

Goal

Cruiser Class Solar Car - 2019 World Solar Challenge



- Designed for practicality
- Seat 2 or more people
 - 6m² silicon solar array
 - 60kg Li-ion battery
 - Judged on external energy use, time taken to complete the course, payload carried, and practicality
 - Allowed to be recharged once

Solar Races

American Solar Challenge (ASC) World Solar Challenge (WSC)

- 1200-1800 mile road race across America
- One seater solar car
- Qualifying race : track race



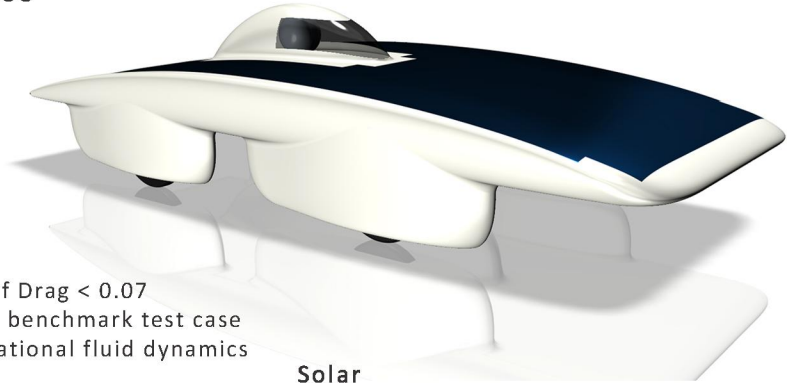
- 3000km road race across Australia
- One seater (Challenger Class) solar car, multiple seater (Cruiser Class) solar car, etc

Interim Goals

Challenger Class Solar Car - 2016 ASC, 2017 WSC, 2018 ASC



- Designed for efficiency
- One seater.
 - 6m² silicon solar array
 - 20kg Li-ion battery
 - First team to complete the course wins
 - Stepping stone to our ultimate goal



Aerodynamics

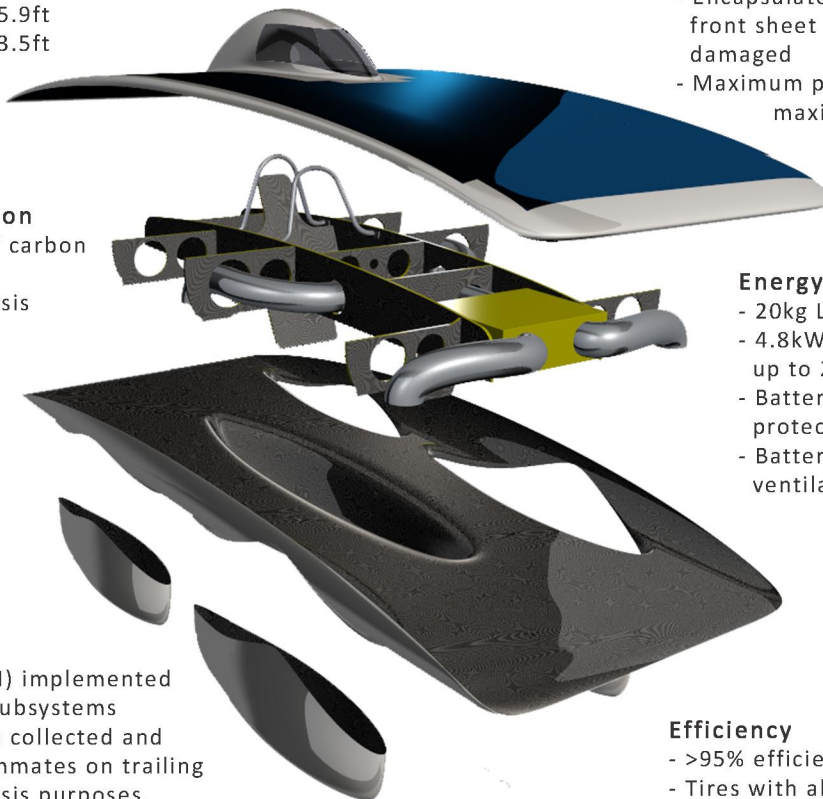
- Target Coefficient of Drag < 0.07
- Use Ahmed body as benchmark test case
- Performing computational fluid dynamics on OpenFOAM
- Iterations for optimization

Solar

- Divided into 4 subarrays
- 6 m², 1.36kW, 391 Mono-Si Solar Cells
- Encapsulated with low optical absorption front sheet to protect the cells from being damaged
- Maximum power point tracker (MPPT) to maximise power input

Dimensions

Frontal Area	: 0.9m ²	9.7ft ²
Length	: 4.5m	14.8ft
Width	: 1.8m	5.9ft
Height	: 1.1m	3.5ft
Target Weight	: 375lbs	



Lightweight body construction

- Top and bottom shell made of carbon fiber with honeycomb core
- Carbon fiber monocoque chassis
- Metal rollcage for driver protection
- Material testing & finite element analysis (FEA)

Energy Storage

- 20kg Lithium ion batteries
- 4.8kWh energy storage, can travel up to 200km
- Battery management system to protect and monitor the batteries
- Batteries are contained in a ventilated box.

Communication

- Controller Area Network (CAN) implemented for communication between subsystems
- Data from various subsystems collected and wirelessly transmitted to teammates on trailing vehicles for monitoring, analysis purposes.
- Race strategy formulated based on data collected, weather forecast, and road conditions ahead.

Efficiency

- >95% efficiency wheel hub motor
- Tires with almost 1/10 the rolling resistance of normal car tires

Our Current Challenger Class Car