannons.

**C** The remaining two Cannons go on the underside of the Strike Vehicle's Wings. Again, refer to the drawing for guidance in properly placing the Cannons (Fig. 38).

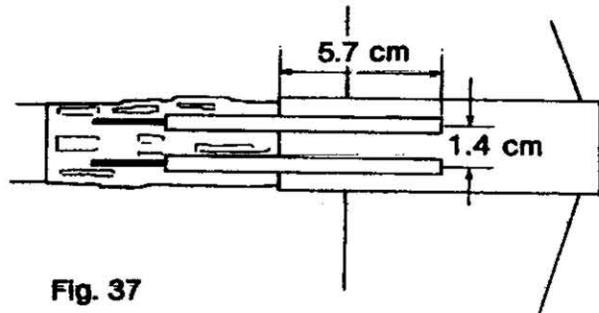


Fig. 37

## PAINTING

Give the entire model two coats of white paint. While spraying, it is best separate the two vehicles, and paint them apart.

## APPLY THE DECALS

Use the box front as a guide in applying the decals to your model. All decals are "repeated" on both sides of the model (except for the Warlock insignia and the serial number).

To apply decals, follow instructions on back of decal sheet.

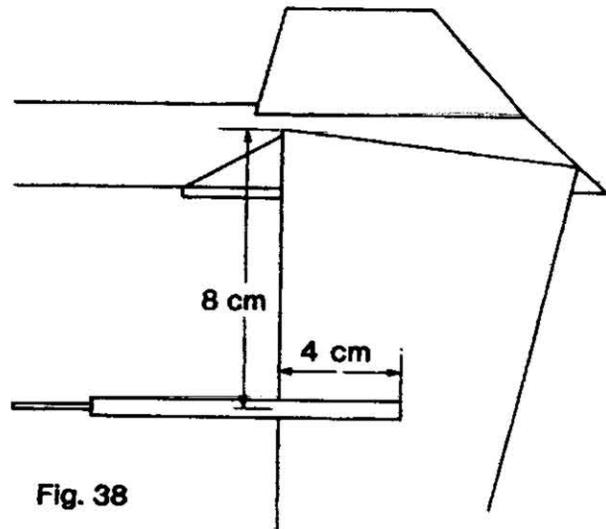


Fig. 38

## TRIMMING THE STRIKE VEHICLE FOR GLIDING FLIGHT

The single, most important factor in achieving good flight performance from the Strike Vehicle is the Vehicle's "trim". "Trimming" a glider refers to adjusting its balance to give the best glide characteristics.

Hold the Strike Vehicle just in front of the wings, between thumb and fore-finger. (Fig. 39)

Gently toss the Strike Vehicle from shoulder height and release it pointed slightly upward, and to the side. The glider will most likely dive, (Fig. 40) as is the characteristic of the Canard configuration.

This means that the balance point is too far forward. The problem is corrected by adding weight to the tail end of the Strike Vehicle. Neatly apply an amount of modelling clay to the underside of the glider, between the two rear stabilizers.

Continue hand throwing, and adding tail weight, until the glide is just barely below the point of "stalling" (Fig. 41). This trim point will result in the best flight characteristics.

The other problem which can occur is a "stall" (Fig. 41). Where the balance point is too far back. This is corrected by neatly adding a small amount of modelling clay to the underside of the Strike Vehicle, just in front of the Front Stabilizers.

When hand throwing do not throw the glider hard. This will cause a "speed stall", and will not give a true indication of the glider's trim condition. A glider's natural speed is slow, and it must be thrown at that speed to act as it would in free flight.

## FLYING THE STARCRUISER WARLOCK

**A** Prepare the Cruiser Vehicle as you would prepare a normal rocket.

Push a 2 to 3 cm thickness of Heat Wadding down into the Power Mounting Tube. The Heat Wadding will protect the parachute from melting due to the hot gasses of the engine's ejection charge.

