Current Status of the Canopy

Design:

The canopy was designed based on the layout of the solar panels, the requirement that the driver be sitting almost completely upright. The design also remains as aerodynamic as possible while staying within these regulations.

Material:

The canopy will be made from Polycarbonate. We need to decide if we want tinted or clear - tinted is more expensive but provides some heat relief.

Company:

Shields - Premiere Windscreens, Shields and Canopies
www.racingshields.com

We have been working with the owner of the company, **Brad Shields**, on the canopy design. He is very supportive of our project and is willing to help us out by creating the canopy as inexpensive as possible. He requires a mold to work from, so we have created a mold from metal wiring and plaster gauze based off of our design. By creating this mold by ourselves, we saved $8,000! Once Brad receives our mold, he will be able to have the canopy made within a few weeks.

Price Quote:
$50 per square foot of material, $1200 total for tooling

Mailing Address:
1000 Industrial Drive Martinsville, IN 46151

Shipping of the Mold:

We have two quotes for shipping the mold to Shields. The first is from the Medford Square Mall UPS Store for packing materials, and the second is from Freight Center for the actual ground freight.

UPS Store - 781-396-2550
The quote was $65 for packing materials.
Freight Center - 1-800-716-7608
The quote was $218.68 for ground freight.

Hatch:

This is a picture of Purdue's solar car. Our car will have this style of hatch - the front of the canopy will swing forward, and the driver will exit to the side in between the two roll cage bars. The hatch materials will be attached to the rollcage, since this is the most sturdy part of the car. The hatch will close with a double sided latch (which is picked out from McMaster) so that both the driver and someone outside of the car will be able to detach the canopy.

When making the hatch, drilling and fastening to the canopy should not be a problem. These are the guidelines given to us by Shields:

source: http://www.racingshields.com/carefab/carefab.htm

***Trimming your* SHIELDS®**

Your polycarbonate **SHIELDS®** can be trimmed using a standard band saw or saber

saw with wood-type blades (fine metal cutting blades may cause the chips to melt behind the blade). Leave the protective masking in place or apply masking tape along the cutting path to avoid gouging.

Drilling your SHIELDS®

Your polycarbonate **SHIELDS®** can be drilled using a standard metal drill bit – without making any modifications. For 1/4" diameter bits (or less), 1800 rpm is recommended; for larger bits, use 1000 rpm. Avoid drilling too quickly reducing heat build-up and stress.

Using ADHESIVES to INSTALL

If you use windshield adhesive to install your **SHIELDS®**

- with or without the gasket –

the adhesive MUST be an **RTV SILICONE**.

Urethane based adhesives will not bond to the **SUPERCOAT™**

Using FASTENERS to INSTALL

If you are using fasteners requiring holes in your **SHIELDS®** windshield or window – slightly oversize your hole & add a small amount of RTV silicone or other grommet to absorb expansion & contraction energies. Countersinking and riveting *will* result in spider cracks around the hole.

TO DO:

Ship the mold to Shields - need to get Karen's approval for shipping materials' P.O.

Finalize the hatch design and pick out the remaining materials from the McMaster-Carr website.
Design the interface between the canopy and the shell.

Update Google Docs spreadsheet with company info

Archive of research that went into creating the canopy:

Many companies were contacted while trying to find a place to make the

canopy. We contacted the following two companies about material ideas:

Duraplex

> Duraplex offers superior impact strength for many applications including signage, displays, skylights, windows, doors and any interior or exterior application where durability is a requirement. It's an economical alternative to polycarbonate sheet providing superior weatherability and thermoforming capabilities. Available in thicknesses of .040" to 500", and widths up to 104". Impact blend percentages include 10, 15, 25, 35, 40, 50, 75 and 100, with custom blends available.
> http://www.plaskolite.com/duraplex.htm

Lexan

> Lexan polycarbonate is one of the most widely known "plastics". Lexan sheet with its unique combination of high impact strength, flame retardancy, and thermoformability makes it ideally suited for security applications. No other plastic can match Lexan's combination of light transmittance (clarity), and the ability to withstand extreme impact.
> http://www.polymerplastics.com/transparents_lexan.shtml
> Lexan found from Yale College:
> http://www.eng.yale.edu/TeamLux/TLProject_Web/appendixA.html

The following companies were contacted about manufacturing the canopy before we discovered Shields:

Airplane Plastics in Dayton, Ohio 937-669-2677 Hydromarine in Ontario, Canada Mac Plastics in Alberta, Canada 780-435-3761
FORM/TEC, the company that created the old canopy

All of these companies were EXTREMELY expensive. The price quoted for our design averaged $9,000 and no one was willing to help us by giving us a deal. Creating an abnormal shape like what we need and since we only wanted one made the tooling required extremely expensive. Finding a company willing to work with us proved to be a very difficult process, and we are lucky to have found Brad Shields and developed a relationship with him. He is working very closely with us to make sure that we make the most inexpensive canopy possible.