



CogAero

Cognis Aerospace



D12-3, C5-3
with adapter

A True Spacecraft!

The LLV 201 represents the next generation of lunar transport. Designed to operate only in the vacuum of space and the lunar environment it needs no streamlining or unnecessary smooth skin. The cargo pods are exposed and only the pressurized crew quarters are closed. An emergency escape vehicle nestles in the nose of the craft.

The LLV 201 will confound your friends when you fly it. It appears to break all the rules of atmospheric rocketry, but will give a firm, straight launch and recovery.

Manufactured and distributed in the US by

**LawnDart
Rocketry**

www.lawndartrocketry.com

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The kit should contain:

- 1 body tube $9\frac{3}{8}" - BT-50$
- 1 balsa nosecone
- 1 parachute
- Balsa stock for landing pads $\frac{1}{4}" \times 3" \times 12"$
- 6 cargo pods $4\frac{1}{4}" - BT-50$
- 25 stringers $\frac{1}{16}" \times \frac{1}{4}" \times 6"$
- 1 eyelet
- 1 kevlar shock cord
- 1 foam crew quarters $5" \phi$

No Decals are included

Construction

Begin constructing LLV201 by checking that all parts are present in the kit.

Assemble the kit in stages:

- Landing legs
- Main body
- Cargo Pods
- Final assembly

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Landing Legs

- ❑ 1. locate the sheet with the full sized leg template on it. Cover it with waxed paper or cling wrap plastic.
- ❑ 2. Lay two spruce stringers in place. Cut them to fit. Hold them in place with pins if necessary.
- ❑ 3. Lay the remaining balsa stringers and gusset in place and glue the assembly together. Make sure you place the spruce stringers correctly. These take the main landing loads.

Leave to dry.

- ❑ 4. Place another layer of waxed paper or cling wrap onto the completed leg and build the second leg on top of it.

Repeat for the third leg.

- ❑ 5. Place each landing pad onto the guide circle at the back of the plan and mark it down the middle with a thin pencil line.

Make sure you place the pad correctly. The grain (lines in the balsa wood) should be at right angles to the line, for strength.

- ❑ 6. Glue each pad to a landing leg outer edge using the mark as a guide. (note the grain direction)

Main body

- ❑ 7. Apply white glue to about 1/3 of the body tube and slide the foam ball over it so it is flush with the end.

Recovery System

- ❑ 8. Cut out the shock cord mount from the last page of these instructions.
- ❑ 9. Place a liberal amount of white glue onto the shock cord mount and lay the end of the shock cord onto it. Fold twice as shown. Place aside until almost dry.

- ❑ 10. Examine the nose cone. The shock cord mount needs to be attached to the inside wall of the body tube 1 times the end length of the nose cone insert. This is to make sure it is clear of the nose cone.

- ❑ 11. When the shock cord mount is almost dry curve it to fit the tube and glue it into place. Press it against the wall with a pencil or finger.

- ❑ 12. Screw the eyelet into the base of the nosecone, unscrew it again, insert a dab of glue into the hole then screw the eyelet back in.

- ❑ 13. Attach the end of the shock cord securely to the eyelet.

- ❑ 14. Locate the parachute kit and assemble as per the separate instructions. NOTE: Your parachute may differ from the one shown.

- ❑ 15. Tie the parachute to the shock cord about 2cm back from the nosecone.

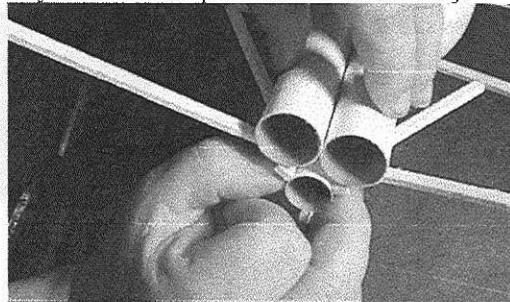
- ❑ 16. Mark a motor 10mm up from one end.

- ❑ 17. Place a ring of white glue inside the end of the body tube opposite end from the foam ball as far up as possible.

