

## Project Title: **Thermal Management & Battery Box Design**

Supervisor: **TBC**

### Project details:

The desired outcome for this project is twofold:

#### Thermal Management

Operating a solar vehicle in 40°C heat in the Australian Outback is a unique challenge. Many components of the car are heat-sensitive, including the driver, batteries and solar cells. This project involves creating a list of heat sources for the solar car, along with airflow requirements for maintaining acceptable operating temperatures and the design for the internal airflow of the car. There will be a strong focus on thermal management of the battery pack, solar array and occupant cooling. The project will likely involve conducting experiments and performing heat transfer calculations to guide design decisions. The size and positions of vents and ducting will need to be considered to minimise impact on aerodynamic performance, whilst achieving thermal management targets.

#### Battery Box Design

A CAD model of a battery box which is safe and manufacturable must be designed. The enclosure which the battery pack sits in contains high-voltage (HV) electrochemical cells and circuitry. This needs to be designed to survive a significant impact in the event of a crash and needs to be contained in a fire-proof housing. The battery box design must meet the cooling requirements of the electrochemical cells.

In addition to the electrochemical cells, there will be many electrical components which need to be housed in the battery box. The optimum placement of constituent parts in the battery box, along with wiring routes (including high voltage and noise-sensitive data lines) will need to be considered.

During the project you will need to fully document all design decisions and schematics, to ensure a traceable route for other team members to follow.

**Closely linked projects:** “Chassis Structure”, and “Electronic Hardware & Solar Arrays”

### Desired Skills and Experience:

*Note: These are not essential (unless listed in **bold**) and those who receive roles will be offered training to compensate for any gaps.*

- **Proficiency in CAD, particularly SolidWorks**
- **Decent grasp of physics of heat transfer**
- Experience in designing for manufacture
- Good communicator of ideas
- Willing team player
- Prior interest/experience with solar cars/CUER
- Flexible and able to work to tight deadlines