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Designing and Implementing Solutions With Global Positioning Technologies

Sky-Tech Cruisers

Tracking devices trailed 20 solar-powered cars racing 2,500 miles across North America, as fans around the globe accessed online maps with live position and performance updates.

Marty Whitford

Tired of stratospheric gas prices? You're not alone. In the United States, regular unleaded gas prices have risen more than 65 percent since January 2004, to an average of more than $2.60 per gallon. The Department of Transportation estimates typical annual vehicle consumption of 715 gallons, or more than $300 per month for the average American two-car household.

While solar cars are just beginning to etch an answer to this compelling need, the technology has captured a strong following, as demonstrated by the July 17–27 North American Solar Challenge (NASC). Twenty qualifying cars tried to weave their 2,500-mile way from Austin, Texas to Calgary, Alberta, Canada, with 14 finishers, all "sky-tech" — powered by solar panels and GPS-tracked in real time.

"We had heard about these tracking systems going into the cars nine months before the race, but we didn't get to see one firsthand to gauge its size and shape until the preliminary qualifier in Topeka, Kansas, and we didn't receive one for mounting until just a few hours before the race started," said Rashaad Sadek, project manager for the University of Calgary's NASC team.

Race teams quickly found room for the 6 × 4 ×1 -inch, 13-ounce battery-powered GPS tracking devices with GSM radios.

"Luckily, it was a self-contained, plug-and-play device, so we really just had to make sure our antenna was mounted with a clear view of the sky," Sadek added. "We didn't have any issues picking up GPS signals because where there's sun, there's sky and usually a clear line of sight to the satellites.

"GPS kept us on track through many interchanges on secondary highways, and gave us constant intelligence on our competition's every move," he added. "In most cases, the systems were accurate to within a few meters, and online mapping reflected this in near real-time."

Traffic Jam. System designers originally planned on the devices enabling a small number of people, such as dispatchers, to track a large number of fleet vehicles or mobile assets. In the case of the NASC, however, legions of solar car fans around the world clogged the event's web site with heavy traffic from opening day. Organizers established a second server solely to host the mapping pages, expediting site access and navigation. More than 70 percent of the site's visitors during the 10-day race surfed the live GPS-enabled race maps.

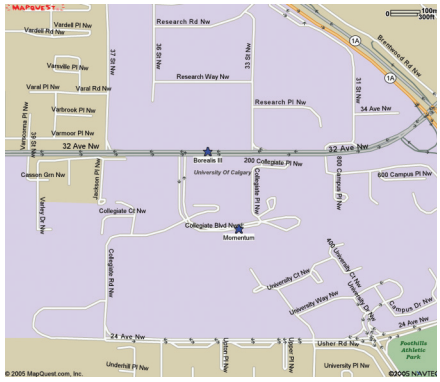
Race Strategy. "We were one of the most GPS-savvy schools in the race because we have our own geomatics department," Sadek stated. "We collected geodetic data on the course prior to the race. We ran the course with our chase car, using its on-board GPS receiver to help map the terrain so we could optimize navigation, speed, energy storage, and consumption at every turn.

"Friends called us on our cell phones in our chase vehicle, warning us of other teams' movements of and remarking on our most-recent moves," he said. "Being trailed online by GPS data cut both ways, because the information improved our competitive intelligence, but sometimes it was a little too much — particularly when some folks called to second-guess our strategy."

Manufacturers

CSI Wireless Inc. of Calgary, Alberta, Canada, loaned each NASC entry an *Asset-Link 410* GPS/GSM tracking system e bedding **SiRF Technology**'s, *SiRFstarIIe/LP* GPS chipset. The University of Calgary's NASC chase car carried a *FlexPak-G2L* GPS receiver from **NovAtel Inc.** of for geodetic mapping.

MARTY WHITFORD is Managing Editor of *GPS World*.



▲ **RACE WEBSITE** shows *Momentum* crossing the finish line (bottom star).

Photos and screenshot are courtesy of the North American Solar Challenge

▲ ***MOMENTUM'S*** winning moment, after an overall average speed of 46.2 miles per hour.

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