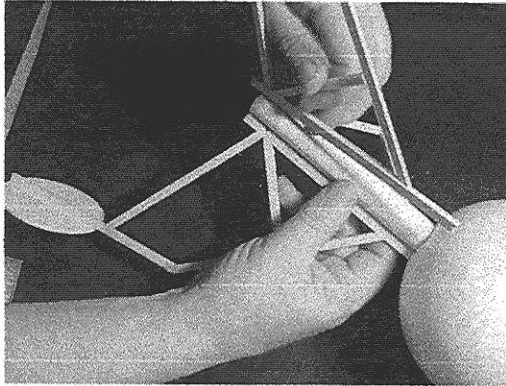
- ❑ 18. Place the engine block into the tube and push it up using the motor until the 10mm mark is reached. Take the motor out again immediately or it will stick!

Cargo Pods

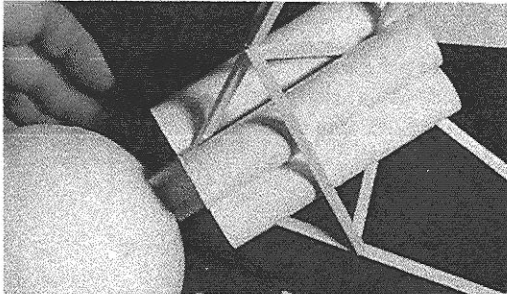
- ❑ 19. Glue cargo pods to each other in pairs, so you have three pairs. Leave aside to dry.



- ❑ 23. Glue the cargo level with the bottom end of the main body tube.

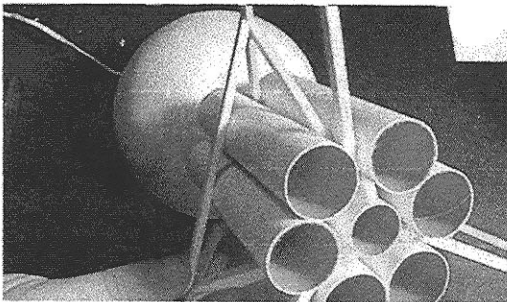


- ❑ 22. When the legs are completely dry glue the landing legs in between the pairs of body tubes.

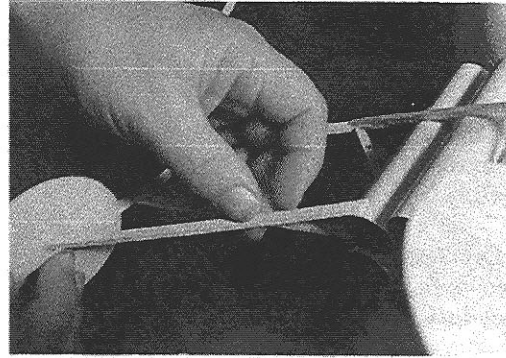


- ❑ 24. You will have to estimate and trial fit the cross strut in place at the level where it meets the cargo pods and the leg struts.

- ❑ 25. Bevel the ends to make a better fit.



- ❑ 26. Glue strut in place. Repeat for the other cross struts.



- ❑ 27. Glue the leg supports in place from the bottom of each cargo pod to the mid point of the landing pad.

- ❑ 28. Slide a launch rod up past one of the landing leg struts where it is glued onto the body tube. There will be some clearance up into the styrofoam ball. Rotate the rod and gently push through until it comes out the top of the model. Wriggle it a bit until there is clearance enough for the model to slide on the rod.

Heating the rod slightly over the stove makes this task easier.

Note the cutout in the nosecone. This is lined up with the rod when placing the model on the launcher.

