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Solar Car Shines in National Competition [1]

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The University of Texas at Austin Solar Vehicles Team [2] camped, pulled all-nighters and ran into some unique mechanical issues on their seven-day, solar-powered road trip adventure. Unlike other road warriors, these travelers spent the previous four years building their solar car together. And for the first time in 15 years, a UT car completed the 1,100 mile American Solar Challenge [3] cross-country race.

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?Our car was 100 percent built by the students,? says faculty advisor Dr. Gary Hallock, of the UT Austin Solar Vehicles Team. ?It was very apparent that some of the other teams had professional involvement. Nevertheless, our telemetry and data system was the envy of other teams.?

The sun-soaked trip required the full gamut of engineering expertise--aerospace, chemical, electrical, mechanical, software and solar engineering--not to mention overcoming sleep and food deprivation. Through class projects, more than 50 undergraduate students per year worked on the solar car, which helped the nucleus team of about 25 students who worked year-round in the official student organization [2]. This core group mastered the marathon motivated by engineering alumni cheerleaders, an unflappable faculty advisor and the gratification of seeing their engineered product at work.

Named the Samsung Solarean, in recognition of their largest sponsor [5], the car was powered by Sunpower A-300 monocrystalline solar cells that generated 800 watts of electricity. That energy was used on demand to run the 600-pound futuristic-looking vehicle, or stored in batteries. The car?s carbon fiber body was covered by 393 solar cells and the solar-generated electricity stored in 506 lithium-ion batteries (LG Chemical type 18650) that helped power its in-wheel electric motor.

?The most valuable thing I've learned from working on this project is that no matter how detailed your plans, there is always something you didn't think of, and you should always be prepared for on-the-spot improvisation,? says Benton Greene, a senior in aerospace engineering and the team?s mechanical engineering leader. ?You can't learn that in the classroom, not even in laboratory classes, because there someone has already solved the problem and there is a straightforward solution that the professor is trying to lead you to. Not so in a project like the solar car; every new problem has an infinite number of solutions and no

single one of them is necessarily the ?right? answer, though some are better than others, and it is the job of the engineer to discover that better solution.?

Engineering challenges were plentiful of course, but harnessing the elements was a small part of the learning experience, say all who participated. The intangibles provided indispensable lessons: communication skills for a large team, persistence to meet rigid deadlines and resourcefulness to keep the machine performing on the road.

?The race was a test of real-time problem solving,? says Hallock, an electrical engineering professor. ?Things break, time is very limited, and we have only the tools and diagnostic equipment we bring along. Good decisions have to be made under pressure and with limited information. Modifications to the car, or for example, keeping the batteries a few degrees cooler on a very hot track, requires lots of innovation.?

Electrical Engineering Graduate Student Fred Engelkemeir, another member of the core solar vehicles team, echoed Hallock?s observations. ?One thing that I learned that I couldn't have learned in a classroom was, as for most of us, how to debug and come up with a solution to problems rapidly with limited resources in assorted places. We also learned how to talk with the public and the media, as well as how to live and sleep in very bizarre conditions.?

This year?s biennial race pitted 17 university teams against each other and 13 completed the course. The inventive Texas team prevailed despite overheating problems, brake issues and a bumpy railroad crossing that sent the car airborne. The latter broke a wire and separated all but four battery cells from the circuit board and created a software glitch. Despite the eventful ride, they reached the finish line an hour ahead of Illinois State.

Jerome Powell, B.S.E.E. '08 who spent all of his student years at UT working on the solar car, now serves as a test engineer at Lockheed Martin. In his new role as a mentor to the team, he could appreciate all of the important, career-building skills at work.

"They learned that engineering is not just about writing code or solving equations but that it involves working with people with different personalities and points of view," Powell said. "The students had to reach out to various companies to secure funding or donations. They learned how to work with venders and manufacturers even some on the other side of the world. Furthermore, they learned how to present themselves in front of the public during outreach events. Working on a solar car provides students with real life experiences that they would never receive in a normal class setting."

Related Faculty:

Gary Hallock [6]

Related Research Areas:

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