The University of New South Wales' Solar Racing Team and their solar car after crossing the finish line in Sydney; back row (l-r) Ryan McCarthy, Andrew Pratley; middle row (l-r) Arthur Collins, Jarryd Beck, Konrad Zurcher, Andrew Wrigley, Georges Chehade, Simon Li; front row (l-r) Yael Augarten, Anton Grimes, Niranda Wright. PHOTO: JUSTIN LIEW

Solar car breaks record

by Justin Liew

Last month, the University of New South Wales' Solar Racing Team set a new record for travelling across Australia in a solar-powered car. The Jaycar Sunswift III travelled from Perth to Sydney in five and a half days, breaking the previous record of eight and a half days which was set by the Aurora team of Melbourne in 1994. The car travelled at an average speed of 70km/h over the course of the journey.

The team consisted of nine students from the university's engineering, science and industrial design departments and two university staff.

The car used a 2.2KW-2.3KW solar array with a total area of 12m^2. The energy was stored in batteries which powered an electric motor in the driving wheel. It is an improved model of the one used in the 2005 World Solar Challenge with a more efficient solar array and improved mechanical and electrical systems. According to Andrew Pratley, academic supervisor for the journey, further refinements are planned for the Darwin-Adelaide World Solar Challenge this year, including an improved telemetry system which will provide more data to the car's support vehicle.

The lithium ion battery pack will also be exchanged for a lithium polymer version.

In designing the car, the team used World Solar Challenge regulations as a guide and worked on reducing weight and aerodynamic drag. One of its features is a regenerative braking system which operates when the vehicle brakes. This energy is fed back into the batteries and stored. This is a system commonly used by hybrid vehicles, including the Toyota Prius.

"This is a demonstration of what the technology can do and how solar power can be used with land transport. Parts of the vehicle such as the telemetry systems, could be commercialised," Pratley said.

During the race, students took turns driving the car which was steered by shifting levers on either side of the seat to move the wheels. Foot pedals activated two independent sets of disc brakes on the front wheels. A device similar to a potentiometer on the right-hand lever controlled the car's speed. A button on the left-hand lever toggled a CB radio that allowed the driver to talk to the support vehicle, which drove behind the solar car. Data transmitted from the solar car such as speed, battery charge, how much sunlight was being converted and the temperature of the wheel motor was sent to laptop computers in the support vehicle. Team members then used the data to form strategic decisions like how fast the car should go to optimise the battery life.

"For example, in this race we travelled at 70km/h for 13 hours a day, literally from sunrise to sunset. We could have travelled at 100km/h but this would have drained the batteries quicker and taken longer," Pratley said.