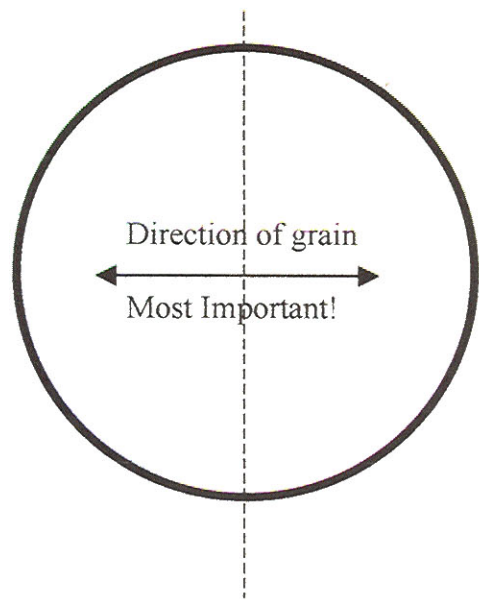
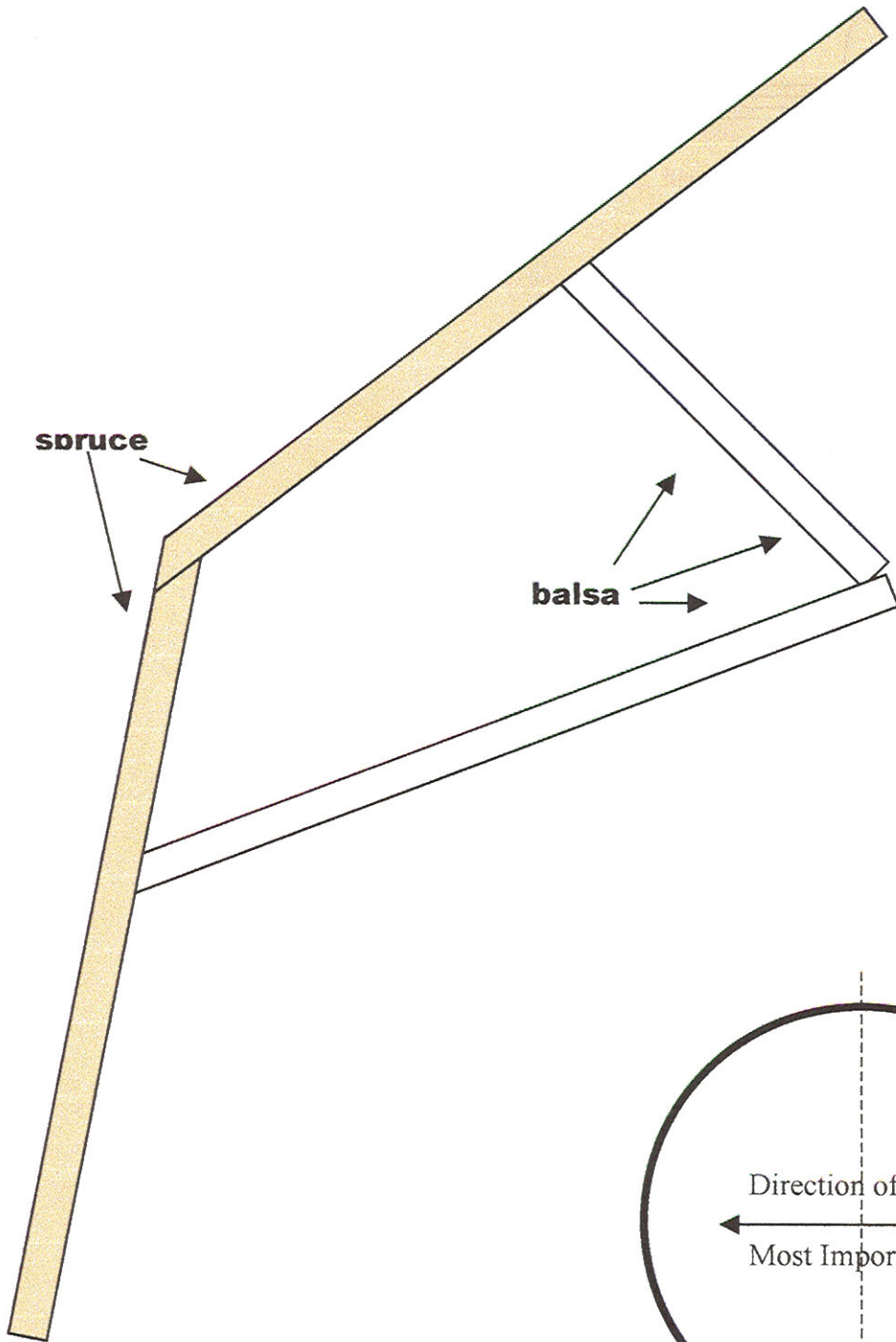
Flying

LLV 201 is a heavy model. It has high drag as well. Make your first flight on a D12-3 motor.