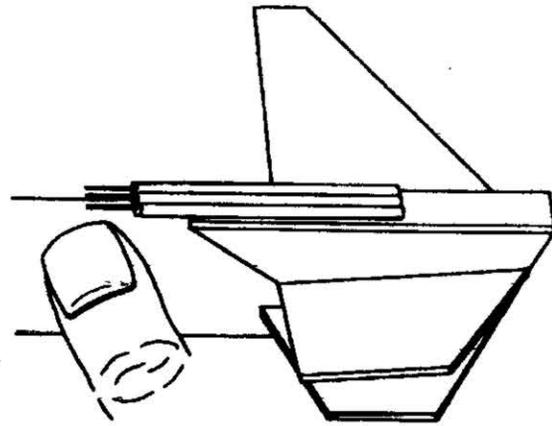
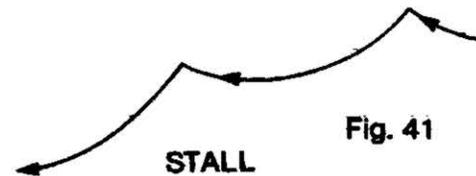


Fig. 39



DIVE

Fig. 40



STALL

Fig. 41

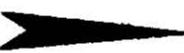
**B** Fold the parachute in the following manner.

- hold the tip of the parachute with one hand and the shroud lines with the other.
- gather together all of the free corners so that the parachute forms a triangle.
- fold over the corners.
- fold over the parachute into thirds.
- wrap the shroud lines around the bundle.

**C** Slide the folded parachute into the rear of the Strike Vehicle, and stuff the shock cord neatly in behind it. Slide the Strike Vehicle into place on the Power Mounting.

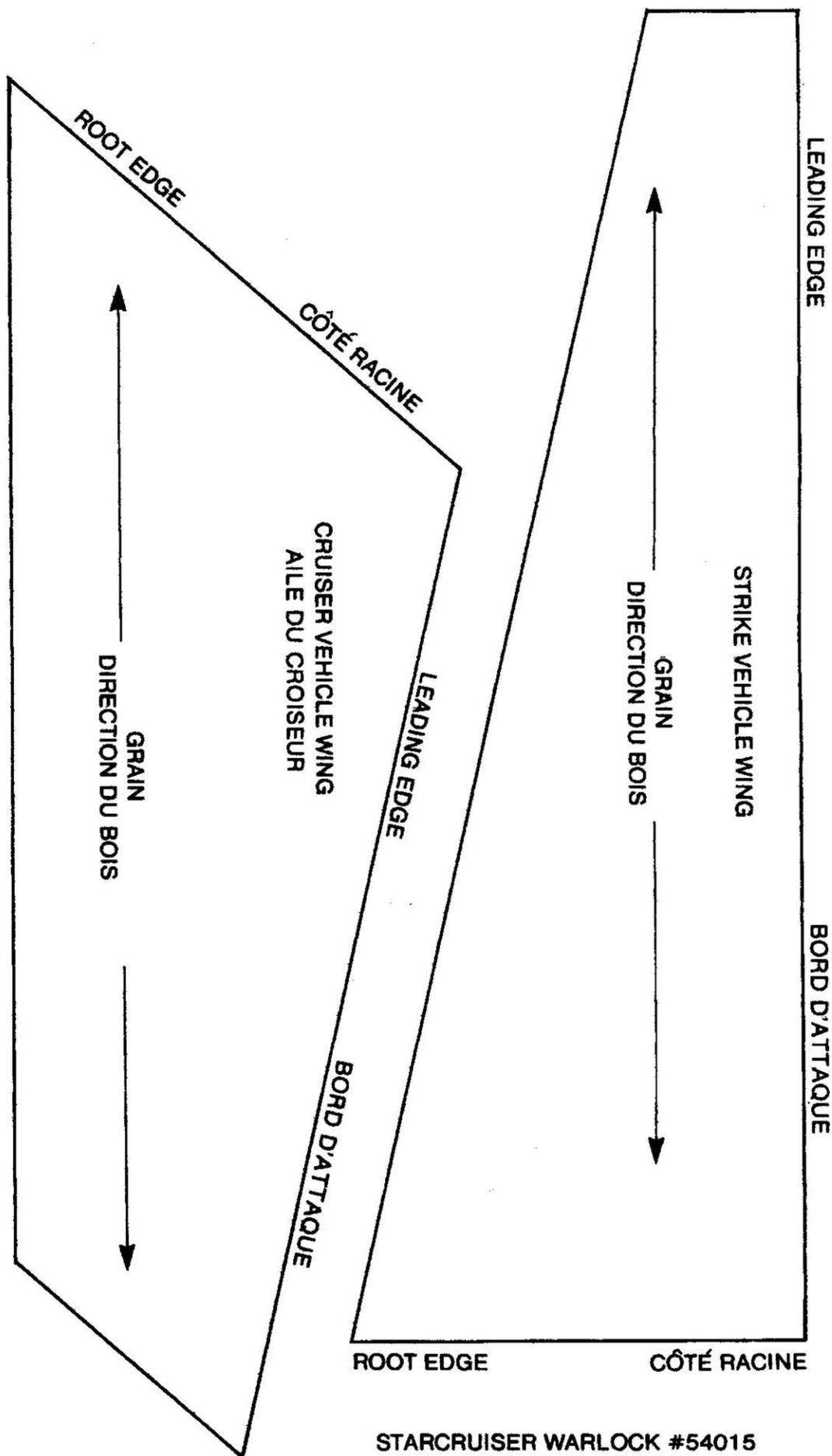
- D** Slip the Starcruiser onto the launch rod of your launcher. The launch rod should go through the launch lug, and the space between the two Support Tubes.
- E** Install an igniter into the engine, according to the instructions which come with it. Wrap masking tape around the engine to obtain a tight friction-fit in the rear of the Power Mounting. The engine must be tight enough that it won't kick out of the rocket at ejection.
- F** Attach the micro clips from your launch controller to the engine's igniter. The micro clips must hang from the engine in such a way, that they will not catch on the Cruiser Vehicle's Wings.
- G** Insert the safety key into your launch controller, give a 5 second count-down, and press the button to launch your model.

