

## Introduction

Having managed to acquire an allergy to UVA and a photo-allergy to one of the constituents of most suncreams I need good protection against the sun. A helmet with a hinged visor made by Icaro looked good but proved susceptible to misting and distorted my vision significantly. A friend, Gordon Bishop, suggested I look at industrial protective visors which led to the system described below. Like any protective equipment it is a compromise between effectiveness and convenience. Nevertheless, it has enabled me to make flights of over five hours in the middle of Spain in summer. It is quite good but not perfect and I would welcome ideas to improve the system.

## Caution

It is known that some adhesives degrade the structure of some helmet shells. I have not investigated the possible effects of the adhesives found on self adhesive Velcro or Velcro like materials may have on any helmets. Any person constructing a visor similar to the one described must satisfy themselves regarding potential problems of degradation of the helmet by the adhesive or take the risk of using materials which are not researched. Similarly it cannot be guaranteed that such a visor will not degrade the performance of the helmet in other ways.

## Function

The lens is fixed to the helmet using Velcro. Two areas are arranged to form a hinges at the top which enable the visor to be opened to put glasses on. The areas at the sides can be opened in flight to allow extra ventilation, particularly important in damp conditons found near cloudbase. In an emergency the visor can be ripped off and jettisoned completely.



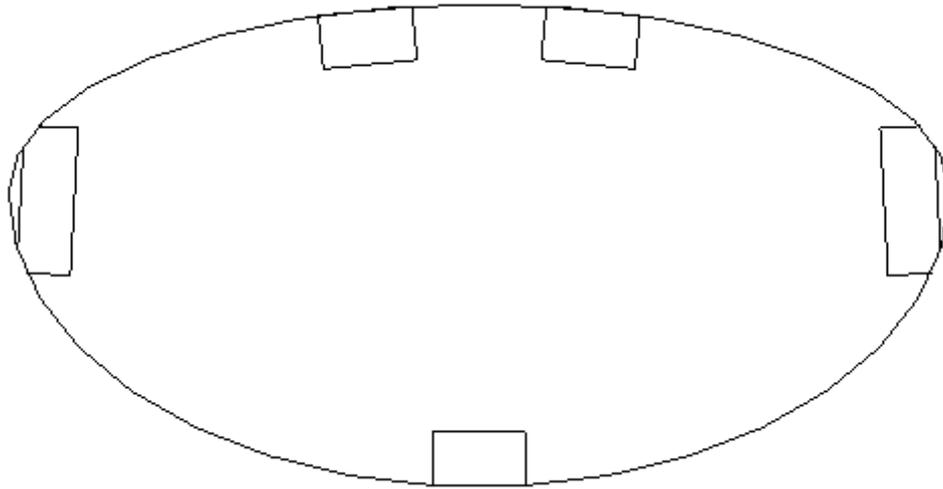
## Material

The visor is made from 1mm thick polycarbonate sheet. The most convenient source for a single visor is to buy a spare lens for an industrial visor from a supplier of protective clothing and cut the shape from that. Be sure to purchase polycarbonate and not acetate. Most polycarbonates will stop 95% of UV. A test Iles Optical kindly did for me on one of their standard lenses showed that it stopped 99.8% of wavelengths shorter than 380nm. If you are concerned about the exact specification your local optician should be able to arrange for a transmission spectrograph to be made using a sample of the material. Polycarbonate and protective lenses which are

specifically made to stop UV at wavelengths below 400nm are available but are more difficult to obtain.

### Shaping The Lens

The material should come with a protective plastic coating which should not be removed until necessary and can be cut with good quality scissors.



The polycarbonate is cut to overlap the aperture in the helmet by about 20 to 25mm and self adhesive Velcro 'loop' material attached in the locations shown after bending.