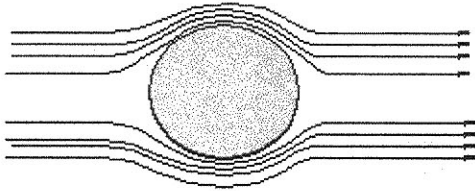
LLV 201 makes a slow, impressive take off.

It should fly straight up. If it doesn't, check the alignment of the legs/landing pads. These act as stabilizers for the model.

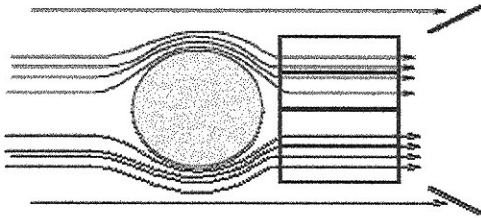
If there is still a problem, check that all the cargo pods are straight. These are the real 'fins' of the model



How It Works

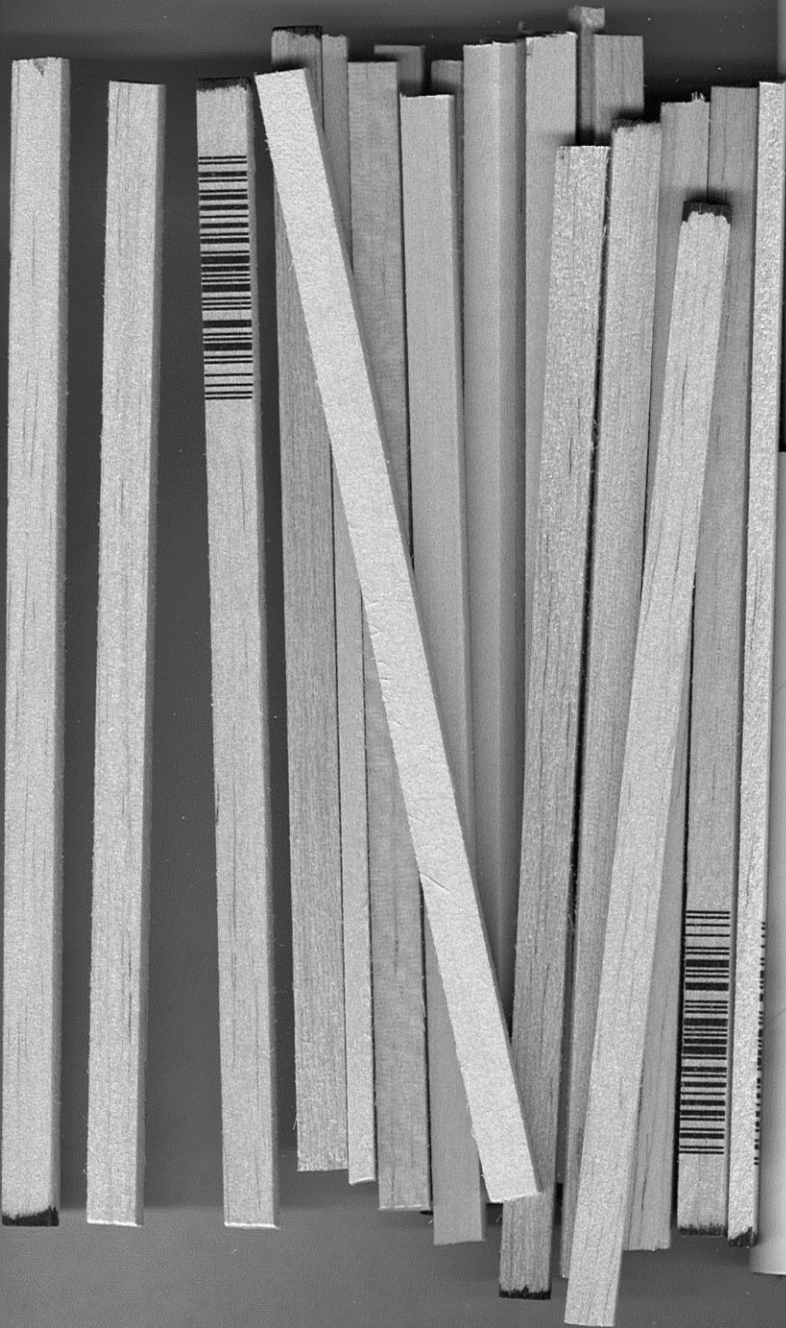
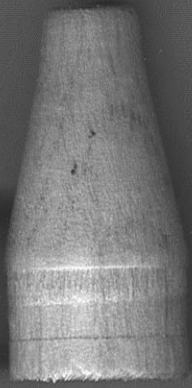
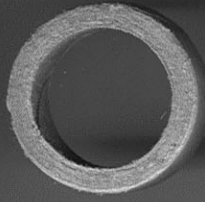


