Shell EcoMarathon Prototype Car

Overview
Shell has presented the challenge to our team to create a new unique car-body made of composite materials that will increase fuel efficiency for the Shell Eco-Marathon car. Shell requires that the body is an enclosed canopy or no open wheels or mirrors. Lastly, Shell requires the team to provide cooling for the battery compartment.

Objectives
Our team created a new airplane-inspired car-body made up of two layers of carbon fibre using the Vacuum Assisted Resin Transport Method. The car-body provided an enclosed canopy for the wheels and mirrors and allowed for an increase in fuel efficiency for the Lithium-Ion battery.

Approach
- The team gathered customer needs by contacting our Shell sponsors for their requirements along with following the Shell EcoMarathon Prototype Rules.
- The customer needs were weighted with a hierarchy process matrix.
- Each member created their own unique body design through inspiration from previous cars and patented designs.
- Each design was created as a CAD model and tested for the lowest drag coefficient using Computational Fluid Dynamics analysis.
- Our chosen design was a combination of two concepts generated after CFD testing.
- A scaled down prototype was created to generate an idea of the dimensions of the body.
- The mirrors were tested to make sure the driver was able to see the cones positioned behind the car.
- CFD analysis and manual calculations were used to validate the decrease in drag coefficient for the new design.

Outcomes
- The sponsor will save $748.47 as a result of this project.
- Manufacturing/production times were reduced by 200 hours as a result of this project.
- The project reduced set up time, assembly time, tool wear, etc.
- The project resulted in a unique car-body design that enclosed the mirrors and wheels while increasing fuel efficiency.