For further tips see Canaroc's **GUIDE TO SPACEMODELLING.**

**CANAROC** 

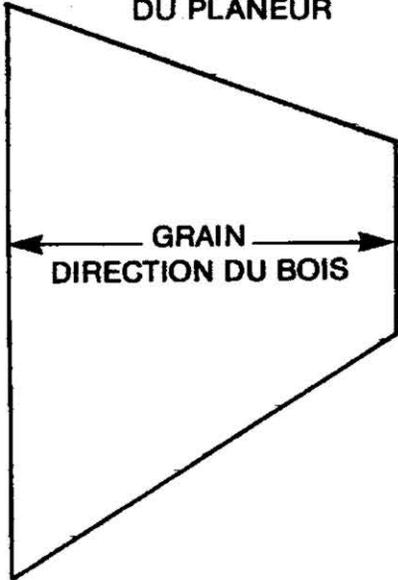


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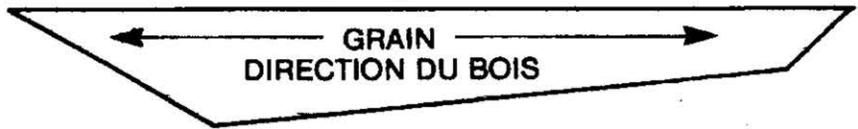


STARCRUISER WARLOCK #54015  
 PATTERN SHEET #2  
 CROISEUR ASTRAL WARLOCK  
 FEUILLE-MODÈLE NO.2

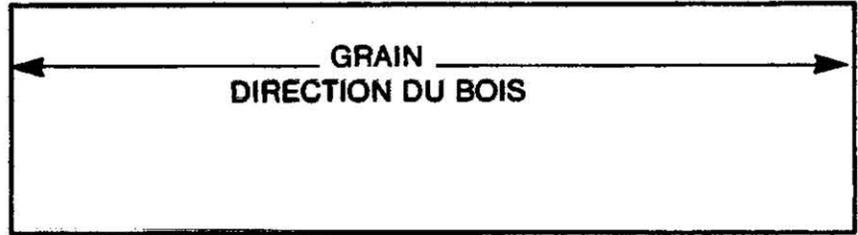
STRIKE VEHICLE  
RUDDER  
GOUVERNAIL  
DU PLANEUR