A sphere is a very aerodynamic shape. Air will naturally flow around it. It does not suffer from turbulent break-away until quite high velocities.

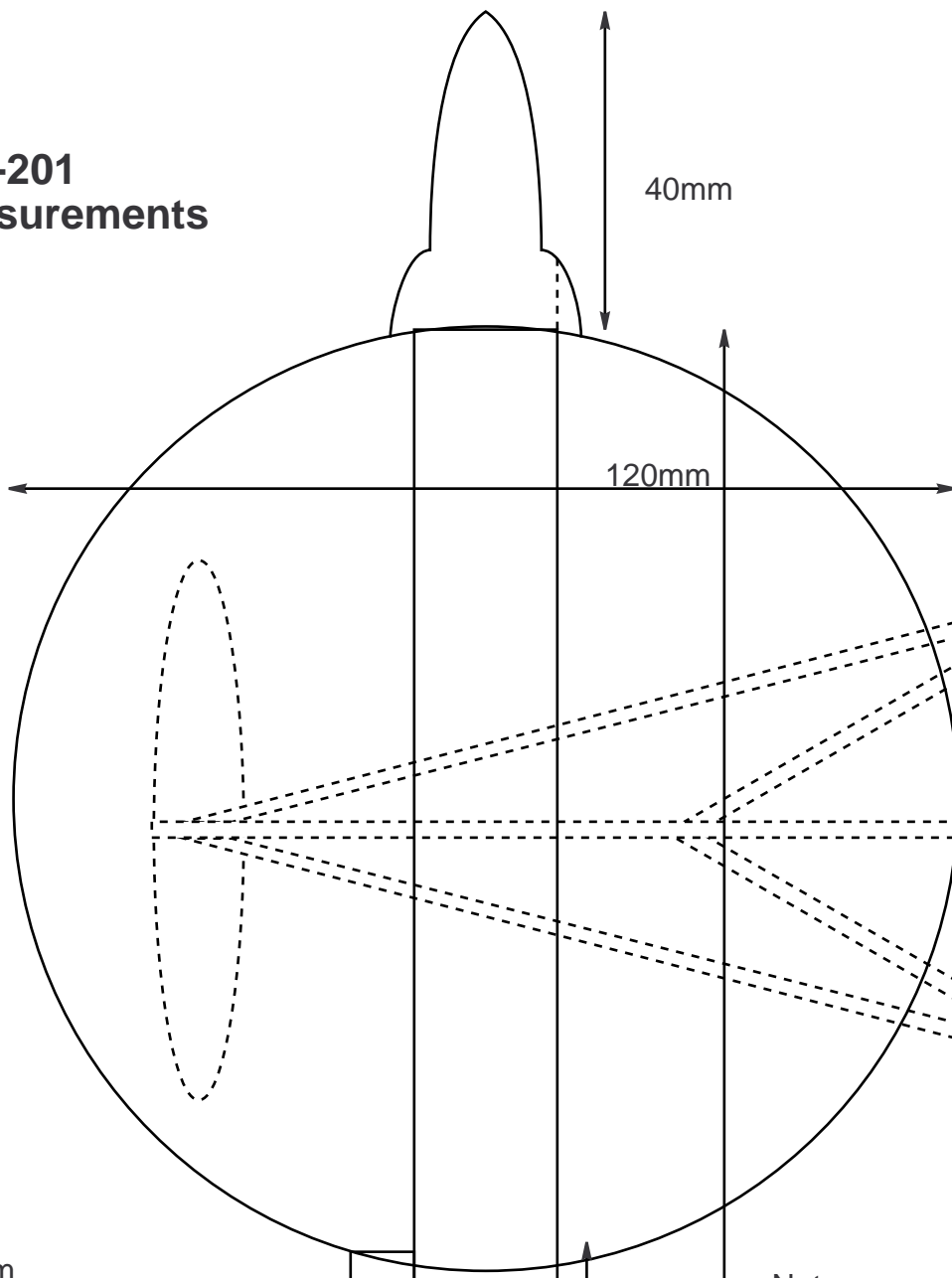
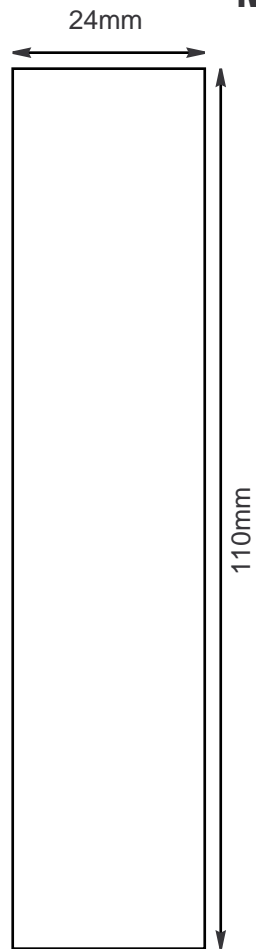


