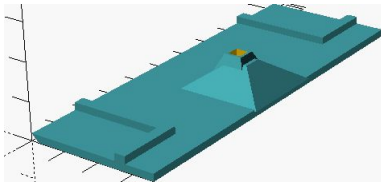
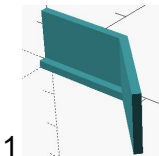
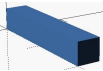
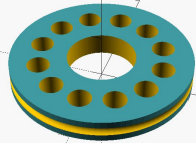
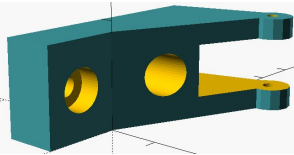



## Linear air track

This equipment is designed to perform experiments of kinematics, dynamics and mechanical energy conservation, minimizing the effect of friction.

### BOM

Count	Metals	
1	Rectangular aluminium tube 2 meters long	
1	MDF 30cm x 30cm (1" thick)	
1	Bearing (aprox 8 mm external diameter)	
1	M3 x 20 mm screw	
1	M3 hex nut	
	<b>3D printed parts</b>	
2	basecompleta (carro.scad)	
4	pestanía (carro.scad)	
2	vastago (carro.scad)	
1	polea (UgroovePulley.scad)	
1	soporte (soporte polea.scad)	
	<b>Tools</b>	

1	cup drill bit 30 mm (it depends on the blower outlet)	
1	Metal drill bit 1 - 1.5 mm	
1	blower machine	

## Building instructions

### Track

Cut a 10 cm piece of the rectangular aluminum tube that is going to be used to build the carts. On 2 adjacent faces of the aluminum tube draw two lines parallel to the edges all along the tube. The first line should be separated 1 cm from the edge and the second one 2 cm from the edge (Fig. 1)..

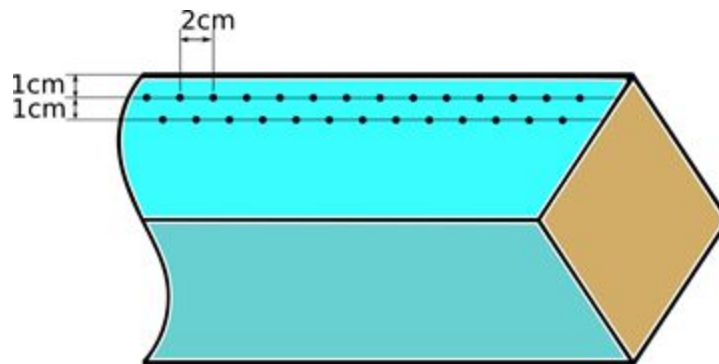


Fig 1. Tube drilling scheme

Perform the holes of 1 - 1.5 mm with the metal drill bit in a way that the holes are displaced 2 cm among them. In the second line make sure of displacing the holes 1 cm

### Track caps

Cut 2 MDF pieces the same size as the transverse section of the tube as caps that can be fit into the tube.

In one cap perform a hole with a cup drill bit of the same diameter as the outlet of the blower machine (Image 1)



Image 1. Blower cap

### Track holder

Cut 2 pieces of MDF as in Fig. 2 in order to hold the track and attach to them two regulable legs.

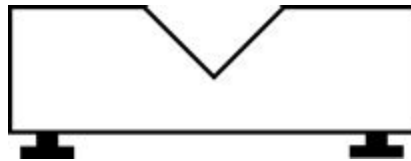


Fig. 2: track holder scheme.

### Carts

In order to build the carts, cut 2 L profiles of 3 cm from the 10 cm long piece of aluminium tube (Fig. 3).

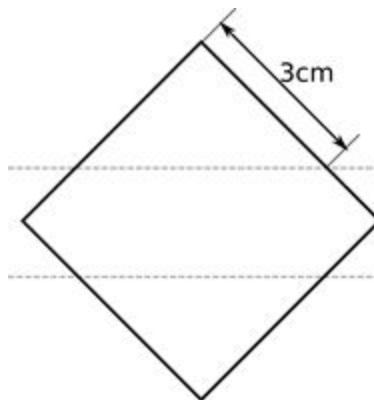


Fig. 3: transverse section of the 10 cm piece of aluminium tube

On top of the profiles glue with contact adhesive the 3D printed parts of the cart (3 parts of carro.scad) as in Image 2

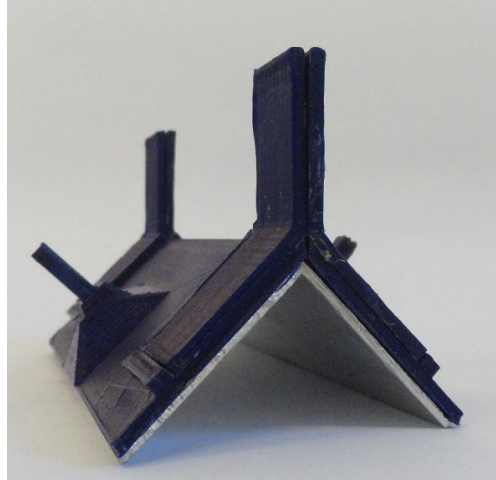


Image 2. Cart

### **Pulley**

The pulley (UGroovePulley.scad) has been design to hold an 8 mm diameter ball bearing (can be salvaged from in a PC or power supply cooler fan). The ball bearing must fit into the pulley and then must be placed into the pulley holder (soporte polea.scad) with the M3 screw as the axle. Then mount the pulley holder into the on the second MDF cap. Make sure that the pulley is just above the edge of the track (Image 3).

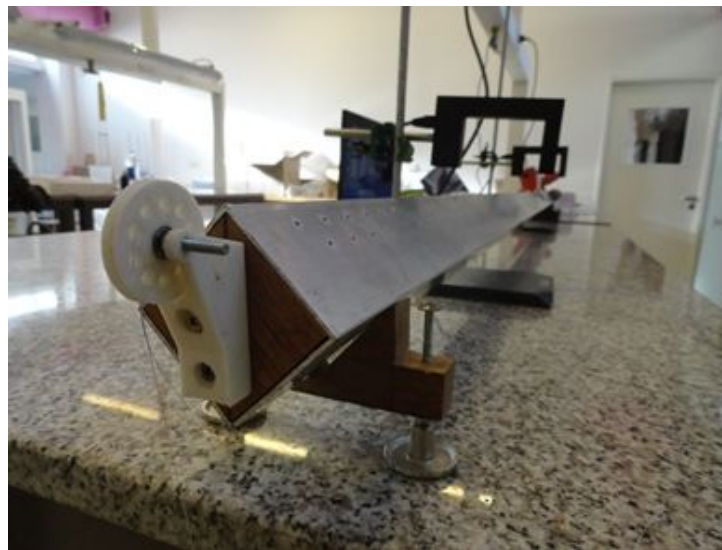


Image 3. Pulley cap

### **Datalogger and photogates**

This version of the air track is based on a local proprietary platform (INGKA <http://www.ingka.com.ar/>) to register the cart speed. This system can be replaced for another datalogger or photogate.