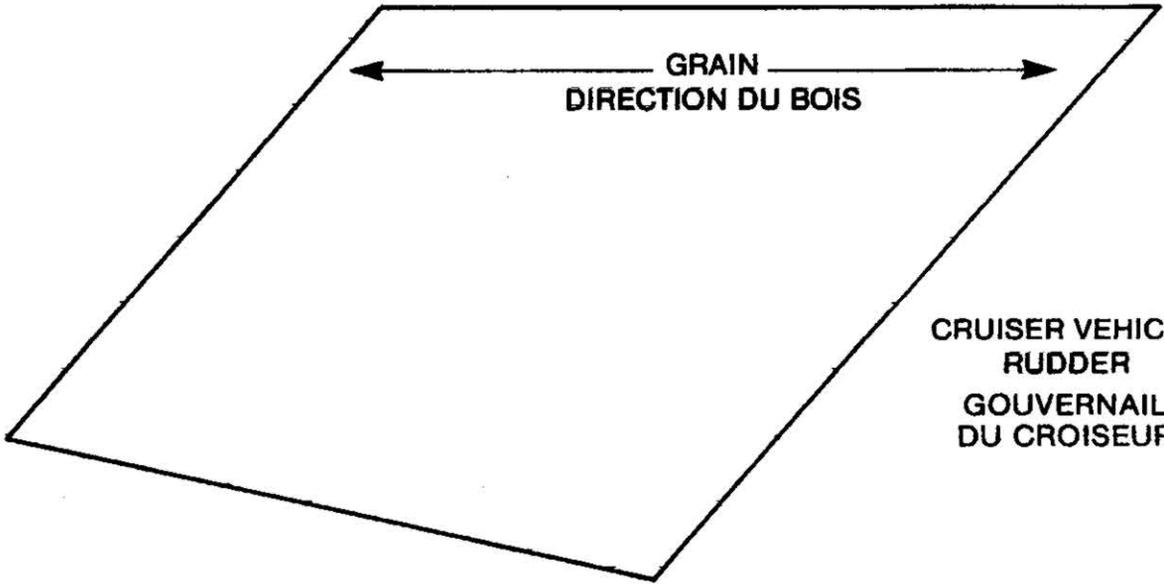
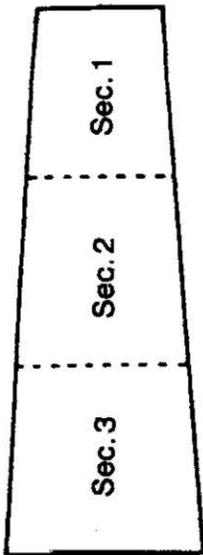
STRIKE VEHICLE WING MOUNT/ MONTAGE D'AILE DU PLANEUR



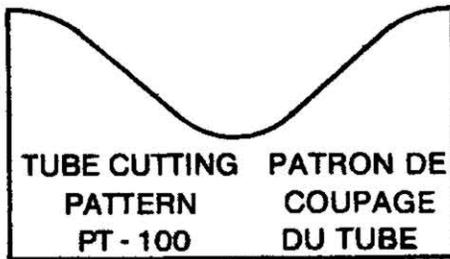
STRIKE VEHICLE UPPER SURFACE  
SURFACE SUPÉRIEURE DU PLANEUR



SHOCK CORD  
MOUNT  
CORDON  
AMORTISSEUR

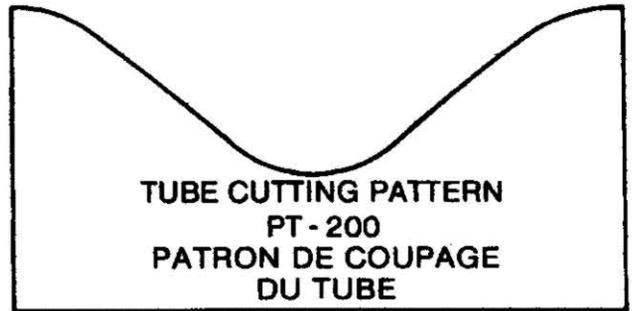


CRUISER VEHICLE  
RUDDER  
GOUVERNAIL  
DU CROISEUR



TUBE CUTTING PATTERNS  
PT - 100

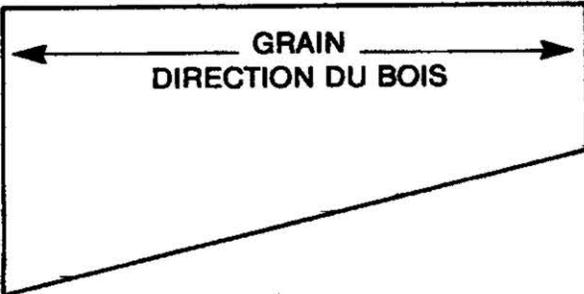
PATRON DE COUPAGE  
DU TUBE



TUBE CUTTING PATTERNS  
PT - 200

PATRON DE COUPAGE  
DU TUBE

STRIKE VEHICLE FORWARD STABILIZER  
STABILISATEUR AVANT DU PLANEUR



STARCRUISER WARLOCK #54015  
PATTERN SHEET #1  
CROISEUR ASTRAL WARLOCK  
FEUILLE-MODÈLE NO.1