### Bending

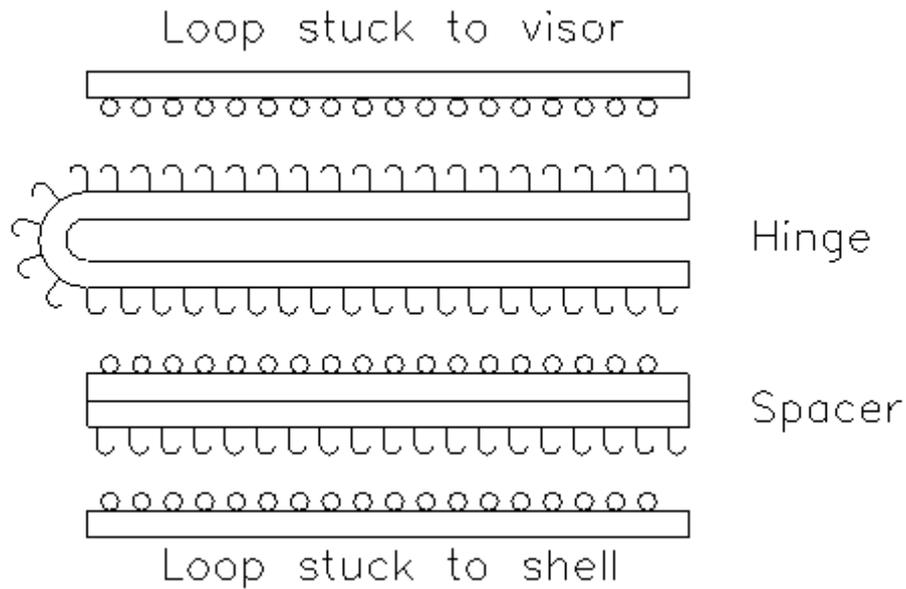
The lens can be made to fit the helmet without bending into a permanent curve but if one side is released for extra ventilation it is inclined to blow away if the head is turned to the opposite side. The aim is to bend the material so that when the Velcro side fixings are released there is a gap of about 45mm between the lens and the helmet each side.

I find the easiest way to bend the material is to make a fairly rigid ring about 125mm diameter from an old coat hanger. I then curl the lens inside the ring to make a sort of tube. This assembly is steamed for two minutes in a pressure cooker without the pressure unit fitted but with a trivet to keep the lens from coming in contact with the bottom of the vessel. Once cooled the lens should spring out to the correct radius.

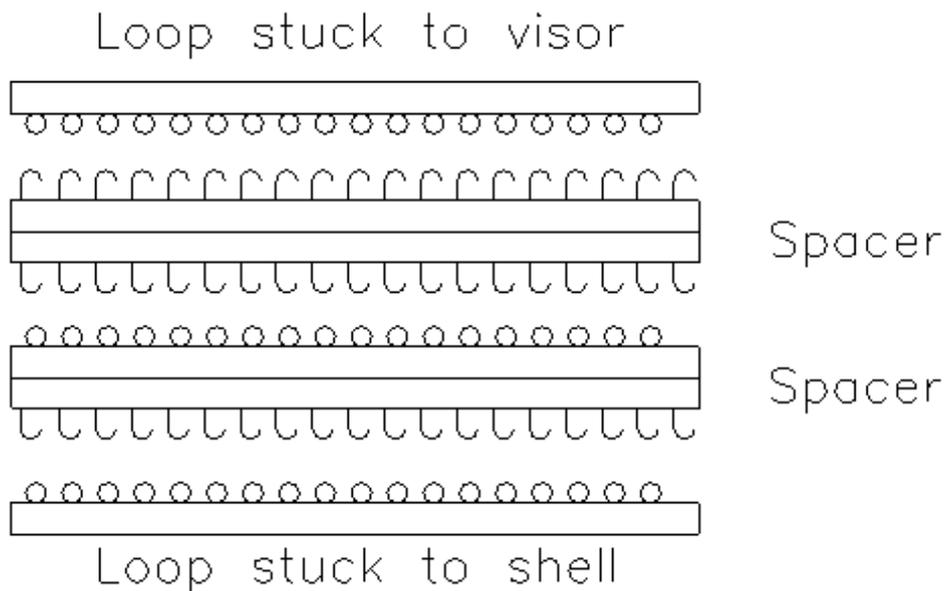
Some experiment may be necessary. I destroyed three lenses before finding a method which worked!

### Fixings

I have used the word 'Velcro' to describe the material used for fixings although similar materials are available under other trade names.



The two hinges at the top are made up as shown above with spacers made of loop and hook material stuck back to back. Such spacers may be stacked to give greater ventilation as shown below for the other fixings.



The side fixings need to be easily opened and closed in flight. This is achieved by using two spacers each side of smaller area 20mm by 15mm. A single ordinary paper staple in each of these smaller spacers stopped a tendency for the glue between the two pieces to become unstuck.

Additional to the fixings shown on the drawing a fixing is placed at the centre top of the lens between the "hinges". This consisted of a piece of Velcro 'hook' connecting 'loop' patches on the outer surface of the lens and the helmet shell.