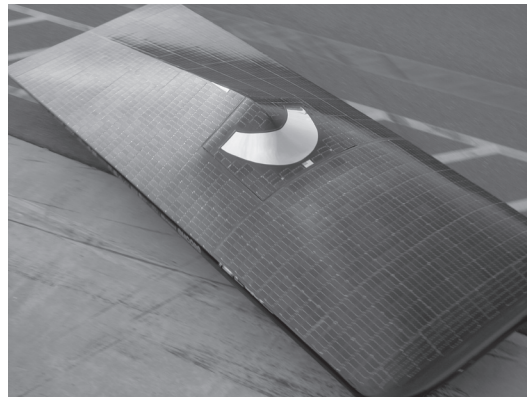


MIT Solar Electric Vehicle Team

Alexander Hayman

Over the past twenty years, the MIT Solar Electric Vehicle Team (SEVT) has designed and built ten cars and raced them all over the world. Tesseract, the most recent car, raced in the 2003 World Solar Challenge in Australia, setting a record for the fastest average speed by an American vehicle at 57 mph and earning third place. In 2005, after making improvements to Tesseract, we placed third in the American Solar Challenge and finished sixth in the World Solar Challenge after recovering from a serious accident only one day before the race.

Tesseract is technologically advanced across numerous science and engineering fields. Its 5 kWhr battery pack has 640 lithium-ion cells, achieving new heights in energy and power density. The array is made up of 2732 space-grade solar cells, each of which has three different layers of semiconductor material that absorb different wavelengths of light and allow efficiencies of around 26%. The vehicle is powered by a 94% efficient 6 hp hub motor, and is equipped with low rolling resistance Michelin tires on lightweight carbon-fiber wheels. The vehicle can maintain speeds in excess of 60 mph off of the array's peak power output of 1800W, demonstrating excellent aerodynamic performance.



Indeed, a solar car race is one of the most exciting events in the world. The vehicles are true engineering marvels and the designers and builders gain priceless experience. However solar car design has drastically converged over the past decade. The vehicles are virtually indistinguishable and there has been little innovation. This same convergence in design has occurred with human-powered vehicles, small recumbent bicycles with bullet-shaped shells that are able to reach speeds up to 80 mph.

This is Tesseract a few days before the 2005 World Solar Challenge. The shell is designed to maximize the number of solar cells on the car while also minimizing aerodynamic drag. The day before the race, the car had a serious accident and much of the array was damaged. Despite this setback, they managed to place 6th in a field of around 20 competitors.

Yet, the fusion of these two technologies has not seen much exploration, and we see a great opportunity for innovation. We have refined the vision of our next generation vehicle and have already commenced testing of a prototype for a two-wheeled solar, electric, and human hybrid. Our inspiration comes from a Swiss "cabin-motorcycle" manufacturer named Peraves, from the high schoolers who build and race solar bikes, and, of course, from Tesseract. Our goal is to create a vehicle that has similar performance to a solar car, but is much more practical.

We have set our goals beyond simply building vehicles and winning races. SEVT has a long history of promoting alternative energy and transportation at local conferences, festivals, fairs, and other community events. We have especially focused on chances to interact with school children and to communicate the joys and rewards of engineering to the next generation of innovators.

SEVT's existence has been made possible through the support of MIT, Infinesse, Ford, and numerous other sponsors. The team is comprised of students from a wide variety of majors, including aeronautics and astronautics, electrical, and mechanical engineering. There are currently a dozen undergrads and several alumni involved with our new project, and we hope to expand further. For more information, please visit <http://www.mitsolar.com>.

