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Solar Car Club Looks to Future

By Ven G. Ipe

The Solar Electric Vehicle Club has been successful in past efforts to build solar-powered race cars. Now it is using its experience for more practical purposes.

"Aztec is an electric, two-seat commuter car. It will be a three-wheeler with a double-wheelbase suspension. It will weigh approximately 800 pounds, which is a lot less than commercial electric cars like General Motors' Impact," said Joe A. Tamai '93, a club member.

Many components of Aztec, the club's entry into the Tour de Sol racing competition later this spring, are being in various stages of completion in a workshop in Building 20. Within three weeks Aztec will be completed and put through initial driving tests in a car convention, Tamai said.

"During the race, Aztec should have a top speed of 65 miles per hour and a cruising speed of between 45 and 55 miles per hour," Tamai said.

The major parts of Aztec are a Kevlar-fiberglass body shell which is almost done, a chromium-molybdenum frame, a $10,000 DC brushless motor, a drive train, a high energy density battery, probably lead-acid, and the electronics which is the hub of Aztec, Tamai said.

Actually the battery is probably the most important part of an electric car, but we don't do any battery research. So the electronics is the most important as far as the work our club does is concerned," he added.

"The electronics is a motor controller which optimally transmits the power from the battery source to the electric motor. It was designed by Gil Pratt when he was a grad student here at MIT. Any electric car worth driving has a motor controller. Ours is one of the best in the world," Tamai said.

Erik P. Blasch '92, another member of the club, said, "This motor controller is the first to include a regenerating brake device. During braking, the motor controller tells the motor to turn into a generator, so that instead of feeding energy into the braking, the motor generates power from the inertia of the braking car."

The 45-pound carbon fiber body shell of Aztec was optimally designed from aerodynamics programs. Its coefficient of drag is about 0.12; a normal road car has a drag coefficient of about 0.35, Tamai said.

"We have a good chance of winning the Tour de Sol commuter car race because Aztec is so light. Most colleges are entering the solar car race because Aztec is so light. Many components of Aztec, the club's entry into the Tour de Sol racing competition later this spring, are being in various stages of completion in a workshop in Building 20. Within three weeks Aztec will be completed and put through initial driving tests in a car convention, Tamai said.

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"We have a good chance of winning the Tour de Sol commuter car race because Aztec is so light. Most colleges are entering the solar car race, so our competition will be from companies, especially Sectronics, which was founded by a former MIT student," Tamai said.

"The body shell of Aztec took about 100 man-hours to make. First the design was translated into 85 separate sections of styrofoam plugs. Then, similar to assembling the different sections of an integral, these 85 parts were glued together to give a rough shape of the model. A mold was made of this and sand-ow down to the shape of the final shell. Kevlar and fiberglass sheets were then put into the mold, after heat treatment, the fiber shell was popped out of the mold," Blasch said.

"This club and contests like Tour de Sol give students a great opportunity to use what they learned in the classroom in real-world situations. This is a real-world project: We go to Athens to use software packages, we weld and machine parts, we deal with finding the real company would. Also, the electri
car is a current engineering problem that needs to be solved soon. The club is a part of this," Tamai said.

Recent California legislation mandates that 2 percent of all cars sold there have to use alternative fuels such as methane or electricity by the end of the decade. The perfor-mance and driving range of gasoline-driven cars remains superior to that of commercial electric cars.

But that makes the research even more important. "Electric cars have a huge future," Tamai said.

The club entered second last year in both the Tour de Sol and Arizona races. This is the first time the club will place an entry in the elec-tric commuter car division.

"Aztec is fun. It's a worthwhile cause. Rather than learning only theory or applying what we learn," said David A. Hampton '92, one of the club's captains.