On the LLV 201 this air is then channelled down through the cargo pod cylinders, adding stability to the model.

Finally, the landing pads will correct the angle of attack of the model if it starts to pitch or yaw.

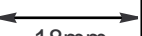


**LLV-201
Measurements**



All thicknesses 2.5mm

EXCEPT  3mm

 18mm

 250mm

 130mm

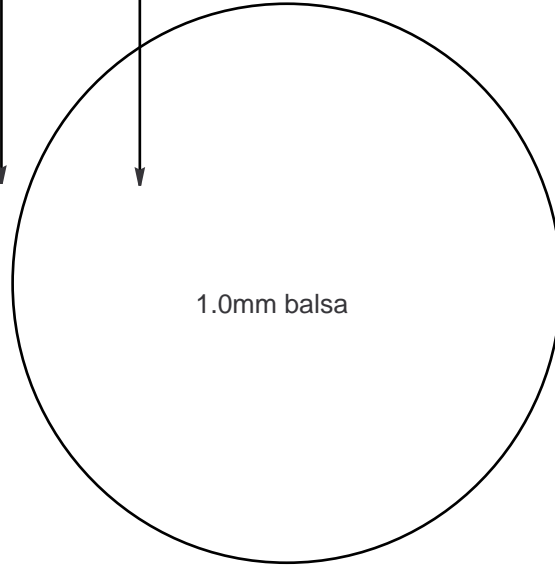
 5mm

balsa

Spruce

Notes:

1. Styrofoam ball is ex-craft shop, standard size.
2. Standard 19mm wood bit will make hole through ball a neat fit for standard Estes tube.
3. Cut all stringers to one length of 150mm, let builder cut to correct lengths.
6 spruce stringers
15 balsa stringers.
4. Refer to instructions 24-27 for clarification if necessary.
5. Nosecone shape is cosmetic. Note cutout for launch rod clearance.



1.0mm balsa

