Weather Data Vital for Solar-Powered Vehicle Race

"One of the most important resources for our race strategy is real-time weather data."

- Spencer Berglund, Electrical Technical Advisor

When the University of Minnesota Solar Vehicle Project (UMNSVP) team was looking for a weather station to compete in the 2017 Bridgestone World Solar Challenge, they contacted Columbia Weather Systems.

"One of the most important resources for our race strategy is real-time weather data," said Electrical Technical Advisor Spencer Berglund.

Founded in 1990, UMNSVP is a student-administered, designed, and built project that teaches members about engineering and management in a complete product development environment.

The diverse design and construction challenges help further the school's mission to "create the best engineers possible." Over the years they have built 13 solar cars, competing in over 30 racing events across three continents. A new car is designed and built every two years.

The Challenge

The biennial Bridgestone World Solar Challenge event challenges university teams from around the world to engineer, build, and race a vehicle that is powered by the sun. In preparing for the 2017 race, Berglund said, "Our lack of accurate weather data is a large limiting factor in maximizing our race performance."

The Solution

A Magellan MX500™ Weather Station was mounted on a support vehicle providing met data to help optimize power for the new solar-powered,

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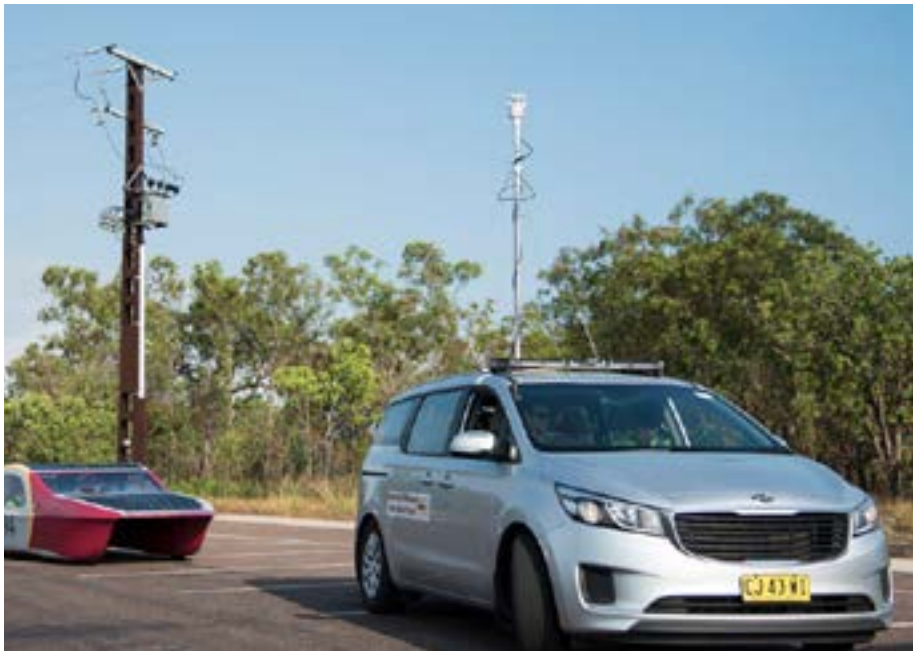
The Magellan MX500™ Weather Station features ultrasonic wind speed and direction, pressure, temperature, relative humidity, compass, and GPS.

Cruiser-Class car dubbed "Eos II." Besides speed, Cruiser-Class vehicles focus on practicality and number of people in the car.

Gearing up for the race, Berglund related, "We've been test driving a lot for the past few days and have been using your weather station for gathering accurate power to drive data for our car. We will also be using it every day on the race." Eos II was one of only five Cruiser-Class cars to drive the entire course across the Australian outback on its own power.



The all-in-one sensor head mounted on the support vehicle provided vital information throughout the 1,800-mile journey.

Weather Data Shapes Race Strategy

Berglund noted key strategy reasons for weather monitoring, "Firstly we used the wind speed/direction data to adjust our predicted power to drive and confirm that the solar car was consuming power at the expected rate as indicated by our car's telemetry system. It is very important to monitor this to make sure we catch any small issues with the car that could increase our power to drive, like low tire pressure, brake rubbing, motor controller de-calibration, etc."

"Secondly," he added, "We used wind and pyranometer data to characterize the accuracy of our online weather data source, which will be very useful for future races. This race in particular was valuable for this reason. Because of the variety of cloud cover and wind patterns, we learned a lot about how to correlate cloud cover information to expected solar irradiance."

Finally, he added, "The integrated GPS was used for navigation, wind speed/direction measurement compensation, and we actually used it to calibrate the solar car's speedometer as well!"

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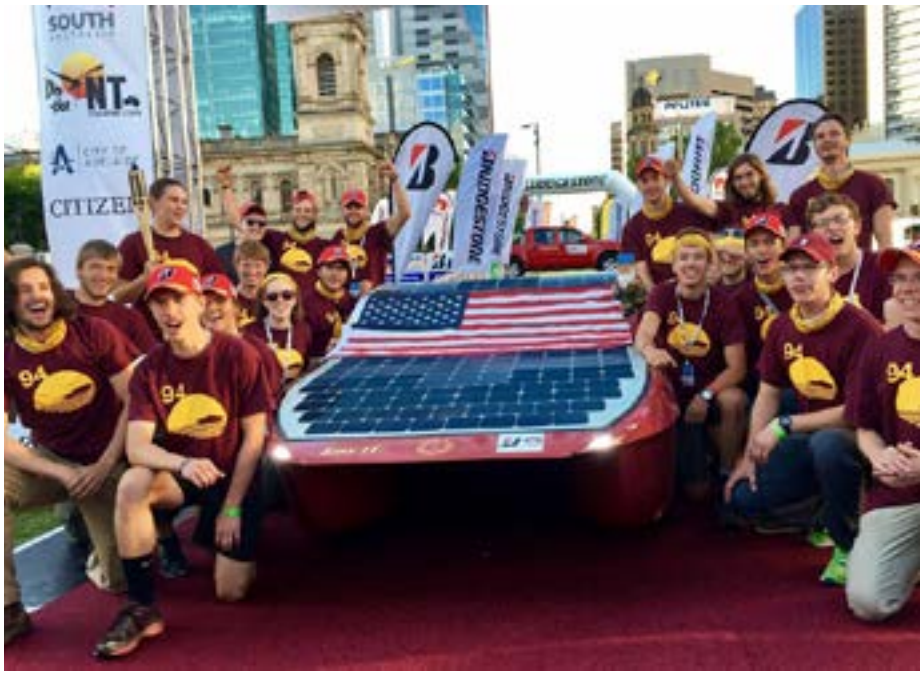
The team plans to race the Eos II at the 2018 American Solar Challenge.



The University of Minnesota Solar Vehicle Team with the Eos II at the finish line in Adelaide, Australia.

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